Give to the Max and you will be matched!

From:	Fresh Energy <info@fresh-energy.org>
To:	Alexandra <aklass@umn.edu>
Sent:	November 8, 2018 1:14:06 PM CST
Received:	November 8, 2018 1:14:30 PM CST

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Give to the Max Day is next Thursday, November 15th.

Mark your calendar or schedule your gift to Fresh Energy today!

Dear Alexandra,

Fresh Energy is excited to kick off our end of year giving by participating in Give to the Max Day one week from today, and we hope you will join us by making your online donation at GiveMN.org.

For more than 25 years, Fresh Energy has worked to shape and drive policies that have moved Minnesota toward clean energy and away from coal and other fossil

fuels that cause climate change pollution. Supporters like you have helped to make this all possible.

But there is still so much to do. Fresh Energy is laser focused on securing policies that will create real change at scale. Using sound data-driven analysis, strong economics, and top-quality legal expertise, Fresh Energy is shaping a healthier future for Minnesota with:

- **More renewable electricity** through new state laws and regulatory decisions that move Minnesota away from coal and toward more wind and solar to power our economy.
- **Equitable energy efficiency** with an improved state Conservation Improvement Program and a building code that saves money, cuts waste, and improves access to efficiency for people of all incomes.
- **A modern, flexible electric grid** that will support big increases in renewables and new "smart" technologies to reduce peak demand and provide low-cost electricity when it is needed most.
- **Zero-emission transportation** with Metro Transit electrifying more of its buses, cities moving to electric car fleets, and more Minnesotans trading their polluting gasoline cars for plug-in electric vehicles.

When you support Fresh Energy, you help create lasting improvements in our clean energy economy.

Please schedule your donation now or mark your calendar to support Fresh Energy on Give to the Max Day one week from today: Thursday, November 15.

Thank you for your support!

Sincerely,

Michael Noble
Executive Director

P.S. The Lang Family Foundation will match all new and increased gifts, dollar for dollar! Please click HERE to give today, and thank you for supporting Fresh Energy on Give to the Max Day.

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Saint Paul, MN 55102

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Fwd: From Climatewire -- EMISSIONS: Colo. formally adopts tougher car rules

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>, Kathryn Hoffman <khoffman@mncenter.org>, Ellen Anderson <ellena@umn.edu>
Sent: November 19, 2018 6:57:07 AM CST

This should be one of the state's first priorities in the new administration.

Alex

Alexandra B. Klass
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Minneapolis, MN 55455
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---------- Forwarded message ---------
From: **aklass** <email_this@eenews.net>
Date: Mon, Nov 19, 2018 at 6:54 AM
Subject: From Climatewire -- EMISSIONS: Colo. formally adopts tougher car rules
To: <aklass@umn.edu>

This Climatewire story was sent to you by: aklass@umn.edu

AN E&E NEWS PUBLICATION

EMISSIONS
Colo. formally adopts tougher car rules

Maxine Joselow, E&E News reporter
Published: Monday, November 19, 2018

In a pointed rebuke to President Trump, Colorado will officially become the 14th state to adopt California's tougher clean car rules.

The Colorado Air Quality Control Commission voted unanimously Friday to adopt the more stringent greenhouse gas emission standards for light-duty vehicles. The 8-0 vote comes as the Trump administration moves to significantly weaken federal standards.

"While the Trump administration is undermining public health, Colorado is stepping in to protect it by ensuring our cars are the cleanest in the nation," Noah Long, an attorney with the Natural Resources Defense Council, said in a statement.

Local green groups were elated Friday on learning of the decision, which came after the commission

heard testimony from a spate of consumer advocates, public health agencies, cities and counties.

"This is a big win for Colorado. This is a big win for our country," said Danny Katz, director of the Colorado Public Interest Research Group.

Garrett Garner-Wells, director of Environment Colorado, said in a statement that Coloradans had sent a "clear message" that "the cars we drive shouldn't hurt the people and places we love."

"We applaud the AQCC for listening to the thousands of voices from throughout our state who want cleaner air and climate action by voting to implement low emission vehicle standards," Garner-Wells said.

The vote makes Colorado the 14th state to adopt California's tougher car rules — and the only one to do so after the Trump administration unveiled its proposed rollback in August.

Colorado's opposition to Trump is underscored by its status as a traditionally purple state. It was considered a battleground state in the 2016 presidential election; Democrat Hillary Clinton beat Trump by 5 percentage points there.

Katz said he hopes other states follow Colorado's lead. A handful of swing states where Democrats wrested control of governors' mansions from Republicans — including Illinois, New Mexico and Michigan — are prime candidates (***Climatewire***, Nov. 6).

"This isn't something that would just benefit Colorado; it's something that every state should do," Katz said. "Pollution knows no boundaries. We hope that every state will take notice and follow us."

Friday's vote focused only on whether to adopt California's Low Emission Vehicle (LEV) program. The commission punted until next month a decision on whether to adopt the separate but related Zero Emission Vehicle (ZEV) program.

A June executive order from Democratic Gov. John Hickenlooper set last week's vote in motion (***Climatewire***, June 19). Hickenlooper is set to retire in January, when he'll be replaced by Gov.-elect Jared Polis (D), who campaigned on a promise of 100 percent renewable energy and has the strong backing of environmental groups.

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Climatewire is written and produced by the staff of E&E News. It is designed to provide comprehensive, daily coverage of all aspects of climate change issues. From international agreements on carbon emissions to alternative energy technologies to state and federal GHG programs, Climatewire plugs readers into the information they need to stay abreast of this sprawling, complex issue.

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Big idea! Need your reaction (and hopefully enthusiasm)

From:	Michael Noble <Noble@fresh-energy.org>
To:	Alexandra Klass <aklass@umn.edu>
Sent:	November 30, 2018 8:03:46 AM CST
Received:	November 30, 2018 8:03:52 AM CST

_____ until 10 and then noon to 2.

Alternatively, are you goong to Leigh Currie's Perry at 4? We could meet at 3:40

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

Re: Big idea! Need your reaction (and hopefully enthusiasm)

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: November 30, 2018 8:40:59 AM CST
Received: November 30, 2018 8:41:00 AM CST

[redacted] Do you need a reaction today or can I call over the weekend or Monday?

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155
Bio: https://www.law.umn.edu/facultyprofiles/klassa.html

On Nov 30, 2018, at 7:03 AM, Michael Noble <Noble@fresh-energy.org> wrote:

> [redacted] until 10 and then noon to 2.
> Alternatively, are you goong to Leigh Currie's Perry at 4? We could meet at 3:40
> Michael Noble
> Executive Director
> Fresh Energy
> Direct: 651 726-7563
> Mobile: 612 963-1268
> Web: Www.fresh-energy.org
> Twitter: @NobleIdeas

Re: Big idea! Need your reaction (and hopefully enthusiasm)

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: November 30, 2018 8:57:38 AM CST
Received: November 30, 2018 8:57:39 AM CST

Great! Can we talk at 10 am or 3 pm?

Alex

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Distinguished McKnight University Professor
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On Nov 30, 2018, at 7:41 AM, Michael Noble <Noble@fresh-energy.org> wrote:

> Monday is fine!
> Michael Noble
> Executive Director
> Fresh Energy
> Direct: 651 726-7563
> Mobile: 612 963-1268
> Web: Www.fresh-energy.org
> Twitter: @NobleIdeas
> **From:** Alexandra Klass <aklass@umn.edu>
> **Sent:** Friday, November 30, 2018 8:40:59 AM
> **To:** Michael Noble
> **Subject:** Re: Big idea! Need your reaction (and hopefully enthusiasm)
>
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> Alex
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> > Michael Noble
> > Executive Director
> > Fresh Energy
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Re: Big idea! Need your reaction (and hopefully enthusiasm)

From:	Alexandra Klass <aklass@umn.edu>
To:	Michael Noble <Noble@fresh-energy.org>
Sent:	December 3, 2018 8:37:47 PM CST
Received:	December 3, 2018 8:37:48 PM CST

I could talk in 20-30 minutes.

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155

On Dec 3, 2018, at 7:31 PM, Michael Noble <Noble@fresh-energy.org> wrote:

> I dropped the ball on this today. Could talk tonight, or before 9 am, or at 3pm tomorrow.
> Michael Noble
> Executive Director
> Fresh Energy
> Direct: 651 726-7563
> Mobile: 612 963-1268
> Web: Www.fresh-energy.org
> Twitter: @NobleIdeas
>
> **From:** Alexandra Klass <aklass@umn.edu>
> **Sent:** Friday, November 30, 2018 8:58 AM
> **To:** Michael Noble
> **Subject:** Re: Big idea! Need your reaction (and hopefully enthusiasm)
>
> Great! Can we talk at 10 am or 3 pm?
> Alex
>
> Alexandra B. Klass
> Distinguished McKnight University Professor
> University of Minnesota Law School
> aklass@umn.edu
> 612-625-0155
> Bio: https://www.law.umn.edu/facultyprofiles/klassa.html
>
> On Nov 30, 2018, at 7:41 AM, Michael Noble <Noble@fresh-energy.org> wrote:
>
> > Monday is fine!
> > Michael Noble
> > Executive Director
> > Fresh Energy
> > Direct: 651 726-7563
> > Mobile: 612 963-1268
> > Web: Www.fresh-energy.org
> > Twitter: @NobleIdeas
> > **From:** Alexandra Klass <aklass@umn.edu>
> > **Sent:** Friday, November 30, 2018 8:40:59 AM

To: Michael Noble
Subject: Re: Big idea! Need your reaction (and hopefully enthusiasm)

[redacted] Do you need a reaction today or can I call over the weekend or Monday?
Alex

Alexandra B. Klass
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On Nov 30, 2018, at 7:03 AM, Michael Noble <Noble@fresh-energy.org> wrote:

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> Michael Noble
> Executive Director
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FW: materials

From:	Michael Noble <Noble@fresh-energy.org>
To:	Alexandra Klass <aklass@umn.edu>
Cc:	Sarah Clark <clark@fresh-energy.org>
Sent:	December 3, 2018 9:37:52 PM CST
Received:	December 3, 2018 9:38:09 PM CST
Attachments:	NYC 2d Cir opening brief.pdf, NYC v BP (dem AGs amicus brief).pdf, Boulder complaint.pdf

Here's the 3 docs I got. I only read through the Boulder one.

Michael Noble
Executive Director
Fresh Energy
Phone 651 726 7563
www.fresh-energy.org | twitter.com/nobleideas

Practical policy. Brighter future. ***Support our work today****.*

From: Michael Noble
Sent: Monday, November 19, 2018 5:20 PM
To: Sarah Clark <clark@fresh-energy.org>
Subject: Fwd: materials

Michael Noble

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From: Lee Wasserman <lwasserman@me.com>
Sent: Monday, November 19, 2018 4:25:19 PM
To: Michael Noble
Subject: materials

M, attached is a complaint and a couple of briefs.

I think this will give you some good background. The Boulder complaint is a page-turner. Probably worth checking out before you make initial calls.

thanks!

PS using this email for a specific reason we can discuss when we next talk. Happy Turkey Day.

1. NYC 2d Cir opening brief.pdf

Type:	application/pdf
Size:	410 KB (420,619 bytes)

2. NYC v BP (dem AGs amicus brief).pdf

Type:	application/pdf
Size:	319 KB (326,999 bytes)

3. Boulder complaint.pdf

Type:	application/pdf
Size:	1 MB (1,615,680 bytes)

18-2188

United States Court of Appeals
for the Second Circuit

CITY OF NEW YORK,

Plaintiff-Appellant,

against

BP P.L.C., CHEVRON CORPORATION, CONOCOPHILLIPS, EXXON MOBIL CORPORATION, and ROYAL DUTCH SHELL PLC,

Defendants-Appellees.

On Appeal from the United States District Court
for the Southern District of New York

BRIEF FOR APPELLANT

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of Counsel

November 8, 2018

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PRELIMINARY STATEMENT

This Court should reverse the judgment of the United States District Court for the Southern District of New York (Keenan, J.), which dismissed a complaint that the City of New York never filed. The City's actual complaint alleges that Defendants—the five largest investor-owned producers of fossil fuels in the world—harmed the City in concrete, measurable ways by producing, promoting, and selling massive amounts of fossil fuels that Defendants knew would contribute to global warming when used exactly as intended.

The City asserts state-law claims for nuisance and trespass to obtain compensation for costs of redressing the effects of global warming that the Defendants have foisted on the City. Those costs involve building sea walls, implementing public-health programs, and taking other resiliency measures to protect the public and municipal property from rising sea levels, increased heat and precipitation, more frequent extreme weather, and other threats. Such costs are currently being borne by taxpayers. New York common-law nuisance and trespass allow these costs to be reallocated to the Defendants, irrespective of whatever social utility Defendants' business activities may have.

This suit would not require a court to impose liability based on Defendants' emissions of greenhouse gases or to dictate any regulation of pollution. Nor is the City attempting to "solve" the problem of climate change. Yet the district court concluded that the case was effectively a suit to regulate global greenhouse-gas emissions, which then became the basis for dismissing the City's claims under a variety of doctrines granting deference to the political branches of government.

But neither Congress nor the Executive Branch has adopted a policy as to whether producers of fossil fuels must compensate communities harmed by the effects of climate change. Nor is global warming a policy issue uniquely of interest to the federal government. There is thus no basis to displace the City's state-law claims with federal common law. And because the Clean Air Act is silent on the production, promotion, and sale of fossil fuels, it neither preempts the state-law claims the City alleged here nor would displace the federal common law if it applied. Finally, the City's claims would not infringe on the separation of powers, interfere with U.S. foreign policy, or present a political question. The complaint alleges local harms for which the courts can and should provide a remedy.

JURISDICTIONAL STATEMENT

The district court had subject-matter jurisdiction under 28 U.S.C. § 1332. Plaintiff is a citizen of New York for purposes of diversity jurisdiction while Defendants are citizens of California, Delaware, New Jersey, Texas, and foreign countries the United Kingdom and the Netherlands. The amount in controversy exceeds $75,000, exclusive of interest and costs (Joint Appendix ("A") 51–53). This Court has jurisdiction under 28 U.S.C. § 1291 because the City appeals from a final judgment resolving all claims (Special Appendix ("SPA") 26).

ISSUES PRESENTED FOR REVIEW

New York law provides a remedy sounding in nuisance and trespass against manufacturers of legal and regulated products that cause environmental harm when used by others as intended. The issues presented are:

1. Did the district court err by holding that federal common law displaced the state-law claims that the City pleaded?

2. Did the district court err by holding that the City's claims were barred by the Clean Air Act?

3. Did the district court err by concluding that separation-of-powers concerns warranted dismissal of the City's claims?

STATEMENT OF THE CASE

New York City seeks damages from BP, Chevron, ConocoPhillips, Exxon Mobil, and Royal Dutch Shell for the harms their products have caused New York City. The asserted New York common-law claims for public nuisance, private nuisance, and trespass will enable the City to recover costs it has incurred and will continue to incur due to the effects of global warming caused by Defendants' products.

A. Defendants' contributions to global warming by producing, promoting, and selling fossil fuels

Climate change is a reality that has already harmed New York City. Fossil fuels are the primary cause of global warming because, when used as intended, they emit greenhouse gases like carbon dioxide and methane (A45, 80–84). These gases are causing the planet to dangerously overheat, resulting in an effectively permanent rise in sea levels and more frequent extreme weather events (A79–80).

There are just 100 large fossil-fuel producers whose products have been responsible for 62% of all the greenhouse-gas pollution from industrial sources going back over a century, and for 71% of the emissions since 1988 (A46). Defendants are the five largest, investor-owned producers of fossil fuels in the world, as measured by the

cumulative carbon and methane pollution generated from the use of their fossil fuels (*id.*). They are collectively responsible, through their production, promotion, and sale of fossil fuels, for over 11% of all the carbon and methane pollution from industrial sources since the Industrial Revolution (*id.*). The majority of greenhouse gases in the atmosphere resulted from fossil fuels produced and promoted by Defendants after Defendants became aware that their products were causing a buildup of greenhouse gases in the atmosphere that would cause dangerous global warming (A47).

Defendants' own scientists and industry consultants warned them, beginning in the 1950s, that the use of fossil fuels was causing greenhouse gases to increase in the atmosphere and that the expected effects included "severe" and even "catastrophic" harms (A87–94). But Defendants continued to produce massive amounts of fossil fuels, and sought to protect their market by discrediting the scientific consensus on global warming (A48). Defendants downplayed the risks of climate change and used large-scale advertising campaigns to portray fossil fuels as environmentally responsible (A47–48, 95–106). Several Defendants created a front group that spent millions of dollars

advertising "contrarian" climate theories that the group's internal documents admitted were unfounded (A96–97).

While publicly denying the reality of climate change, Defendants took steps to protect their own business assets (A48, 93–94). These actions included raising the decks of offshore oil-drilling platforms; protecting pipelines from increasing coastal erosion; and designing helipads, pipelines, and roads for use in the warming Arctic (A93–94).

In short, Defendants have known for decades that the consumption of their products was resulting in increasingly elevated levels of greenhouse gases in the atmosphere that will remain there for hundreds of years, that this process presented a threat of severe harm through the greenhouse effect, and that avoiding dangerous climate change required reducing the use of their fossil-fuel products (A45–47, 87–94). Yet Defendants continued to produce, promote, and sell massive amounts of fossil fuels (A45, 87–88, 95).

B. The effects of climate change on New York City

New York City is particularly vulnerable to global warming because it has 520 miles of coastline and is primarily situated on islands (A49–50, 76). Climate change is already causing the City to

suffer increased hot days, flooding of low-lying areas, shoreline erosion, and higher threats of extreme weather events and catastrophic storm-surge flooding (A49–50). Sea-level rise in New York City since 1900 has occurred at nearly twice the observed global rate, and has risen more quickly in recent decades (A73). These worrying trends are projected to continue and worsen into the future (A73–78).

The City has been forced to take steps to protect itself and its residents from the current and future impacts and dangers of climate change (A106–11). In the aftermath of Hurricane Sandy, the City launched a multi-billion dollar program to increase climate resiliency across the five boroughs to protect against future harms (A107). Addressing climate change threats requires the City to build sea walls and other coastal armament, implement extensive public-health programs, and take other resiliency measures to protect the public and City property (A50–51, 106–11). Among the measures the City is undertaking are the construction of a 2.4-mile-long barrier along the East River to protect neighborhoods on Manhattan's Lower East Side from flooding (A107–08); fashioning a comprehensive "Cool Neighborhoods" program to keep communities safe during extreme heat

(A108); implementing a plan to elevate shorelines at 91 identified sites across the City (*id.*); and enlarging, elevating, and augmenting the City's storm and wastewater infrastructure (A108–09). Absent judicial relief to compensate the City, taxpayers will bear the costs of these needed resiliency measures.

C. The City's lawsuit seeking damages for its expenditures to address the changing climate

Faced with the costs of addressing the harms caused by Defendants' production, promotion, and sale of fossil fuels, New York City filed suit in the Southern District of New York. The City's amended complaint (the operative complaint here) alleged three New York state-law causes of action: public nuisance, private nuisance, and trespass (A112–17). The City seeks damages for costs it has already incurred and is continuing to incur to protect City infrastructure and property, and to protect the public health, safety, and property of its residents from the impacts of climate change (A45–46, 117–18). The complaint also seeks an injunction to abate the public nuisance and trespass that would take effect only if Defendants failed to pay court-determined damages (A118).

The City's complaint expressly disclaims any attempt to impose liability based on Defendants' emissions of greenhouse gases. (A51). The complaint focuses exclusively on Defendants' production, promotion, and sale of fossil fuels while knowing the harms they would cause. The City likewise disclaims any attempt to restrain Defendants from engaging in their business operations (A51). Nowhere does the complaint seek the imposition of emissions standards. Instead, the City seeks only compensation for the harms it has been forced to bear by Defendants' products (A45–46, 117–18).

D. The district court's dismissal of the City's lawsuit

The U.S.-based Defendants moved to dismiss the complaint under a multitude of theories (A145, 148, 151).[1] The district court granted the motions and dismissed the complaint with prejudice in its entirety (SPA24).

Disregarding the complaint's express disclaimer of any attempt to impose liability for Defendants' emissions of greenhouse gases, the district court concluded that the crux of the City's complaint is actually

[1] The district court adjourned the time for the foreign defendants (BP and Shell) to respond to the complaint pending the resolution of these motions (SPA9 n.1).

an attempt to effectively regulate greenhouse-gas emissions (SPA13). Thus, the court concluded that the City's state-law claims were displaced by federal common law governing the control of interstate pollution (SPA11). The court then held that those federal-common-law claims were in turn displaced by the Clean Air Act, which provides for regulation of domestic emissions of certain air pollutants by EPA (SPA18).

Finally, the court ruled that to the extent the City sought damages stemming from foreign greenhouse-gas emissions, the claims were barred by the presumption against extraterritoriality in light of the possibility of "significant"—though unspecified—foreign relations implications (SPA21–23). The district court concluded with a brief attempt to distinguish this Court's holding in a previous case that a claim against fossil-fuel-fired electricity plants did not present a political question (SPA23–24). The district court did not expressly decide whether the claims here were barred by the political-question doctrine.

STANDARD OF REVIEW AND SUMMARY OF ARGUMENT

This Court reviews the district court's dismissal of the complaint *de novo*. *Allco Fin., Ltd. v. Klee*, 861 F.3d 82, 94 (2d Cir. 2017). "To survive a motion to dismiss, a complaint need only provide sufficient factual matter, accepted as true, to state a claim to relief that is plausible on its face." *Citizens United v. Schneiderman*, 882 F.3d 374, 380 (2d Cir. 2018) (quotation marks omitted). The Court "accept[s] as true all factual allegations in the complaint and draw[s] all reasonable inferences in favor of the non-moving party." *City of Providence v. Bats Global Mkts., Inc.*, 878 F.3d 36, 48 (2d Cir. 2017).

The district court erred in dismissing the complaint. The court misunderstood the City's allegations and, on the basis of that misunderstanding, erroneously concluded that various federal-law doctrines barred the City's claims.

I. The first step in reviewing the district court's rulings on questions of federal law is to understand the nature of the New York common-law claims asserted in the City's complaint. Broadly, those claims, sounding in public nuisance, private nuisance, and trespass,

seek to require producers of fossil fuels to pay compensation for environmental harm to the City, its residents, and its property.

These long-established causes of action offer a means of providing compensation to injured plaintiffs without requiring courts to judge the social utility of a defendant's commercial activity or regulate its conduct. When brought against lawful commercial activity, an award of damages for public nuisance often seeks to reallocate the costs imposed by lawful economic activity without requiring that activity to cease or imposing a standard of conduct. Such is the core theory of liability asserted by the City here.

New York law provides that manufacturers, like Defendants, can be liable in nuisance and trespass for selling products with the knowledge that those products will cause environmental harm. Traditional concepts of causation and foreseeability serve as guideposts for determining the limits of manufacturers' potential liability for the effects of their products. Under these principles, nuisance and trespass claims have been allowed to proceed against manufacturers despite the intervening acts of other parties in using their products. Where the Defendants here produced, promoted, and sold fossil fuels knowing that

the products would cause serious environmental harm when their customers used them as intended, they can be liable under state law for nuisance and trespass.

II. The district court held that the City could not pursue the state-law claims it had pleaded because the claims had to be brought instead under federal common law. Contrary to the district court's finding, the allegations here do not render this one of the extraordinary cases where state law must be displaced by federal common law. Displacement of state law by federal common law is appropriate only where there is an actual and significant conflict between state law and a uniquely federal interest. Here, there is no uniquely federal interest at stake, nor is there a significant conflict with any such interest that may exist.

No federal policy or statute regulates the relief sought in this suit—compensation for local harms resulting from the effects of climate change—or purports to prevent state-law tort suits seeking such relief. Indeed, this Court has already rejected the argument that there is a uniquely federal interest in a damages case against producers and sellers of a product used by the military as a defoliant in a foreign war—circumstances where the federal interest was at least as strong as

any claimed here. The Supreme Court and this Court have also rejected the notion that there is a uniquely federal interest in every case involving environmental matters or even interstate pollution. Unlike in the environmental cases where a uniquely federal interest was held to warrant application of federal common law, this suit does not have the purpose, and would not have the effect, of regulating Defendants' direct discharges of out-of-state pollution. Rather, the City is merely seeking a proper allocation of costs via a tool traditionally used for that purpose: state nuisance and trespass law. The district court offered no explanation of how such an allocation could require displacing state law in an area of traditional state power like the resolution of nuisance and trespass tort claims.

Nor does this suit against private defendants implicate the federalism concerns that have, in rare cases, warranted application of a federal standard of decision displacing state common law. By interpreting the complaint to the contrary, the district court judged the need for a federal standard of decision against claims that the City does not assert. Most troubling, the court did so with no actual intention of applying federal common law to those rewritten allegations. Rather,

displacement of state law by federal common law was a mere way station on the road to finding that the judicially minted federal-common-law claims were themselves displaced by federal statute.

III. The district court then erred in holding that the Clean Air Act barred the City's claims. Because the court erroneously concluded that the City's state-law claims were displaced by federal common law, it failed to undertake an analysis of whether the state-law claims were preempted by the statute under the more demanding standard for preemption of state law. Had the court done so, it would have had to conclude that the claims could proceed. Congress did not include any express preemption statement in the Clean Air Act. Nor is Congress's regulatory scheme sufficiently comprehensive to crowd out a state-law nuisance or trespass claim seeking compensation for the costs of responding to the effects of climate change under a field-preemption analysis. Finally, state law on this matter does not stand as an obstacle to the purposes of federal law. The City's claims can continue without impairing the federal regulatory scheme.

If federal common law did displace the City's state-law claims, the Clean Air Act still would not bar the City from proceeding. While the

Clean Air Act displaces claims under federal common law seeking to directly regulate greenhouse-gas emissions, it is silent as to claims seeking monetary damages for harms caused by the production, promotion, and sale of fossil fuels. The Clean Air Act does not speak directly to the issues that this case actually presents.

The district court wrongly dismissed this distinction as illusory because the case can be said to involve emissions. But the pertinent question is a more targeted and well-defined one: whether the suit threatens to create a competing *regulation* of emissions that intrudes on the domain committed to EPA in the Clean Air Act. The claims here do not do so, because they do not seek to impose an emissions standard or rest on a finding that Defendants violated one. The primary fault the City alleges is that Defendants contributed to serious environmental harm that they knew their highly profitable production and marketing activities would cause and that they should therefore pay compensation.

And even if the Clean Air Act displaced the judicially recast federal-common-law claims, it would not take out state law along with it. A statute that displaces federal common law leaves state law intact unless that state law has been preempted by the federal statute, which

is not the case here. Notwithstanding its conclusion that federal common law governed, the district court should have separately considered whether the Clean Air Act barred the City's state-law claims after finding the federal common law displaced.

IV. The district court ended its decision by raising misplaced concerns that resolving the City's claims would interfere with the separation of powers and the President's ability to conduct foreign policy in the area of climate change. But the district court did not articulate how the City's claims offended any U.S. foreign policy on global warming. This case does not remotely present any of the concerns that have animated decisions on extraterritorial application of domestic law and foreign-policy preemption, such as suits between foreign parties for harms occurring abroad, or suits that directly conflict with an official U.S. foreign policy. The district court merely found that global warming is the subject of international negotiations. But that fact does not show a conflict between U.S. foreign policy and a tort lawsuit seeking compensation for local injuries. Nor is the City's suit barred by the political-question doctrine. Clear, judicially manageable standards for resolving the City's case are set forth in state tort law.

As with much of its analysis, the district court's reasoning on these points is based on a flawed understanding of the City's allegations. The City does not seek to regulate global greenhouse-gas emissions, implement a comprehensive solution to climate change, or interfere with any such solution that may be adopted by Congress or the President. The complaint asks only that Defendants pay for the demonstrable harms their products cause New York City.

ARGUMENT

POINT I

NEW YORK LAW RECOGNIZES NUISANCE AND TRESPASS CLAIMS AGAINST MANUFACTURERS OF LEGAL AND REGULATED PRODUCTS THAT HAVE CAUSED ENVIRONMENTAL HARM

Understanding the New York common-law claims asserted by the City provides an important backdrop to this appeal. Indeed, the district court's failure to recognize the true nature of the City's state-law tort claims was the root source of its mistaken rulings holding the suit to be barred by a cluster of federal-law doctrines.

The City's complaint alleges that Defendants' production, promotion, and sale of fossil fuels have caused and will continue to cause serious environmental harm to the City, its residents, and its

property. The complaint presents traditional state-law nuisance and trespass claims that courts applying New York law have long entertained and adjudicated. New York courts routinely permit such claims against manufacturers whose lawful products foreseeably cause environmental harms when used by others.

The particular theory of the claims asserted here assumes that Defendants' business activities have substantial social utility and does not hinge on a finding that those activities themselves were unreasonable or violated any obligation other than the obligation to pay compensation. Instead, the City asserts a narrower theory that would require Defendants to pay for the severe harms resulting from their lawful and profitable commercial activities, rather than allowing them to force the City to bear all costs from those harms.

A. Nuisance and trespass offer a means to reallocate the costs imposed by lawful economic activity.

Under New York law, which looks to the Restatement of Torts as a source of authority for these claims, a public nuisance "is an offense against the State" that can be remedied by "the proper governmental agency." *Copart Indus. v. Consol. Edison Co. of N.Y.*, 41 N.Y.2d 564, 568

(1977) (citing Restatement (First) of Torts, notes preceding § 822). A defendant's conduct constitutes a public nuisance if it "amounts to a substantial interference with the exercise of a common right of the public," thereby "endangering or injuring the property, health, safety or comfort of a considerable number of persons." *532 Madison Ave. Gourmet Foods v. Finlandia Ctr.*, 96 N.Y.2d 280, 292 (2001). A private nuisance is an "interference with the use or enjoyment of land." *Copart*, 41 N.Y.2d at 568. And trespass "is the intentional invasion of another's property." *Scribner v. Summers*, 84 F.3d 554, 559 (2d Cir. 1996).

These causes of action are among the oldest in Anglo-American jurisprudence. *See* George E. Woodbine, *The Origins of the Action of Trespass*, 33 Yale L.J. 799 (1924); C.H.S. Fifoot, *History and Sources of the Common Law: Tort and Contract* 3–5 (1970). In modern times, New York courts have adapted them to new and more complex forms of injury. Of particular relevance here, courts have held that production and sale of lawful products that cause environmental harm can give rise to nuisance and trespass liability. *See, e.g.*, *In re Methyl Tertiary Butyl Ether ("MTBE") Prods. Liab. Litig.*, 725 F.3d 65 (2d Cir. 2013) (gasoline additive).

These causes of action offer a means of providing compensation for injured plaintiffs without requiring courts to judge the social utility of a defendant's commercial activity or regulate its conduct. It is well settled that nuisance or trespass liability may be imposed on an otherwise lawful business operating in full compliance with relevant regulations when it creates or contributes to a public nuisance. *City of New York v. Beretta U.S.A. Corp.*, 315 F. Supp. 2d 256, 280–81 (E.D.N.Y. 2004) (collecting cases); *accord New York Trap Rock Corp. v. Town of Clarkstown*, 299 N.Y. 77, 81 (1949) (quarry operations); *Clawson v. Central Hudson Gas & Elec. Corp.*, 298 N.Y. 291, 294–95 (1948) (dam); *Hoover v. Durkee*, 212 A.D.2d 839, 841–42 (3d Dep't 1995) (auto racetrack).

When brought against lawful commercial activity, an award of damages for public nuisance reallocates the costs imposed by such activity without requiring that the challenged activity cease. "In determining whether to award damages, the court's task is to decide whether it is unreasonable to engage in the conduct without paying for the harm done." Restatement (Second) of Torts § 821B cmt. i. "[C]ertain types of harm may be so severe" that they can be considered a public

nuisance "regardless of the utility of the conduct." *Id.* § 829A cmt. b; *see also* William L. Prosser & W. Page Keeton, The Law of Torts § 52 (5th ed. 1984) (explaining that the "interference … can be unreasonable even when the defendant's conduct is reasonable").

In other words, "[a]lthough a general activity may have great utility it may still be unreasonable to inflict the harm without compensating for it." Restatement (Second) of Torts § 821B cmt. i. Thus, for example, in a leading case, the New York Court of Appeals concluded that the dirt, smoke, and vibrations emanating from a cement plant were a nuisance, and damages needed to be paid to those harmed, despite the fact that the plant operated legally and contributed to the local economy and thus should not be enjoined from operating. *Boomer v. Atl. Cement Co.*, 26 N.Y.2d 219, 222, 225–26 (1970). The court distinguished between the compensation remedy it was approving and a comprehensive solution to air pollution from cement plants, which was "likely to require massive public expenditure and … to depend on regional and interstate controls." *Id.* at 223. The court acknowledged that although a legislative solution was needed to resolve the wider

systemic problem, it could still perform its "essential function" of "decid[ing] the rights of parties before it." *Id.* at 222.

B. Manufacturers can be liable in nuisance or trespass for selling products that they know will cause environmental harm when used by others.

The City's claims invoke the principle of New York law that a manufacturer can be liable in nuisance and trespass for selling products with the knowledge that those products will cause environmental harm. *See, e.g., State v. Schenectady Chems., Inc.*, 117 Misc.3d 960, 966 (N.Y. Sup. Ct. 1983) (public nuisance applies to a "party who, either through manufacture or use, has sought to profit from marketing a … product" that causes environmental harm), *aff'd as modified*, 103 A.D.2d 33 (3d Dep't 1984); *State v. Fermenta ASC Corp.*, 238 A.D.2d 400, 404 (2d Dep't 1997) (upholding trespass verdict by a county water authority against a chemical manufacturer that directed consumers to apply pesticide to soil). For example, in *Williams v. Dow Chem. Co.*, the court sustained a New York public-nuisance claim against a pesticide manufacturer that knew that its product could cause harm to consumers if used in high doses. No. 01 Civ. 4307 (PKC), 2004 U.S. Dist. LEXIS 10940, at *59–64 (S.D.N.Y. June 15, 2004).

A manufacturer need not be the sole party responsible for creating a nuisance to be held liable. If the conduct of the third-party users and its effects were normal and foreseen, manufacturers may be liable for their role in creating the harm. *See Abbatiello v. Monsanto Co.*, 522 F. Supp. 2d 524, 541 (S.D.N.Y. 2007) ("Under New York law, '[e]veryone who creates a nuisance or participates in the creation or maintenance thereof is liable for it.'" (quoting *Penn Cent. Transp. Co. v. Singer Warehouse & Trucking Corp.,* 86 A.D.2d 826, 828 (1st Dep't 1982))); Restatement (Second) of Torts § 840E ("[T]he fact that other persons contribute to a nuisance is not a bar to the defendant's liability for his own contribution.").

To determine the limits of manufacturers' potential liability for the effects of their products, courts deciding New York nuisance and trespass claims have employed traditional concepts of causation and foreseeability. Where third parties' use of a product is the direct cause of the alleged injuries, the causal chain is not broken if that use is the "normal" and "foreseeable" consequence of a defendant's conduct. *Derdiarian v. Felix Contracting Corp.*, 51 N.Y.2d 308, 315 (1980); *Beretta*, 315 F. Supp. 2d at 284; *In re Opioid Litig.*, 2018 NY Slip Op

31228(U), *80-81 (N.Y. Sup. Ct. June 18, 2018). The manufacturer's acts or omissions must be a "substantial factor" in bringing about the injury, but need not be the sole factor.[2] *MTBE*, 725 F.3d at 116.

Under these principles, nuisance and trespass claims have been allowed to proceed against manufacturers despite the intervening acts of other parties in using their products. For example, in *MTBE*, this Court upheld a substantial jury verdict against Exxon (also a defendant here), the manufacturer of gasoline containing the additive methyl tertiary butyl ether (MTBE). *MTBE*, 725 F.3d 65. Despite being aware of the hazardous effects of MTBE years before the public, Exxon sold gasoline including MTBE to gasoline stations in Queens, which stored it in underground tanks, from which it seeped into water wells owned by the City. *Id.* at 88. Exxon argued that its contribution to the City's injuries was too remote because it did not release the chemicals into the

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[2] Thus, it is no defense to a public-nuisance claim that there were many other contributors, as is common in cases involving pollution. *See, e.g.*, *Boim v. Holy Land Found. For Relief & Dev.*, 549 F.3d 685, 696—97 (7th Cir. 2008) (en banc) ("'[P]ollution of a stream to even a slight extent becomes unreasonable [and therefore a nuisance] when similar pollution by others makes the condition of the stream approach the danger point. The single act itself becomes wrongful because it is done in the context of what others are doing.'") (quoting Prosser & Keeton § 52, p. 354)); *Warren v. Parkhurst*, 45 Misc. 466, 469 (N.Y. Sup. Ct. 1904), *aff'd*, 105 A.D. 239 (3d Dep't 1905), *aff'd*, 186 N.Y. 45 (1906).

City's water supply. This Court was unpersuaded, holding that the City had established causation with evidence that "Exxon knew that MTBE gasoline it manufactured would make its way into Queens, where it was likely to be spilled, and once spilled, would likely infiltrate the property of others." *Id.* at 121.

Similarly, in *Abbatiello v. Monsanto Co.*, the court allowed a private-nuisance claim to proceed against Monsanto, which manufactured and sold materials and products containing polychlorinated biphenyls, or PCBs, to General Electric. 522 F. Supp. 2d 524. The court found that allegations that Monsanto had for years suppressed and concealed facts about the dangers of PCBs from GE and the plaintiffs (GE employees and owners of land near a GE facility) was sufficient to support a claim that "Monsanto participated to a substantial extent in creating the nuisance." *Id.* at 541.

So too, in *Fermenta,* 238 A.D.2d at 404, the court upheld a trespass verdict against an herbicide manufacturer even though the immediate cause of injury to the public was the application of the herbicide to the soil by third parties. The court held that the manufacturer could be held liable because "defendants' actions in

directing consumers to apply [the herbicide] to the soil was substantially certain to result in the entry of [the toxin] into [the county's] wells." *Id.*; *see also Schenectady*, 117 Misc. 2d at 967 (sustaining public-nuisance claim against chemical manufacturer despite the intervening actions of a third party).[3]

Like the manufacturer defendants in *MTBE, Abbatiello,* and *Fermenta,* Defendants here produced, promoted, and sold fossil fuels knowing that the products would cause serious environmental harm if their customers used them as intended (A45–48, 87–94). Nevertheless, for decades, Defendants promoted their fossil-fuel products by concealing and downplaying the harms of climate change, profited from the misconceptions they promoted as to the cause of climate change, and knowingly shifted the cost of these harms to cities like New York (A48, 95–106). New York nuisance and trespass law offers the City a

[3] The district court questioned whether the City's trespass claim properly alleged an "unlawful" invasion (SPA17). An invasion is "unlawful" if it is "without justification or permission." *Emerson Enters., LLC v. Kenneth Crosby New York, LLC*, 781 F. Supp. 2d 166, 181 (W.D.N.Y. 2011) (quotation marks omitted); *see also Marone v. Kally*, 109 A.D.3d 880, 882 (2d Dep't 2013); 104 N.Y. Jur. 2d Trespass § 5. The City properly alleged that Defendants' conduct was substantially certain to result in an invasion "without permission or right of entry" (A116–17).

remedy for these wrongs, and the complaint as pleaded alleges the necessary facts to be awarded that remedy.

Defendants contended below (in an argument that the district court did not address) that New York law would refuse to extend liability in nuisance and trespass to producers of lawful products that cause harm when used by third parties (Dkt. 100 at 39–41). The cases recounted above refute any suggestion that New York law disallows such claims when environmental harms are alleged. Moreover, Defendants misread the two cases on which they primarily relied. Those cases involved suits against gun companies for harms caused by third parties' criminal use of their products. *See Hamilton v. Beretta U.S.A. Corp.*, 96 N.Y.2d 222 (2001); *People v. Sturm, Ruger & Co.*, 309 A.D.2d 91 (1st Dep't 2003). At bottom, those cases are rooted in the law's traditional reluctance to hold a defendant responsible for another's intervening criminal acts.

Neither *Hamilton* (a negligence action brought by relatives of persons killed by handguns) nor *Sturm, Ruger* (a public-nuisance action alleging that gun companies contributed to the high number of illegally possessed handguns) purported to cast doubt on the established

principles that lawful products can cause nuisances or trespasses and that manufacturers can be liable for foreseeable conduct by their customers who use the product precisely as is intended.[4] Indeed, *Hamilton* emphasized that "a manufacturer may be held liable for complicity in dangerous … activity," 96 N.Y.2d at 235, and held open the possibility that this complicity could be proved with proper evidence in the future even against the gun companies regarding harms caused by users' criminal acts, *id.* at 237. The cases thus provide no cause to doubt the viability of the City's claims here. The City's complaint presents traditional nuisance and trespass claims under New York law.

POINT II

FEDERAL COMMON LAW DOES NOT DISPLACE THE CITY'S STATE-LAW CLAIMS

The district court wrongly held that federal common law displaces the City's state-law claims. The City's claims apply traditional New

[4] In *Hamilton*, the court found that the plaintiffs' trial evidence failed to show that their relatives' deaths were traceable to the defendants' marketing practices. *Sturm, Ruger* relied on these findings from the *Hamilton* trial evidence and concluded that nearly identical claims for gun murders were "caused directly and principally by the criminal activity of intervening third parties," over whom defendants "have absolutely no control." *Sturm, Ruger*, 309 A.D.2d at 99, 103–04.

York nuisance and trespass principles to seek compensation for funds it spent and will spend addressing the local effects of the use of Defendants' products, without inviting or requiring the courts to regulate the greenhouse-gas emissions of Defendants' customers. In these circumstances, displacement of state common law by federal common law was unwarranted.

Any discussion of displacing state law with federal common law must begin with the principle, unacknowledged by the district court, that such displacement is greatly disfavored and reserved for "extraordinary cases." *O'Melveny & Myers v. FDIC*, 512 U.S. 79, 89 (1994). Generally, unless Congress has expressly authorized the courts to formulate substantive rules (which has not happened here), federal common law arises "only in such narrow areas as those concerned with the rights and obligations of the United States, interstate and international disputes implicating the conflicting rights of States or our relations with foreign nations, and admiralty cases." *Tex. Indus. v. Radcliff Materials*, 451 U.S. 630, 641 (1981). None of those interests are present here.

A. The City's lawsuit does not pose a significant conflict with any identifiable federal interest.

A party seeking to displace state law with federal common law must overcome a "substantial burden" of showing (1) a uniquely federal interest and (2) an actual and significant conflict between state law and an identifiable federal policy or interest. *Boyle v. United Techs. Corp.*, 487 U.S. 500, 507, 508 (1988); *Empire HealthChoice Assurance, Inc. v. McVeigh*, 396 F.3d 136, 138, 140 (2d Cir. 2005); *Woodward Governor Co. v. Curtiss-Wright Flight Sys.*, 164 F.3d 123, 127 (2d Cir. 1999). The conflict must be significant to warrant the displacement of state law. *O'Melveny & Myers*, 512 U.S. at 87; *Milwaukee v. Illinois*, 451 U.S. 304, 313 (1981) ("*Milwaukee II*"); *Empire HealthChoice*, 396 F.3d at 138, 140; *Woodward,* 164 F.3d at 127 ("[A]n actual, significant conflict between a federal interest and state law must be specifically shown, and not generally alleged." (quotation marks omitted)). Both prongs of the test must be satisfied before federal common law will displace state law. *Boyle*, 487 U.S. at 507; *Empire HealthChoice*, 396 F.3d at 140–41; *Woodward Governor Co.*, 164 F.3d at 128.

Having skipped this analysis, the district court never identified *any* actual and specific federal policy or interest that conflicts with the

City's lawsuit. The City seeks compensation for the costs of constructing infrastructure and implementing programs necessary to protect itself and its residents from the local impacts of climate change such as rising sea levels, extreme weather, and increased flooding. There is no uniquely federal interest in the adjudication of such a case; nor does this lawsuit pose a conflict with any interest that may exist.

No federal policy or statute regulates the relief sought in this suit—compensation for local harms that result from fossil-fuel production—or purports to prevent state-law tort suits seeking such relief. Congress has never enacted legislation to immunize fossil-fuel producers from bearing the costs for the harms their products inevitably create when used as intended. This contrasts with, for example, the case of firearms manufacturers and dealers, who are shielded by federal law from liability for the criminal or unlawful misuse of their products. 15 U.S.C. §§ 7901–03. Indeed, this Court already has found that "there really is no unified [federal] policy on greenhouse gas emissions." *Connecticut v. Am. Elec. Power Co.*, 582 F.3d 309, 331–32 (2d Cir. 2009) ("*AEP I*"), *aff'd in relevant part, rev'd on other grounds by* 564 U.S. 410 (2011) ("*AEP II*"). Absent an identifiable federal policy, there is no

uniquely federal interest that can conflict with this suit for damages from the production and sale of an inherently harmful product.

Indeed, this Court has already rejected the argument that federal common law displaced state law in a damages case against producers and sellers of products where the federal interest was at least as weighty as any claimed here. *In re "Agent Orange" Prod. Liab. Litig.*, 635 F.2d 987, 994–95 (2d Cir. 1980). In *Agent Orange*, Vietnam War veterans who had suffered injuries from military use of herbicides as defoliants during the war sued the chemical companies that manufactured the herbicides. *Id.* at 988. This Court recognized the "obvious interests" of the United States in both the welfare of its military veterans and in ensuring the supplies of war materiel, but nonetheless held that state law—not federal common law—applied. *Id.* at 994–95. "Although Congress has turned its attention to the Agent Orange problem, it has not determined what the federal policy is with respect to the reconciliation of these two competing interests." *Id.* In the absence of such a decision by Congress, the separation of powers and federalism concerns cut *against* the application of federal common law and in favor of state law. *See id.* So too here, where there is no

determination by Congress weighing the competing interests of parties injured by climate change and companies that produce, promote, and sell fossil fuels. There are certainly no stronger federal interests presented in this case that would point to a different result.

There is also no uniquely federal interest in every case involving environmental matters. *See New York v. Shore Realty Corp.*, 759 F.2d 1032, 1050 (2d Cir. 1985) (applying New York common law alongside federal statutory claim). States and cities have important and obvious interests in addressing the consequences of the changing climate that are felt within their borders.[5] *Cf. Nat'l Audubon Soc'y v. Dep't of Water*, 869 F.2d 1196, 1203 (9th Cir. 1988) ("[T]here is not 'a uniquely federal interest' in protecting the quality of the nation's air."). Likewise, states have an interest in applying their own law to local environmental harms caused by fossil-fuel products. *See MTBE*, 725 F.3d 65.

[5] Indeed, numerous states and cities have passed laws, regulations, and policies on climate change. *See, e.g.*, *Rocky Mtn. Farmers v. Corey*, 730 F.3d 1070, 1106–07 (9th Cir. 2013) (upholding state law regulating carbon intensity of ethanol sold in interstate commerce); *Coal. for Competitive Elec. v. Zibelman*, 272 F. Supp. 3d 554, 559 (S.D.N.Y. 2017) (upholding state program promoting clean energy sources), *aff'd* 906 F.3d 41 (2d Cir. 2018).

The district court grounded its decision to displace state law primarily on the supposed need for a "uniform standard of decision" (SPA14). This reasoning was in error. The need for uniformity—"that most generic (and lightly invoked) of alleged federal interests"—is insufficient to justify displacing state common law. *O'Melveny & Myers*, 512 U.S. at 88; *accord Woodward Governor Co.*, 164 F.3d at 129; *In re "Agent Orange,"* 635 F.2d at 993–94. Tort causes of action employed solely to allocate harms from a product or activity, like the nuisance and trespass claims alleged here, fall "well within the state's historic powers to protect the health, safety, and property rights of its citizens." *MTBE*, 725 F.3d at 96. The application of federal common law is especially disfavored where it would affect such "areas traditionally occupied by the states." *Marsh v. Rosenbloom*, 499 F.3d 165, 177, 182 (2d Cir. 2007) (rejecting uniformity as a cause to invoke federal common law).

The purported need for uniformity is particularly misplaced here. To start, it is not at all clear that there is significant variation among the states' common law on these issues. *See AEP I*, 582 F.3d at 351 n.28 ("A majority of states have adopted the Restatement's definition of public nuisance."). But even if different states did vary in the degree to

which they would allow Defendants to be held liable for creating a public nuisance, that variation would not create a conflict with any federal policy.

Differences in state tort law merely require defendants to bear certain costs imposed in one state that they may not bear in another. If New York law here imposes liability while, say, Indiana law does not, the price of oil (or the profits that Defendants collect) will simply reflect those internalized costs. The possibility of different tort standards faces every producer who sells goods across state or national boundaries. But that does not require imposing a federal standard of decision on all claims involving goods in the interstate market. *See In re "Agent Orange,"* 635 F.2d at 994–95; *see also Jackson v. Johns-Manville Sales Corp.*, 750 F.2d 1314, 1324 (5th Cir. 1985) (en banc) (holding that federal common law did not govern claim against asbestos manufacturers).

The need for uniformity weighs differently when a suit under state law would regulate the defendant's direct discharges of pollution across state lines. This concern arises in state-law suits seeking to dictate standards for emissions (which inevitably cross state lines),

because those suits raise the prospect that an emitter would be unable to determine whether its conduct is lawful in every jurisdiction that its emissions reach. *See Int'l Paper Co. v. Ouellette*, 479 U.S. 481, 496–97 (1987). For this reason, the interstate-pollution cases in which the Supreme Court has looked to federal common law to supply the rule of decision have entailed a plaintiff seeking to enjoin the conduct of parties in discharging pollution in another state. *See AEP II*, 564 U.S. at 415 ("[P]laintiffs ask for a decree setting carbon-dioxide emissions for each defendant at an initial cap, to be further reduced annually.")[6]; *Illinois v. Milwaukee*, 406 U.S. 91, 93 (1972) ("*Milwaukee I*") ("Plaintiff asks that we abate this public nuisance.").

But this case does not seek to regulate out-of-state (or indeed, any) emissions or impose an emissions standard. Rather, it seeks to allocate the costs of protecting the property, health, and safety of the City and its residents from the impacts of climate change on infrastructure and public health. The City here assumes that Defendants will continue to

[6] In *AEP*, the plaintiffs pleaded federal-common-law causes of action, with state-law claims alleged only in the alternative (A160, 201, 203). The Supreme Court assumed without deciding that federal common law applied. *AEP II*, 564 U.S. at 423. The Court did not decide whether federal common law displaced state law or address the standard for such displacement. *See generally id.*

produce, promote, and sell fossil fuels. The complaint merely seeks compensation for the local harms those products are causing. Nothing about such a complaint poses a significant conflict with any uniquely federal interest.

B. Previous decisions applying federal common law to the control of interstate emissions do not dictate the result here.

In lieu of applying the controlling test for determining the extraordinary cases when federal common law displaces state law, the district court erroneously concluded that cases related to interstate pollution are exclusively governed by federal common law (SPA11–13). In doing so, the district court vastly oversimplified the analysis. The relevant question is not whether the suit can fairly be said to relate to interstate pollution; thus, the fact that emissions constitute a component of the causal chain for the harm alleged in the complaint does not control. The appropriate question is whether the suit implicates and threatens to impair a uniquely federal interest. And here, as discussed, it does not.

The cases where the Supreme Court has held that federal common law controls present federalism and other concerns that are not present

here. The seminal case is *Milwaukee I*, where the Supreme Court considered a suit filed by the State of Illinois against several cities and local sewage commissions in Wisconsin seeking to enjoin them from continuing to discharge untreated sewage into Lake Michigan. 406 U.S. 91. As the Supreme Court noted, this lawsuit between one sovereign state and direct dischargers of pollution from sources in another sovereign state touched "basic interests of federalism" that counseled in favor of fashioning a federal rule of decision. *Id.* at 105 n.6. Namely, if Illinois law could be used to regulate a pollution source in Wisconsin, it would be invading Wisconsin's sovereign prerogatives. But if Wisconsin law did not provide a remedy for Illinois, that would invade Illinois' sovereign prerogative to protect its citizenry. The foreseeable result of either situation is significant conflict between the states. *Id.* at 107. Such federalism concerns are absent in this suit between New York City and private producers of products that, unlike a point source of pollution, are untethered to a specific jurisdiction.

It is thus unsurprising that all of the cases the district court cited for the proposition that federal law applies to the control of interstate pollution directly challenged the emission of pollutants into the air or

water (SPA11). This case does not. The distinction between production, promotion, and sales on the one hand, and emissions on the other, is significant for multiple reasons.

First, one of the Supreme Court's repeated rationales for authorizing federal common law to override state law in the domain of emissions is that it was necessary to "fill in statutory interstices" in areas where Congress has acted within the national legislative power. *AEP II*, 564 U.S. at 421(quotation marks omitted); *see also Milwaukee I*, 406 U.S. at 103. Congress acted in the realm of interstate air pollution with the passage of the Clean Air Act. But, as discussed below, that statute does not address the production, promotion, and sale of fossil fuels. Thus, a court would not be filling the "statutory interstices" by imposing federal common law, but would rather be striking out into entirely new terrain. A court tempted to engage in such an endeavor should "remain[] mindful that it does not have creative power akin to that vested in Congress." *AEP II*, 564 U.S. at 422.

Second, a suit challenging a defendant's direct emissions of greenhouse gases or other pollutants naturally implicates conduct that sets up a conflict between the source state and the state where the

harm occurs. As discussed, where the plaintiff seeks to regulate such emissions, the application of a federal standard of decision may be necessary to avoid interstate conflict. But the production, promotion, and sale of products does not involve such a conflict. Indeed, countless products today are sold in interstate and international commerce, but this fact alone does not create the necessary conflict to require displacing state common law with federal common law. *See In re "Agent Orange,"* 635 F.2d at 994; *Jackson*, 750 F.2d at 1324. If it were otherwise, the federal courts would be "awash in 'federal common-law' rules." *O'Melveny & Myers*, 512 U.S. at 88.

In finding that the City's state-law claims were displaced, the district court mistakenly reasoned that the federal common law must govern any case somehow pertaining to emissions (SPA12–14). To be sure, the complaint discusses greenhouse-gas emissions. But those emissions are a step in the causal chain by which Defendants' products caused the City harm. A step in the causal chain is not the basis for the claim itself. Indeed, the City neither alleges that Defendants themselves emitted greenhouse gases nor seeks to impose any liability for any emissions Defendants did release. These points are not

superficial: they go to the fundamental question whether this lawsuit will operate as a regulation of cross-boundary emissions. Because the City's claims will not, directly or indirectly, establish any standard for emissions, they should not be understood to regulate them. If the City, as plaintiff, is to remain the "master of the complaint," *Marcus v. AT&T Corp.*, 138 F.3d 46, 52 (2d Cir. 1998), the district court's misconstruction of that complaint must be rejected. Federal common law does not displace the state-law claims that the City alleged here.

POINT III

THE CITY'S CLAIMS ARE NOT BARRED BY THE CLEAN AIR ACT

The district court further erred in concluding that the Clean Air Act barred the City's claims. Federal preemption of state law requires clear and manifest evidence of congressional intent. There is no such evidence here. But because the district court erroneously concluded that the City's state-law claims were displaced by federal common law, it did not engage in a preemption analysis, and instead considered only whether the Clean Air Act in turn displaced the federal claims (SPA14). Even assuming, however, that federal common law does displace the City's state-law claims, the court was wrong to find those claims

displaced by the Clean Air Act, which does not speak directly to the particular issues raised in this lawsuit.

A. The Clean Air Act does not preempt the City's state-law claims.

Had the district court engaged in a preemption analysis, it would have had to conclude that the City's state-law claims are not preempted by the Clean Air Act. Courts considering the preemption of state law start with the assumption that claims within "the historic police powers of the States"—including those asserting nuisance and trespass—are not preempted "unless that was the clear and manifest purpose of Congress." *MTBE*, 725 F.3d at 96 (quotation marks omitted); *see also AEP II*, 564 U.S. at 423. There are three situations in which the Supreme Court has found a congressional intent to preempt state law: "(1) where Congress expressly states its intent to preempt; (2) where Congress's scheme of federal regulation is sufficiently comprehensive to give rise to a reasonable inference that it leaves no room for the state to act; and (3) where state law actually conflicts with federal law." *Marsh*, 499 F.3d at 177. None of those situations is present here.

First, Congress did not include any statement of preemption in the Clean Air Act. Instead, the congressional findings for the statute explain that the prevention and control of air pollution "is the primary responsibility of States and local governments." 42 U.S.C. § 7401(a)(3). It is therefore unsurprising that the Clean Air Act contains no provision precluding state courts from taking action under traditional tort theories. *MTBE*, 725 F.3d at 97. To the contrary, the statute states that its provision of private remedies shall not "restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any emission standard or limitation *or to seek any other relief*." 42 U.S.C. § 7604 (emphasis added).

Second, there is no viable argument that Congress's regulatory scheme is sufficiently comprehensive that it crowds out state action. Field preemption exists only "where Congress has legislated so comprehensively that federal law occupies an entire field of regulation and leaves no room for state law." *New York SMSA Ltd. P'ship v. Town of Clarkstown*, 612 F.3d 97, 104 (2d Cir. 2010) (quotation marks omitted). The City is not aware of any case in which this Court—or any court—has embraced field preemption of state law under the Clean Air

Act. *See Ass'n of Taxicab Operators, USA v. City of Dallas*, 866 F. Supp. 2d 595, 603 (N.D. Tex. 2012) (rejecting contention that the Clean Air Act occupied the field of air pollution regulation), *aff'd*, 720 F.3d 534 (5th Cir. 2013). To the contrary, the Clean Air Act explicitly contemplates active state and local participation. *See* 42 U.S.C. § 7401(a)(3).

Third, this is not a situation where state law actually conflicts with—or even poses an obstacle to—the enforcement of federal law. In order to establish obstacle preemption, there must be a "sharp" and "actual conflict" between New York law and "the overriding federal purpose and objective" of the Clean Air Act. *MTBE*, 725 F.3d at 101. This is a heavy burden, and is only met where a "repugnance or conflict is so direct and positive that the two acts cannot be reconciled or consistently stand together"; mere "tension" is not enough. *Id.* at 102 (quotation marks omitted).

In part because the district court never engaged in the preemption analysis, it never identified any actual conflict between state nuisance law and the Clean Air Act. The closest the court came was its statement that determining liability on the City's claims would require factfinders

"to consider whether emissions resulting from the combustion of Defendants' fossil fuels created an 'unreasonable interference' and an 'unlawful invasion' on City property" and that such a finding would supposedly conflict with EPA's authority to issue emissions limits under the Clean Air Act (SPA17–18). But this is wrong as a matter of tort law and the Clean Air Act.

Adjudicating liability in a nuisance case does not intrude into the sphere of regulating emissions. For example, in *Boomer*, the New York Court of Appeals concluded that it lacked the expertise to determine if air pollution from a cement plant could or should be reduced, and that enjoining the plant's operation was out of the question because of its size and social value as a large employer. 26 N.Y.2d at 223, 225–26. But the court still held that the cost of pollution should be borne by the plant and not by those it had injured, and awarded damages. *Id.* at 226. Similarly, the Restatement requires proof that the interference with public rights is "unreasonable," but explains that this can be shown in a damages case by proving "severe" harm that would be unreasonable if uncompensated. Restatement (Second) of Torts § 829A.

The City's trespass claim likewise is not tantamount to setting emissions standards. It requires only proof that Defendants were substantially certain that their production, promotion, and sale of fossil fuels would interfere with the City's right to possession of real property (*e.g.*, by seawater intruding onto the City's land) yet continued to engage in this harmful conduct. *See MTBE*, 725 F.3d at 119–20. The City's claims involve traditional questions of tort liability, without threatening EPA's expertise or its authority under the Clean Air Act to regulate emissions.

But even if the utility or reasonableness of Defendants' conduct were at issue, imposing liability would not commit a court to an actual conflict with the Clean Air Act, much less one that is "direct and positive" or "sharp." *MTBE*, 725 F.3d at 101. The activities at issue in this lawsuit involve the production, promotion, and sale of fossil fuels—activities that are not regulated by the Clean Air Act. Rather, the statute regulates emissions. As discussed above, there is no chance here of Defendants being subject to conflicting obligations.

B. If federal common law applied, it would not be displaced by the Clean Air Act.

If the Court were to find that federal common law displaces the City's state-law claims here, those federal-common-law claims still would not be barred by the Clean Air Act (SPA14–21). Displacement of federal common law occurs only where a federal statute "speaks directly to the question at issue." *Mobil Oil Corp. v. Higginbotham*, 436 U.S. 618, 625 (1978); *AEP II*, 564 U.S. at 424; *see also Cty. of Oneida v. Oneida Indian Nation*, 470 U.S. 226, 237 (1985) ("[F]ederal common law is used as a 'necessary expedient' when Congress has not 'spoken to a *particular* issue.'" (quoting *Milwaukee II*, 451 U.S. at 313)). Regulation that only generally relates to the subject matter is insufficient to displace federal common law. *Milwaukee I*, 406 U.S. at 104; *AEP I*, 582 F.3d at 381–87.

The Clean Air Act does not speak to the particular issues presented here. It addresses emissions, but is silent as to the remedy for environmental harms to the City's property resulting from the production, promotion, and sale of fossil fuels. "Congress's mere refusal to legislate … falls far short of an expression of legislative intent to supplant the existing [federal] common law in that area." *United States*

v. Texas, 507 U.S. 529, 535 (1993) (quotation marks omitted). Where Congress expressly regulates in one domain (*e.g.*, emissions) but not in others (*e.g.*, the production, promotion, and sale of fossil fuels), courts presume that Congress intended not to determine the latter issues. *See Marsh*, 499 F.3d at 181.

While "[e]missions from domestic sources are certainly regulated by the Clean Air Act," the City here has pleaded allegations arising from "the earlier moment of production and sale of fossil fuels" when Defendants sold a harmful product knowing that it would cause local harms when used exactly as intended. *California v. BP P.L.C.*, No. C 17-06011 WHA, 2018 U.S. Dist. LEXIS 32990, at *12 (N.D. Cal. Feb. 27, 2018). The Clean Air Act does not speak directly to that "earlier moment" and so cannot displace the claims the City raised here.

Moreover, as discussed, the particular causes of action asserted in the complaint here do not rest on the claim that Defendants violated any standard of conduct governing emissions. To be sure, emissions by users of fossil fuels form part of the causal chain leading to the City's injury. But the City's claims for compensation are premised on Defendants' decision to manufacture, market, and sell a product that

they knew would cause harm as a result of those emissions. While it is possible that Defendants may elect to adjust their production, promotion, or sales activities in some way in response to a liability finding, that falls far short of establishing that the suit operates as a regulation of emissions that intrudes upon territory covered by the Clean Air Act.

The district court's reliance on the Supreme Court's decision in *AEP II* and the Ninth Circuit's extension of that holding in *Kivalina* ignored the significant differences between the claims presented in those cases and the claims the City has made here. In *AEP II*, the plaintiffs filed "federal common-law public nuisance claims against carbon-dioxide emitters" and sought "a decree setting carbon-dioxide emissions for each defendant at an initial cap, to be further reduced annually." *AEP II*, 564 U.S. at 415. Thus, the Court's holding resolved only claims under federal common law for injunctive relief for carbon emissions. *Id.* at 424. The plaintiffs in *Kivalina* sought damages under federal common law for harms arising from the defendants' own emissions of greenhouse-gas. *Native Vill. of Kivalina v. ExxonMobil Corp.*, 696 F.3d 849, 853 (9th Cir. 2012).

Both cases centered on claims that are not present here. Unlike here, the plaintiffs in both cases alleged that the defendants' *emissions* caused them harms. And it makes sense to conclude that Congress spoke directly to the regulation of emissions when it passed the Clean Air Act. As the Supreme Court explained, the Clean Air Act directs the EPA Administrator to regulate greenhouse-gas emissions and provides multiple avenues for enforcement of those emissions regulations that do not involve common-law claims. *AEP II*, 564 U.S. at 424–25. Indeed, it was a "critical point" in the Court's analysis that Congress delegated regulation of carbon-dioxide emissions to EPA. *Id.* at 426. Thus, the Court saw "no room for a parallel track" invoking federal common law. *Id.* at 425; *see also Kivalina*, 696 F.3d at 856. But this case will not create a parallel track on matters regulated by the Clean Air Act. While the Clean Air Act speaks directly to the regulation of emissions, Congress did not delegate authority to EPA over the production, promotion, and sale of fossil fuels. Thus, a "critical point" of the Supreme Court's reasoning in *AEP II* is missing from this case.

The district court mistakenly concluded that *AEP II* and *Kivalina* held that the Clean Air Act displaces not only claims regulating

emissions, but all "claims against energy producers' contributions to global warming and rising sea levels" (SPA18 (quoting *Cty. of San Mateo v. Chevron Corp.*, 294 F. Supp. 3d 934, 937 (N.D. Cal. 2018)).[7] Nothing in the Clean Air Act suggests that Congress spoke directly to every issue related to global warming and its effects. Indeed, the Supreme Court has held that the parallel Clean Water Act lacks the requisite "clear indication of congressional intent to occupy the entire field of pollution remedies" to displace a federal-common-law claim seeking damages. *Exxon Shipping Co. v. Baker*, 554 U.S. 471, 488–89 (2008). This case presents an even less-likely candidate for displacement than *Exxon Shipping*, which involved the liability of a direct discharger of pollution. Holding the Clean Air Act to displace the City's claims here would stretch the statutory displacement doctrine well beyond its breaking point.

And while the distinction between remedies may not always matter in itself, sometimes the remedy sought in a particular case helps confirm the nature of the underlying cause of action. Critically, in

[7] To the extent that the Ninth Circuit's decision in *Kivalina* might be read to support such a conclusion, it was wrongly decided.

public-nuisance cases, precedents related to actions for injunctive relief "are by no means interchangeable" with precedents in actions for damages. Restatement (Second) of Torts § 821B cmt. i. This is because the question for injunctive relief is necessarily whether a harm is so unreasonable that it must be stopped or directly curtailed, while some actions for damages instead ask only whether the harm is unreasonable if uncompensated. *Id.* "It may be reasonable to continue an important activity if payment is made for the harm it is causing, but unreasonable to continue it without paying." *Id.*[8] The City here alleges that the severe harms it has suffered from Defendants' products are unreasonable so as to warrant compensation.

The Clean Air Act does not displace nuisance and trespass claims seeking such damages for harms arising from the production, promotion, and sale of fossil fuels. This case is simply too far removed from the ambit of the Clean Air Act to be displaced by that statute. The

[8] The nature of the remedy that a party seeks cannot be simultaneously a critical point in the displacement analysis and irrelevant to it. Indeed, although the *Kivalina* majority mistakenly ascribed no significance to the remedy, the concurring judge properly recognized that congressional displacement or preemption can turn on whether the claim seeks injunctive relief or damages. *See Kivalina*, 696 F.3d at 857; *id.* at 863 (Pro, J., concurring).

statute does not directly speak to that conduct and there is nothing to suggest a broad congressional intent to displace federal common law in all suits related to global warming. Because the City's claims here do not intrude on the domain Congress staked out in passing the Clean Air Act, the district court erred in finding the claims displaced by statute.

C. Displacement of federal common law does not automatically also preempt related state tort law.

After concluding that the Clean Air Act displaced the City's newly recast federal-common-law claims, the district court erred by not considering whether the City's claims, as originally pleaded under state law, were also preempted by the statute. That is because, when a federal statute displaces federal common law, a state-law claim may still be asserted unless it has been preempted by the statute. *AEP II*, 564 U.S. at 429; *Cty. of San Mateo*, 294 F. Supp. 3d at 937; *see also California v. BP*, 2018 U.S. Dist. LEXIS 32990, at *12.

The Supreme Court applied this principle in *Ouellette*. There, the Court noted that water pollution had been governed by federal common law until that law was displaced by the Clean Water Act. *Ouellette*, 479 U.S. at 488–89. Accepting that the Clean Water Act displaced all

federal common law, the Court then turned to the question of whether and to what extent the statute preempted state law. *Id.* at 489, 491. This analysis compels the conclusion that state-law claims survive the statutory displacement of federal common law.

The Court applied similar logic in *AEP II* when, after holding that the federal-common-law claims were displaced, it left the question of the Clean Air Act's preemptive effect on the state-law claims open on remand. *AEP II*, 564 U.S. at 429. If state-law claims touching areas of federal common law are forever barred by the statutory displacement of the federal common law, this portion of the Court's decision would be inexplicable.[9]

Ignoring the Supreme Court's reasoning in *Ouellette* and *AEP*, the district court thought that it would be "illogical to allow the City to bring state law claims when courts have found that these matters are

[9] The district court wrongly believed that *AEP II*'s preservation of state common law has no bearing here because the plaintiffs in that case pleaded their alternative state law claims under the law of the source states, whereas the City here pleads under New York law. But, unlike this case against producers, sellers and marketers of products, *AEP* was a case against direct dischargers of federally regulated pollution and thus, under *Ouellette*, the alternative state-law claims in *AEP* had to be pleaded under the law of the source states. *See* 479 U.S. at 500. No similar requirement exists for suits brought against the producers, promoters, and sellers of harmful products.

areas of federal concern" (SPA20). But it is nothing of the kind. The conclusion that the statutory displacement of federal common law allows for state-law claims to proceed makes perfect sense and is in fact the correct result. The standard for preempting state law is higher than that for displacing federal common law, reflecting federalism concerns not present in displacement analysis. *AEP II*, 564 U.S. at 423; *Milwaukee II*, 451 U.S. at 316–17; *In re Complaint of Oswego Barge Corp.*, 664 F.2d 327, 335 (2d Cir. 1981). Permitting statutory displacement of federal common law to extend to state-law claims in the same area would create an end-run around the presumption against preempting state law.

Nor does the conclusion that Congress chose to displace an area of federal common law with the Clean Air Act logically imply that Congress also intended to preempt state law in that domain. *See Merrick v. Diageo Ams. Supply, Inc.*, 805 F.3d 685, 693 (6th Cir. 2015) ("There are fundamental differences, however, between displacement of federal common law by the [Clean Air] Act and preemption of state common law by the Act."). Answering the latter question requires an entirely separate analysis—one the district court skipped.

POINT IV

THE CITY'S CLAIMS DO NOT IMPLICATE SEPARATION OF POWERS OR FOREIGN-POLICY CONCERNS

The district court supported its decision to dismiss the City's complaint with references to misplaced concerns that resolving the City's claims would interfere with the separation of powers (SPA21–23). Drawing on an amalgamation of doctrines, the court held that the City's claims would infringe on foreign-policy decisions, act extraterritorially, transgress the need for judicial caution in expanding federal-common-law liability, and raise political questions (SPA21–23). The district court's skepticism toward the claims here arose from its belief that some entity other than the courts should redress the City's injuries. That belief neither is well-founded nor would warrant dismissal of the City's complaint if it were.

A. Foreign-policy considerations do not displace or preempt the City's claims.

The district court erred by finding that foreign-policy concerns required dismissing the complaint. Such a dismissal is appropriate only where there is "clear conflict" between state law and some concrete statement of U.S. foreign policy, such as an executive agreement with a

foreign state or a federal statute. *Am. Ins. Ass'n v. Garamendi*, 539 U.S. 396, 421 (2003) (executive agreement); *Crosby v. Nat'l Foreign Trade Council*, 530 U.S. 363, 372–73 (2000) (statute). No such conflict exists here.

The district court's concerns about foreign policy are entirely misplaced. The district court asserted that the City's "claims implicate countless foreign governments and their laws and policies" and that litigating this suit "would severely infringe upon the foreign-policy decisions that are squarely within the purview of the political branches" (SPA23). But the court never explained how. It never said how treating these five defendants like other product-makers sued in tort would conflict with any foreign-policy decisions by the United States. The court noted that climate change is the subject of international agreements, but it never articulated how a suit for damages between the City and private defendants would pose an obstacle to the accomplishment and execution of those agreements. The relevant agreements—such as the United Nations Framework Convention on Climate Change and the Paris Climate Accords—apply to nations instead of private parties.

This is a far cry from a state law seeking to impose a foreign-affairs approach contrary to one expressly set out by Congress in a statute (as in *Crosby*) or by executive agreements between the president and foreign states (as in *Garamendi*). This is a tort suit brought against companies whose products cause demonstrable harm in New York City. The fact that two of those companies are incorporated in foreign countries does not render them immune from U.S. tort law.

In the end, the district court's reasoning seems to be that because climate change is the subject of ongoing international discussions, any lawsuit related to climate change must conflict with foreign policy. But the existence of international discussions is insufficient to preempt tort law. In fact, courts that have considered the issue have repeatedly held that even direct state regulations of greenhouse gases are not preempted by attempts to negotiate international emissions reductions. *See Green Mt. Chrysler Plymouth Dodge Jeep v. Crombie*, 508 F. Supp. 2d 295, 396–97 (D. Vt. 2007) (holding that foreign-policy preemption did not apply to Vermont regulation of motor-vehicle greenhouse-gas emissions); *Cent. Valley Chrysler-Jeep, Inc. v. Goldstene*, 529 F. Supp.

2d 1151, 1183–88 (E.D. Cal. 2007) (same, as to California regulation). There must actually be a clear conflict. Here, there is none.

B. The City's claims do not implicate prudential doctrines limiting the application of U.S. law to conduct abroad.

Even if this Court finds that it was proper to federalize the City's claims, it should reject the district court's reasoning that these claims were barred by the presumption against extraterritorial application of U.S. law or the need for judicial caution in extending or creating federal causes of action. These prudential doctrines have no place here.

The district court made passing reference to the canon of statutory construction known as the presumption against extraterritoriality (SPA 21–22), but did not discuss how that presumption might apply outside the context of construing a federal statute. Indeed, the first step in analyzing this issue is determining "whether the statute gives a clear, affirmative indication that it applies extraterritorially." *RJR Nabisco, Inc. v. European Cmty.*, 136 S. Ct. 2090, 2101 (2016). This is an incoherent question where there is no statute to consider.

Even assuming the presumption applies here, there is no need to consider whether it is overcome—that is, whether the common-law

claims at issue *could* apply extraterritorially—because the City's claims for the local harms it is suffering simply do not apply extraterritorially. Instead, the "focus" of the City's claims is a "domestic injury." *RJR Nabisco*, 136 S. Ct. at 2106; *see id.* at 2101 n.5 (stating that a court may "in appropriate cases" begin with the "focus" inquiry rather than determining the extraterritorial reach of a law).

In determining whether a claim is extraterritorial, courts must determine whether the claim "touch[es] and concern[s] the territory of the United States." *Kiobel v. Royal Dutch Petroleum*, 569 U.S. 108, 124–25 (2013). The first step is to identify the territorial events or relationships that are the focus of the cause of action. *Morrison v. Nat'l Australia Bank Ltd.*, 561 U.S. 247, 267–68 (2010); *Mastafa v. Chevron Corp.*, 770 F.3d 170, 183 (2d Cir. 2014). The next step is to examine the plaintiff's allegations regarding where these events or relationships are located. If, as here, this location is within U.S. territory, the claim has domestic application.

The City's claims are focused on local, domestic injuries and so are not extraterritorial under this standard. Nuisance and trespass are quintessential causes of action focused on particular injuries rather

than the conduct that produced those injuries. Public nuisance is any "unreasonable interference with a right common to the general public." Restatement § 821B. The defendants' liability thus does not turn on the reasonableness or utility of the underlying conduct producing the interference. *Id.* §§ 829A, 826. The same is true of trespass, which is concerned with protecting property from invasion. The City's claims therefore focus on the site of its injuries—within its own local borders—not the site of the conduct giving rise to those injuries.

There is also no bar to the City's claims in the case law calling for judicial caution in creating or extending new federal-common-law causes of action that interfere with foreign policies. In finding to the contrary, the district court relied on *Jesner v. Arab Bank, PLC*, where foreign victims of terrorist acts occurring abroad sued a Jordanian bank under the Alien Tort Statute. 138 S. Ct. 1386 (2018). The Court there expressed reluctance to extend international law in this direction because foreign corporate liability was likely to hamper foreign relations, and indeed had in that particular case. *See Jesner*, 138 S. Ct. at 1406–07.

Here, in contrast, any impact on foreign relations from the City's suit would be purely speculative. Foreign corporations are regularly sued in the United States for injuries that their products cause in the United States. The fact that the harm here arises through the combined effects of Defendants' products when used both domestically and abroad is simply a product of the fact that local environmental harms are caused by conduct affecting the global atmosphere. The district court never identified any concrete way in which this lawsuit would adversely affect U.S. foreign policy on climate change. Indeed, the court's attempt to shoehorn this case into a framework set when construing the Alien Tort Statute—involving a lawsuit by foreign citizens against a foreign company for conduct undertaken entirely outside the United States and arguably implicating foreign governments—shows how far afield the court ventured in seeking grounds to dismiss the City's claims.

C. The City's claims do not present political questions.

In the final paragraph of its opinion, the district court gestured toward the notion that the City's suit may be barred by the political-question doctrine (SPA23–24). The decision is unclear because the court

attempted to distinguish contrary precedent under the political-question doctrine without offering any affirmative statement of why that doctrine might apply. But to the extent the court rested its decision on this doctrine, it again erred.

Indeed, this Court has already rejected the district court's conclusion. In *AEP I* it held that the responsibility for resolution of tort claims touching on climate change rests with the judiciary. 582 F.3d at 325. The Court explained that tort liability for injuries resulting from climate change can be addressed through principled adjudication. *Id.* at 329. In fact, federal courts have "successfully adjudicated complex common law public nuisance cases for over a century." *Id.* at 326. If a suit like *AEP*—where the plaintiffs requested that the district court weigh various harms and benefits in the course of mandating a specific 10-year plan for emissions reductions—does not implicate political questions assigned to the political branches, then the resolution of the state-law tort claim for damages against producers of fossil fuels here surely does not. *See also Comer v. Murphy Oil USA*, 585 F.3d 855, 875, 879 (5th Cir. 2009) (declining to find that state-law tort case alleging that the defendants' fossil fuel emissions caused harms suffered during

Hurricane Katrina presented a political question), *vacated for en banc review*, 598 F.3d 208 (5th Cir. 2010) (*en banc*), *appeal dismissed for failure of quorum*, 607 F.3d 1049 (5th Cir. 2010) (*en banc*).[10]

The district court's repeated statement that climate change is a matter left solely to the political branches of government lacks merit (SPA21, 23). The Supreme Court has been clear that federal courts are not barred from considering "political cases," only "political questions." *Baker v. Carr*, 369 U.S. 186, 217 (1962). Even if a legislative solution were preferable, the federal judiciary is not deprived of the ability to act. *Oneida Indian Nation v. New York*, 691 F.2d 1070, 1083 (2d Cir. 1982). Nor should it be. State-law nuisance and trespass claims offer a means for the City to seek redress for the local injuries it has suffered and continues to suffer.

Finally, the district court seemed to despair because it believed the problem of climate change was simply too large for judicial

[10] The Fifth Circuit regards the 2009 panel opinion in *Comer* as good law notwithstanding the procedural vacatur. *See Servicios Azucareros de Venezuela, C.A. v. John Deere Thibodeaux, Inc.*, 702 F.3d 794, 800 (5th Cir. 2012). And regardless of the subsequent procedural history, the panel's reasoning remains persuasive authority, particularly where the Fifth Circuit has never repudiated that reasoning.

resolution (SPA14, 20–21, 23). Nor is it the only district court to have done so. *See City of Oakland v. BP P.L.C.*, 325 F. Supp. 3d 1017, 1026 (N.D. Cal. 2018). But judicial surrender on viable claims is not permitted. "The defendants point to the scale of the wrong alleged and the size of the remedy sought as rendering the claims nonjusticiable.… Yet we know of no principle of law that would relate the availability of judicial relief inversely to the gravity of the wrong sought to be redressed." *Oneida Indian Nation*, 691 F.2d at 1083.

Contrary to the district court's recasting of the City's complaint, the City is not attempting to implement a "comprehensive solution" to climate change. Nor is it seeking anything that would interfere with such a solution that may be put forward by Congress or the President. The City is asking nothing more than that Defendants pay the costs of addressing the harms that their products cause when used as intended. A court can consider those claims and should be permitted the opportunity to do so here.

CONCLUSION

This Court should reverse the district court's judgment dismissing the complaint.

Dated: New York, NY
November 8, 2018

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

I hereby certify that this brief was prepared using Microsoft Word 2010, and according to that software, it contains 13,395 words, not including the table of contents, table of authorities, this certificate, and the cover.

/s/
JOHN MOORE

18-2188

United States Court of Appeals for the Second Circuit

CITY OF NEW YORK,

Plaintiff-Appellant,

v.

CHEVRON CORPORATION, CONOCOPHILLIPS, EXXON MOBIL CORPORATION, ROYAL DUTCH SHELL PLC, BP P.L.C,

Defendants-Appellees.

On Appeal from the United States District Court
for the Southern District of New York

BRIEF FOR AMICI CURIAE STATES OF NEW YORK, CALIFORNIA, MARYLAND, NEW JERSEY, OREGON, RHODE ISLAND, VERMONT, AND WASHINGTON, AND THE DISTRICT OF COLUMBIA IN SUPPORT OF APPELLANT

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Dated: November 15, 2018

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INTEREST OF AMICI

Amici—eight States and the District of Columbia—have experienced profound and costly impacts from climate change and are heavily invested in mitigating the future impacts of climate change. Within our borders, climate change already is causing a loss of land due to rising seas;[1] reductions in drinking water supplies due to decreased snowpack;[2] reductions in air and water quality; reductions in the productivity of agriculture and aquaculture; the decimation of biodiversity and overall ecosystem health; and increases in the frequency and intensity of heatwaves, insect-borne diseases, wildfires, severe storms, and flooding.[3]

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[1] *See, e.g.*, *Massachusetts v. EPA*, 549 U.S. 497, 522-23 (2007) (discussing how greenhouse gases cause sea level rise that had "already begun to swallow Massachusetts' coastal land").

[2] *See, e.g.*, *Connecticut v. American Elec. Power Co. ("AEP")*, 582 F.3d 309, 341-42 (2d Cir. 2009) (noting that reduced snowpack is already occurring, and that "declining water supplies and the flooding occurring as a result of the snowpack's earlier melting obviously injure property owned by the State of California"), *rev'd on other grounds*, 564 U.S. 410 (2011).

[3] For a detailed description of climate harms to various States and localities, see generally Appendix A to Comments of the Attorneys General of New York, et al. on EPA's Proposed Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units (Oct. 31, 2018) (internet). (For sources available on the internet, full URLs appear in the table of authorities.)

Because climate change is unlikely to abate in the near future, amici States—like plaintiff the City of New York (City)—likely will have to undertake significant, costly measures to adapt to a warmer world. The City seeks to use New York's common law of nuisance and trespass to ensure that some of the adaptation costs it has already started to incur are shared by the five largest publicly owned fossil fuel corporations. As detailed in the City's Amended Complaint (Complaint), those companies have profited from the marketing and sale of their fossil fuel products that are responsible for climate change, and are thus properly held responsible for some of the foreseeable costs of the use of their products.

The United States District Court for the Southern District of New York (Keenan, J.) dismissed the City's common-law claims on the ground that they are based on harms from the emissions of greenhouse gases and such harms are governed exclusively by federal law. But that holding ignores the fact that the City's tort claims do not seek relief for *emissions*—which have long been subject to standards set pursuant to federal common law and then the federal Clean Air Act—but instead seek relief for *marketing and selling* defendants' environmentally harmful products, conduct which has not been regulated by federal common law

or delegated exclusively to the U.S. Environmental Protection Agency (EPA) under the Clean Air Act. The district court's dismissal of the City's claims reflects its incorrect view that federal law alone governs *all* actions touching on climate harms.

Courts have consistently held otherwise, recognizing that States have not only critical interests in abating climate change and mitigating climate harms, but also authority to address those interests. Amici States already have adopted numerous measures to mitigate the dangers of a warming world, including carbon-trading programs, efficiency mandates, adaptation measures, and more. Like the City's common-law claims here, many of these measures impose mandates or responsibilities on contributors to climate change in order either to reduce greenhouse-gas emissions or to respond to their effects.

The district court's holding here would lead to the extraordinary conclusion that no law at all applies to the environmental harms caused by defendants' allegedly tortious activities. Under the district court's view, state common law is displaced by federal common law and federal common law is displaced by the Clean Air Act, which provides no remedies to the City for the conduct and harms alleged in the complaint.

This Court should reject that approach and hold that state common law may properly provide a remedy for defendants' conduct.

ARGUMENT

POINT I

STATES AND LOCALITIES HAVE ADOPTED A BROAD RANGE OF MEASURES TO ABATE AND MITIGATE CLIMATE HARMS

At the heart of the district court's erroneous ruling is its conclusion that defendants' conduct is subject exclusively to federal laws governing transboundary emissions of air pollution—even though that conduct is distinct from any emissions activity that is directly governed by such laws. A recurring theme of the district court's opinion—one that appears in its analyses of the effect of federal common law (SPA 13), the effect of federal statutory law (SPA 20), and the effect of federal foreign policy (SPA 23) on the City's claims—is that the federal government is the appropriate entity to formulate solutions to the harms of climate change: only the federal government can develop a "uniform, national solution" to "an immense and complicated problem" that "requires a comprehensive solution weighing the global benefits of fossil fuel use with the gravity of impending harms." (SPA 20-21, 23.)

The district court's reasoning, however, is inconsistent with the States' longstanding authority to protect their residents from environmental harms. "It is well settled that states have a legitimate interest in combating the adverse effects of climate change on their residents," and that they may use their broad sovereign powers "to protect the health of citizens in the state" from the harms of climate-altering air pollution. *American Fuel & Petrochem. Mfrs. v. O'Keeffe*, 903 F.3d 903, 913 (9th Cir. 2018) (quotation marks omitted); *see also Massachusetts*, 549 U.S. at 521-23 (recognizing significant state interests in climate change). Exercising such powers, States have taken substantial steps in the past years to reduce climate-altering emissions and to prepare the adaptation measures required to survive in a warming world.

For example, New Jersey's Global Warming Response Act requires set levels of carbon reductions—culminating in a 2050 level that is 80% lower than the State's 2006 level—and also establishes funding for climate-related projects and initiatives. N.J. Stat. Ann. §§ 26:2C-37 to -58. Washington law requires the largest electric utilities to meet a series of benchmarks on the amount of renewables in their energy mix, and to achieve 15% reliance on renewables by 2020. Wash. Rev.

CodeP§§ 19.285.010-19.285.903. And Maryland recently amended its laws to require that utilities derive 25% of their sales from renewable sources by 2020, and to encourage, through tax credits and study methods, installation of energy storage measures that will facilitate the integration of renewable energy into its energy grid. Md. Laws Ch. 1 (2017) (Pub. Utils. § 7-703(b)(15)); Md. Laws Ch. 389 (2017) (Tax Law § 10-719); Md. Laws. Ch. 382 (2017).[4]

The States also have collaborated on successful regional solutions. California is part of the Western Climate Initiative, which comprises a multi-sector approach to reducing greenhouse gas emissions, including through a cap-and-trade program.[5] Nine northeastern States (including several amici) are part of the Regional Greenhouse Gas Initiative,[6] a cap-and-trade system codified and implemented through each participating States' laws and regulations, which places increasingly stringent limits

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[4] For a broader sampling of state-led initiatives, see generally Appendix B to Comments of the Attorneys General of New York, et al. on EPA's proposed Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units (Oct. 31, 2018) (internet).

[5] *See* http://www.wci-inc.org.

[6] *See* https://www.rggi.org.

on carbon pollution from power plants. Since this initiative's implementation, the participating States have reduced power-sector carbon-dioxide emissions by forty percent.[7] And, California, Oregon, and Washington are members of the Pacific Coast Collaborative, a West Coast initiative that includes aggressive commitments for greenhouse-gas emission reductions by 2050.[8]

To be sure, efforts to address climate change or redress its harms would be enhanced if undertaken nationwide—and even more so if adopted globally. But, in the meantime, state law—including state common law—can provide a valuable tool to combat these harms. Indeed, this Court has already rejected the argument that state common-law suits are barred by a need to "wait for the political branches to craft a 'comprehensive' global solution to global warming," *AEP*, 582 F.3d at 331, and the Supreme Court affirmed that ruling, 564 U.S. at 420 & n.6 (rejecting threshold challenges by equally divided court). And contrary to the district court's reasoning (SPA 20-21, 23), Congress has not required

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[7] Acadia Center, Outpacing the Nation: RGGI's Environmental and Economic Success 3 (Sept. 2017) (internet).

[8] *See* http://pacificcoastcollaborative.org/about/.

the States to rely solely on the federal government to formulate solutions to the harms of climate change. Indeed, as set forth below (at __-__), the Clean Air Act's broad reservation of state authority belies the notion that the federal government has *exclusive* authority to address air pollution and climate harms. Rather, the States retain broad authority to address climate harms, whether through positive enactments or the common law.

And properly so. State authority is essential to respond to one of the most important public policy issues of our time. As this Court noted in 2009, "there really is no unified [federal] policy on greenhouse gas emissions." *AEP*, 582 F.3d at 331-32. Since that time, there has been no significant federal climate change legislation from Congress, and the Executive Branch has been unwilling (or unable, because of court challenges) to declare a consistent, coherent climate policy or to sustain engagement in international negotiations on carbon reductions or climate-change mitigation.[9] The district court's view that use of state

[9] In June 2017, the President initiated the United States' withdrawal from the Paris Accord (a process that cannot be completed before 2020), the current international framework in which member nations undertake to address climate change. More recently, in explaining his view that no urgent measures were required to address rising temperatures and increasing greenhouse gas emissions, the

common law to mitigate climate harms should cede to a unitary national or international policy is inconsistent with that reality. The States must retain authority to address climate-change harms through the use of their historical sovereign powers, including through the use of state common law to address the gaps not regulated by federal law.

POINT II

CLAIMS SEEKING TO REQUIRE FOSSIL FUEL PRODUCERS TO BEAR SOME OF THE COSTS OF THEIR PRODUCTS ARE NOT DISPLACED BY FEDERAL COMMON LAW OR PREEMPTED BY THE CLEAN AIR ACT

The district court ignored the crucial distinction between this suit against sellers of fossil fuel products and a suit against emitters of air pollution. (*See, e.g.*, SPA 14, 17-18, 20). As a result, it mistakenly invoked case law relating to emitters, and mistakenly held that the City's state common-law claims were barred by federal common law and the federal Clean Air Act, although each addresses the obligations of pollution emitters and not the marketing and sale of fossil fuels by these defendants.

President expressed doubts that climate change was due to human activity. *See* President Donald J. Trump, Statement on the Paris Climate Accord (June 1, 2017) (internet); Interview by Lesley Stahl with President Donald J. Trump, *60 Minutes* (Oct. 15, 2018) (internet).

A. The State-Law Claims Pleaded by the City Are Not Governed by Federal Common Law.

1. State common law has traditionally governed sales of products that lead to environmental harms.

The district court based its determination that the City's claims must be brought under federal common law on the incorrect premise that tort suits seeking to redress the harms from greenhouse-gas emissions are categorically outside the purview of state common law. (*See* SPA 11.) The Supreme Court decisions cited by the district court do not go so far. Rather, those cases hold only that federal common-law standards governed suits by States seeking direct limits on out-of-state pollution emissions into interstate flows. *See Illinois v. City of Milwaukee (Milwaukee I)*, 406 U.S. 91, 103-04 (1972); *see also International Paper Co. v. Ouellette*, 479 U.S. 481, 492 (1987) (explaining that Clean Water Act displaced this federal common law); *AEP*, 564 U.S. at 429 (listing cases applying federal common law in "suits brought by one State to abate pollution emanating from another State").[10]

[10] The district court also cited to the Ninth Circuit's decision in *Native Village of Kivalina v. ExxonMobil Corporation*, 696 F.3d 849, 855 (9th Cir. 2012), which similarly addressed the conduct of those responsible for transboundary pollution discharges.

The City's claims here are quite different. The City's damages suit seeks to hold defendants liable for some share of the costs that defendants have inflicted on the City and its residents by selling and marketing fossil fuel products whose foreseeable use will cause harm to the City. The City thus does not seek to directly abate any interstate air pollution or even to regulate the conduct of emitters.

Whether or not the City can prove the elements of its tort claims, the conduct that the City has alleged plainly falls within the realm of state law. Unlike regulating out-of-state discharges into interstate streams of air or water, it has always been the province of the States to develop standards (including common-law tort standards) to regulate the sales of products whose use causes environmental harm. Moreover, it is of no moment under state law whether parties other than defendants ultimately introduced those products into the environment or caused the exposures that inflicted the harms: tort law regularly imposes liability on multiple actors for different conduct that collectively causes or facilitates a harm. *See, e.g.*, *Chianese v. Meier*, 98 N.Y.2d 270, 273-74 (2002) (apportioning personal injury tort damages between intentional assailant and negligent landlord); *Penn Cent. Transp. Co. v. Singer*

Warehouse & Trucking Corp., 86 A.D.2d 826, 828 (1st Dep't 1982) ("Everyone who creates a nuisance or participates in the creation or maintenance thereof is liable for it." (quotation marks omitted)).

For example, this Court found that a worldwide producer, wholesaler, and marketer of gasoline was liable under New York nuisance law for supplying a third-party service station with gasoline containing a toxic additive that ultimately leached into the ambient environment through the service station's leaky tanks. *In re "MTBE" Prods. Liability Litig.*, 725 F.3d 65, 121 (2d Cir. 2013). This Court also has held that state common law governed veterans' claims against the manufacturer and seller of a herbicide for injuries caused by the military's use of that chemical abroad. *In re "Agent Orange" Prod. Liability Litig.*, 635 F.2d 987, 993-94 (2d Cir. 1980). Similarly, the en banc Fifth Circuit allowed state common-law suits against the major manufacturers and sellers of asbestos by plaintiffs exposed in the workplace. *See Jackson v. Johns-Manville Sales Corp.*, 750 F.2d 1314, 1316 (5th Cir. 1985) (en banc). As these cases all recognize, the manufacturer or producer of a product may be held liable under the common law for the foreseeable harms caused by the use of their

products, even if the manufacturer or producer was not itself directly responsible for that use.

The district court failed to recognize these black-letter common-law principles and instead mischaracterized the City's allegations. It reframed the complaint as "based on the 'transboundary' emission of greenhouse gases" (SPA 14) or, alternatively, as addressing the "combustion of Defendants' fossil fuels" on a "worldwide basis" by entities other than defendants (SPA 20). But that framing is irreconcilable with the City's actual allegations: that defendants marketed and sold large quantities of their fossil fuel products, including in New York State, when defendants for decades have known that those fuels would cause climate harms. Whether or not that theory comprises a viable nuisance or trespass claim, it is not displaced by any established body of federal common law.

2. Defendants cannot show a uniquely federal interest or a significant conflict with that interest.

This Court should not expand the scope of federal common law to reach a new class of environmental case absent the type of "actual, significant conflict between state law and a federal interest" not present

here. *See Woodward Governor Co. v. Curtiss-Wright Flight Sys., Inc.*, 164 F.3d 123, 127 (2d Cir. 1999). "Cases that call for the creation of federal common law are few and restricted." *Marsh v. Rosenbloom*, 499 F.3d 165, 181 (2d Cir. 2007) (quotation marks omitted). Federal common law arises only in areas "involving uniquely federal interests" that "are so committed by the Constitution and laws of the United States to federal control that state law is pre-empted and replaced." *Boyle v. United Techs. Corp.*, 487 U.S. 500, 504 (1988) (quotation marks omitted). There is no uniquely federal interest at stake in this matter because there is no "genuinely identifiable" federal policy (see *supra* at 8-10) implicated by claims against those who produce, market, and sell the fossil fuels responsible for the lion's share of global warming. *See O'Melveny & Myers v. FDIC*, 512 U.S. 79, 89 (1994).

The district court focused on a purported need for a federally driven, uniform solution to the overall problem of climate change. But "a mere federal interest in uniformity is insufficient to justify displacing state law in favor of a federal common law rule," and "variations in rules among states do not prove a need for uniformity." *Marsh*, 499 F.3d at 182-83 (quotation marks omitted); *see also In re "Agent Orange" Litig.*, 635 F.2d

at 993, 996 (no sufficient federal interest in creating a uniform federal rule to set litigation standards in suit involving more than two million plaintiffs in up to forty different judicial districts). The Supreme Court has made it clear that uniformity will suffice as a uniquely federal interest only where there is a need for a single rule to govern "the primary conduct of the United States" or its agents. *E.g.*, *O'Melveny & Myers*, 512 U.S. at 88.[11] Otherwise, "we would be awash in 'federal common-law' rules." *Id.* at 88. Thus, for claims like the one here—which are "against private manufacturers" and are not "asserted by or against the United States," and where "no substantial rights or duties of the government hinge on [their] outcome"—there is no uniquely federal interest in uniformity that would justify overriding state law. *In re "Agent Orange" Litig.*, 635 F.2d at 993.[12]

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[11] "[F]ederal courts since *O'Melveny*"—which was decided in 1994, after the Supreme Court cases on which the district court relied—"have shown a marked reluctance to displace state law by finding a significant conflict with a federal interest." *Woodward Governor*, 164 F.3d at 127.

[12] *See also Woodward Governor*, 164 F.3d at 128 (finding no sufficient federal interest in dispute between private subcontractors under federal procurement contract because "the United States has no immediate interest" in the outcome "and there is no allegation that the United States could incur liability").

Even if there were a uniquely federal interest somewhere in this field, such an interest still would establish only "a necessary, not a sufficient, condition for the displacement of state law," *Boyle*, 487 U.S. at 506. Defendants also would have to show "an actual, significant conflict," by identifying, at a bare minimum, at least "a single state law or state-imposed duty" at odds with the federal interest. *Empire Healthchoice Assurance, Inc. v. McVeigh*, 396 F.3d 136, 141 (2d Cir. 2005) (quotation marks omitted), *aff'd*, 547 U.S. 677 (2006). Yet the district court never explained how a liability imposed on the companies who market and sell fossil fuels would conflict with, rather than further, the policies embodied by federal law.[13] *See Woodward Governor*, 164 F.3d at 127 (conflict "must be specifically shown, and not generally alleged" (quotation marks omitted)).

[13] *Cf.* Energy Policy Act of 1992, 42 U.S.C. § 13382(a)(2), (g) (policy of "stabilization and eventual reduction in the generation of greenhouse gases"); Global Climate Protection Act of 1987, Pub. L. No. 100-204, § 1103(a)(3), 101 Stat. 1331, 1408 (policy to "limit mankind's adverse effect on the global climate").

3. The district court's invocation of federal common law is inconsistent with its separate conclusion that federal common law has been displaced by the Clean Air Act.

The district court also erred for a separate reason in concluding that federal common law on transboundary air pollution applied here. The court reasoned that the City's "'interstate pollution' claims arise under federal common law, and the Clean Air Act displaces [federal common law] claims." (SPA 20.) But that analysis is internally inconsistent: if the Clean Air Act displaces the applicable federal common law, then there is no federal common law available to in turn displace state common law. Instead, the only remaining analysis is whether the Clean Air Act preempts state law. For the reasons given below (see *infra* at 19-26), it does not.

The Supreme Court's decisions in *AEP* and *Ouellette* confirm this point. In *AEP*, the Supreme Court held that the Clean Air Act displaced federal common-law nuisance claims seeking to impose greenhouse-gas emission limits on power plants. 564 U.S. at 423, 429. Turning then to the state common-law claims also pleaded in that case, the Court cited twice to *Ouellette* to hold that the availability of such claims would depend on "the preemptive effect" of the federal Clean Air Act—not on

whether such state common-law claims would be covered by the now-displaced federal common law. *Id.* at 429; *see also Ouellette*, 479 U.S. at 497 (holding that when federal common-law claims for interstate water pollution were displaced by the Clean Water Act, state common-law claims were viable except to the extent preempted by that act).

The district court's failure to follow *AEP* and *Ouellette* led it to invoke the wrong presumption here. When the question is whether a federal statute has displaced federal common law, "separation of powers concerns create a presumption in favor of" displacement. *In re Oswego Barge Corp.*, 664 F.2d 327, 335 (2d Cir. 1981). By contrast, when the question is whether a federal statute preempts state law, "federalism concerns create a presumption against preemption of state law, including state common law." *Id.* The district court asked whether the Clean Air Act displaced federal common law (which in turn had displaced state common law), when the proper inquiry is whether the Clean Air Act preempts state common law. As a result, the district court improperly applied the presumption in favor of displacement, using a test that "does not require the same sort of evidence of a clear and manifest

congressional purpose demanded for preemption of state law." *AEP*, 564 U.S. at 423 (quotation marks and alteration omitted).

B. The Clean Air Act Does Not Preempt the City's Claims.

The district court erred in determining that the Clean Air Act barred the City's state-law claims. A finding that the federal Clean Air Act preempts state common law would require a showing that Congress had a "clear and manifest" intent to do so. *See Sprietsma v. Mercury Marine*, 537 U.S. 51, 69 (2002). That showing could be made in one of three ways: by establishing (1) that Congress "expressly preempted" the state law; (2) that Congress "has legislated so comprehensively that federal law occupies an entire field of regulation and leaves no room for state law"; or (3) that "local law conflicts with federal law such that it is impossible for a party to comply with both or the local law is an obstacle to the achievement of federal objectives." *New York SMSA Ltd. P'ship v. Town of Clarkstown*, 612 F.3d 97, 104 (2d Cir. 2010) (quotation marks omitted).

Although the district court did not reach the necessary preemption analysis, it could not have found preemption here. It is undisputed that no provision of the Act expressly preempts the City's state-law claims.[14]

Nor does the Act bar the City's suit by occupying the field. The district court focused on the Act's various procedures to set emission standards for stationary sources that emit air pollutants (including greenhouse gases). But those provisions do not touch on the sale and marketing of fossil fuels.[15] "There is no federal pre-emption in vacuo, without a constitutional text or a federal statute to assert it," and here, no "enacted statutory text" supports the district court's exceptionally

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[14] While a provision of the Clean Air Act does give EPA a circumscribed authority to preempt state regulations imposing controls or prohibitions on motor vehicle fuels, that provision has no bearing on this suit, and defendants have not argued otherwise. *See* 42 U.S.C. § 7545(c)(4) (preempting state regulations of vehicle fuels if they (1) are aimed at controlling motor vehicle emissions; and (2) the Administrator has prescribed a control or prohibition on a particular fuel's characteristic or component or published a determination that no such control or prohibition is necessary).

[15] Nor does any provision of the Clean Air Act speak to the type of damages remedy the City here pursues. *See Exxon Shipping Co. v. Baker*, 554 U.S. 471, 488-89 (2008) (holding that plaintiffs could seek damages not authorized by Clean Water Act because that Act did not "occupy the entire field of pollution remedies").

broad reading of those provisions.[16] *See Puerto Rico Dep't of Consumer Affairs v. Isla Petroleum Corp.*, 485 U.S. 495, 503 (1988).

Any possibility of field preemption is also foreclosed by the Act's express recognition that addressing air pollution "is the primary responsibility of States and local governments." 42 U.S.C. § 7401(a)(3); *see also New York Pub. Interest Research Grp. v. Whitman*, 321 F.3d 316, 320 (2d Cir. 2003). The Act thus expressly preserves the ability of States and political subdivisions to "adopt or enforce," inter alia, "any requirement respecting control or abatement of air pollution," except that such requirements may not be "less stringent" than required by the Act or EPA. 42 U.S.C. § 7416; *see also Connecticut v. EPA*, 696 F.2d 147, 151 (2d Cir. 1982) (describing Act's "cooperative federalism" approach). While the federal government is tasked with developing baseline air-pollution standards, the States "are expressly allowed to employ standards more stringent than those specified by the federal requirements," and the

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[16] Indeed, Congress's delegation of authority to a federal agency should not be read to "negate the lawful exercise of state authority" over activity that Congress has not given that agency authority to regulate. *National Ass'n of Regulatory Util. Comm'rs v. FCC*, 880 F.2d 422, 428-29 (D.C. Cir. 1989) (delineating preemptive effect of Communications Act).

States determine in the first instance how to achieve the relevant standards.[17] *Bell v. Cheswick Operating Station*, 734 F.3d 188, 190 (3d Cir. 2013); 42 U.S.C. § 7416. The Act's express terms thus foreclose any interpretation that would "leave[] no room for state law" in the field of air pollution regulation. *See New York SMSA*, 612 F.3d at 104 (quotation marks omitted).

Conflict preemption is similarly foreclosed. Subjecting defendants to the City's causes of action for damages would not interfere with the Act's emissions-related procedures or "effectively override" any such policy choice that the Clean Air Act delegates to federal and state agencies. *See Ouellette*, 479 U.S. at 495. The district court's concern that this suit would conflict with the emissions regulations actually covered by the Clean Air Act hinged entirely on its misplaced belief that granting relief would require the court to assess the conduct of nonparty emitters and to determine "what constitutes a reasonable amount of greenhouse

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[17] The federal government also serves a backstop function when States fail to comply in the first instance with their obligations under the Act. *See, e.g.*, 42 U.S.C. § 7410(c)(1) (requiring EPA to promulgate federal implementation plans in cases where state implementation plans are missing or defective). That role is not at issue here.

gas emission under the Clean Air Act." (SPA 18.) But the City is not asking for the court to "determine, in the first instance, what amount of carbon-dioxide emissions is unreasonable" for any given emitter or emitting industry, nor to "decide what level of reduction is practical, feasible and economically viable." *See AEP*, 564 U.S. at 428 (quotation marks omitted). Rather, the City seeks only to compel defendants to bear some portion of the costs that have been imposed on the City by the intended and foreseeable use of the products that defendants have sold. By seeking damages rather than injunctive relief, the City's claims would not prevent defendants (much less any party regulated by the Clean Air Act) from engaging in any type or level of conduct. Rather, defendants need only bear some of the costs of the harms that their profitable activities have externalized onto others.

In any event, even if the City's claims could be construed as somehow regulating the emitting sources that the Clean Air Act directly regulates, those claims still would not necessarily conflict with the Act. The Supreme Court's interpretation of the preemptive scope of the Clean Water Act—a statute that resembles the Clean Air Act in key

respects[18]—illustrates the narrow class of conflict that would be required to trigger preemption. The Supreme Court has squarely held that the Clean Water Act does not preempt States from regulating effluent discharges through applying the common law of a State in which a discharge occurs. Rather, States are preempted only from applying their own common law to a wholly out-of-state discharge authorized by a Clean Water Act permit, as such a cross-border application would impermissibly allow a nonsource State to "effectively override both the permit requirements and the policy choices made by the source State." *Ouellette*, 479 U.S. at 495-97; *see also AEP*, 564 U.S. at 429 (citing *Ouellette* analysis as applicable to Clean Air Act).

Applying this same analysis to the Clean Air Act, the Third and Sixth Circuits have declined to apply conflict preemption, allowing

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[18] As with the Clean Air Act, the Clean Water Act broadly reserves state authority over pollution discharges, and contains a savings clause that uses virtually the same language as the Clean Air Act in recognizing the States' principal regulatory role. To the extent there are any differences between the statutes, courts have generally concluded that "Congress intended to preserve more rights for the states, rather than less," in the Clean Air Act as compared to the Clean Water Act. *Bell*, 734 F.3d at 190.

common-law suits brought directly against air-pollution emitters to proceed under the laws of the States in which they operated. *See Merrick v. Diageo Americas Supply, Inc.*, 805 F.3d 685, 690 (6th Cir. 2015) ("the Clean Air Act expressly preserves the state common law standards on which plaintiffs sue"); *Bell*, 734 F.3d at 190 ("source state common law actions are not preempted").[19] But here, failing to apprehend that state common law may be viable even in suits brought against emitters regulated by the Act, the district court failed to specify how granting the City relief would result in a sharp conflict with the Clean Air Act's procedures or the Act's statutory allocation of authority. *See Ouellette*, 479 U.S. at 497-99; *see also In re MTBE Litig.*, 725 F.3d at 101 (preemption requires "sharp" and "actual conflict" (quotation marks omitted)).

For preemption purposes, it is also immaterial that this suit is based on state common law rather than state legislation or regulation.

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[19] In *North Carolina ex rel. Cooper v. Tennessee Valley Authority*, the Fourth Circuit relied on *Ouellette* to hold that North Carolina could not use its own state nuisance law to limit the purely out-of-state emissions of power plants located in Tennessee and Alabama. 615 F.3d 291 (4th Cir. 2010). To the extent that the Fourth Circuit, in dicta, read *Ouellette* as creating a general presumption against nuisance suits in the field of air pollution, even as applied to in-state sources, *see id.* at 303, the court simply misread the Supreme Court's decision.

The preemption analysis requires the same showing of a manifest intent to preclude the operation of state law, whatever its source. *See, e.g.*, *Sprietsma*, 537 U.S. at 69. And nothing in the Clean Air Act reflects a congressional intent to more broadly preclude state common law than state statutes and regulations. To the contrary, the Clean Air Act's savings clause preserves States' ability to "adopt or enforce . . . any *requirement* respecting control or abatement of air pollution," 42 U.S.C. § 7416 (emphasis added), and the term "requirement" in preemption clauses is routinely construed to "reach[] beyond positive enactments, such as statutes and regulations, to embrace common-law duties." *Bates v. Dow Agrosciences LLC*, 544 U.S. 431, 443 (2005); *accord Cipollone v. Liggett Grp.*, 505 U.S. 504, 521 (1992); *see also Ouellette*, 479 U.S. at 497-99 (holding that the similarly structured Clean Water Act preserves state common-law suits except those incompatible with that act's procedures).

CONCLUSION

For the reasons above, amici urge this Court to reverse the decision below and confirm the continuing vitality of state law to address the conduct alleged in the City's complaint.

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Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to Rule 32(a) of the Federal Rules of Appellate Procedure, Oren L. Zeve, an employee in the Office of the Attorney General of the State of New York, hereby certifies that according to the word count feature of the word processing program used to prepare this brief, the brief contains 5,412 words and complies with the typeface requirements and length limits of Rules 29 and 32(a)(5)-(7), and Circuit Local Rule 32.1.

/s/ Oren L. Zeve

DISTRICT COURT, COUNTY OF BOULDER STATE OF COLORADO Boulder County Combined Court 1777 Sixth Street Boulder, CO 80302	
Plaintiffs: BOARD OF COUNTY COMMISSIONERS OF BOULDER COUNTY; BOARD OF COUNTY COMMISSIONERS OF SAN MIGUEL COUNTY; CITY OF BOULDER v. **Defendant**: SUNCOR ENERGY (U.S.A.), INC.; SUNCOR ENERGY SALES, INC.; SUNCOR ENERGY, INC.; EXXON MOBIL CORPORATION	▲COURT USE ONLY▲ Case Number: Division:
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COMPLAINT AND JURY DEMAND

Plaintiffs Board of County Commissioners of Boulder County, Board of County Commissioners of San Miguel County and the City of Boulder, through counsel, allege the following against Defendants Suncor Energy (U.S.A), Inc., Suncor Energy Sales, Inc., Suncor Energy, Inc., and Exxon Mobil Corporation.

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INTRODUCTION

1. The Plaintiffs in this case are three local governmental entities in the State of Colorado that face substantial and rising costs to lessen the impacts of human alteration of the climate ("climate change") on their property and to protect the health, safety and welfare of their residents.

2. They bring this lawsuit against Exxon Mobil Corporation ("Exxon") and companies affiliated with Suncor Energy Inc. (collectively, the "Suncor Defendants," more specifically defined in Paragraphs 45-64 below) for the substantial role they played and continue to play in causing, contributing to and exacerbating climate change.

3. As recognized by both Colorado's Governor and General Assembly, climate change will bring more (and more serious) heat waves, wildfires, droughts, and floods to the State, as well as myriad other consequences caused by rapidly rising temperatures.

4. These impacts have already harmed Plaintiffs' property and impacted the health, safety and welfare their residents. The damages will only multiply as climate change worsens. Plaintiffs are taking reasonable (and necessary) measures to address and abate these impacts within their respective jurisdictions. As the impacts of climate change grow more severe, they will do more harm to Plaintiffs and cause greater expense.

5. Alone, Plaintiffs and their taxpayers cannot pay the full costs of all that is needed, nor should they. The costs should be shared by the Suncor and Exxon Defendants because they *knowingly* and *substantially* contributed to the climate crisis by producing, promoting and selling a substantial portion of the fossil fuels that are causing and exacerbating climate change, while concealing and misrepresenting the dangers associated with their intended use.

6. Plaintiffs are not asking this Court to stop or regulate the production of fossil fuels in Colorado or elsewhere and they are not asking this Court to stop or regulate emissions in Colorado or elsewhere; they ask only that Defendants help remediate the nuisance caused by their intentional, reckless and negligent conduct, specifically by paying their share of the Plaintiffs' abatement costs.

7. **Changes to the climate were caused by, and continue to be exacerbated by, unabated fossil fuel use**. Since the 1960s, unchecked fossil fuel combustion has caused an unprecedentedly rapid rise in the concentration of greenhouse gases (GHGs) in the atmosphere. Indeed, fossil fuel combustion accounts for nearly 80 percent of all GHG emissions between 1970 and 2010. As a result, more heat has been, is being, and will continue to be trapped by the atmosphere, triggering changes to the climate.

8. **The hazards created by climate change are real, recognized by every level of the government in the United States, and pose a clear and present threat to property and public health in Colorado**. Climate change impacts in Colorado are and will continue to be severe. For example, in 2017, the federal government reported that "[t]he frequency and intensity of extreme high temperature events are *virtually certain* to increase" and "[t]he incidence of large forest fires in the western United States [which has already increased on account of climate change] . . . is projected to further increase in those regions as the climate changes, with profound changes to regional ecosystems." These and other changes, moreover, "are particularly important for human safety, infrastructure, agriculture, water quality and quantity, and natural ecosystems."

9. **Plaintiffs have taken substantial steps to prevent climate change, but have been harmed, and will continue to suffer harms regardless**. Climate change has already injured people and damaged property. Recognizing this, Plaintiffs have taken substantial steps to reduce their own GHG emissions. They have taxed their residents to fund emission reduction efforts, limited their own fossil fuel use, and tried to prohibit or reduce the environmental impacts of fossil fuel production within their borders.

10. In spite of these efforts, and in light of the hazards that are here and worsening, Plaintiffs are spending, and must continue to spend, millions of dollars to protect their property and residents from the impacts of climate change.

11. **Defendants cannot contest the reasonableness or necessity of Plaintiffs' climate response.** While Defendants publicly fought against climate science – to protect their profits from the impacts of regulation and informed public choice – they privately relied on the same established science to protect their business from climate change impacts. Now that Plaintiffs are also forced to grapple with and respond to climate change, Defendants cannot contest the necessity of a response.

12. **While Plaintiffs have acted reasonably, Defendants have acted recklessly.** Decades ago, Defendants learned: that fossil fuel combustion was causing a dramatic rise in the concentration of GHGs in the atmosphere; that "significant temperature changes" were likely to result, which would, in turn, "bring about climatic changes"; that "there [was] no leeway" time for remedial action; and that "[w]e can either adapt our civilization to a warmer planet or avoid the problem by sharply curtailing the use of fossil fuels." They were specifically warned that inaction would likely cause "dramatic climatic changes," including a temperature rise of 9°F,

complete snow loss "in the contiguous states, except on higher mountains," and "major shifts in weather patterns in the northern hemisphere."

13. Despite receiving the warning that "fossil fuel use should not be encouraged," Defendants spent decades selling and promoting fossil fuels without disclosing the dangers that continued fossil fuel over-use posed.

14. **Defendants have substantially contributed to and exacerbated the impacts of human-caused climate change, thereby substantially contributing to Plaintiffs' injuries.** Defendants are responsible for billions of tons of the excess greenhouse gas emissions in the atmosphere. They have sold a substantial percentage of all the fossil fuels whose intended and foreseeable use – i.e., combustion – contributed to and exacerbated the impacts of climate change. Moreover, long after they became aware of the dangers of climate change, Defendants chose to develop dirtier fuel sources and sell dirtier fuels that create substantially more GHGs than traditional fossil fuels when burned, notably those developed from the Canadian tar sands[1] and refined in Colorado.

15. **Defendants' present and planned fossil fuel activities will accelerate and exacerbate climate change and its impacts.** Defendants' ongoing actions continue to significantly contribute to climate change. While they may now acknowledge the reality of climate change, they nevertheless plan to produce and sell even more fossil fuels in the future. Plaintiffs' costs of adapting to climate change will only increase if this happens.

16. **Defendants acted to prevent and forestall changes in energy use and supply, which they knew were needed, exacerbating the harms suffered by Plaintiffs and their**

[1] Tar sands are also known as oil sands.

residents. By hiding what they knew about, and affirmatively misrepresenting the dangers of unabated fossil fuel use, the Defendants protected fossil fuel demand, and obstructed the changes needed to prevent or at least minimize the impacts of climate change.

I. PARTIES

A. Plaintiffs

17. The Plaintiffs in this case are the Board of County Commissioners of Boulder County ("Boulder County"), the Board of County Commissioners of San Miguel County ("San Miguel County"), and the City of Boulder (occasionally referenced hereafter as the "City").[2]

BOULDER COUNTY

18. Plaintiff Boulder County, a subdivision of the State of Colorado, is a body corporate and politic in the State of Colorado empowered to sue and be sued. It lies in north central Colorado, on the eastern slopes of the Rocky Mountains in the Front Range Urban Corridor, encompassing 753 square miles.

19. Land within the County contains sub-alpine and alpine ecosystems and a shrinking glacier. The County's west contains forests, slopes, mountain communities and canyons, which hold creeks that bring water to the cities, high plains, grasslands and farmlands of the County's east.

20. The County is home to roughly 319,000 people, and includes both unincorporated areas – the rural, mountainous and plains communities – and incorporated towns and cities,

[2] References in the Complaint to "Boulder," or the "Boulder area," refer to the geographic area of Boulder County, which includes both the incorporated towns and cities, including the City of Boulder, in addition to the unincorporated areas of the County.

including Plaintiff City of Boulder.

21. Boulder County has long held a commitment to stewardship of the land, environment, and community. The eastern plains are rich in agricultural farmland, lakes and rolling pastures filled with distinctly defined cities and communities, while the foothills and mountains to the west feature prominent rock formations, forests and high-altitude valleys and sweeping vistas. Preserving the County's future in a way that maintains its agricultural landscape, character and unique way of life is a top priority for County residents.

22. As a governmental entity, Boulder County takes its stewardship responsibilities to heart and works daily to further the County's long-term vision for well-planned urban development, economic vitality and the preservation of its rural and mountain communities.

23. In its unincorporated areas, Boulder County maintains hundreds of miles of paved and unpaved roads, over 80 major bridges, hundreds of large culverts and smaller bridges/access points, as well as thousands of small culverts.

24. The County provides a wide range of services to residents in unincorporated areas, including health and human services, emergency services, wildfire mitigation, and other necessary governmental functions. It also provides services to residents living in the incorporated areas of Boulder County, including housing and human health programs, as well as emergency services.

25. Boulder County owns or holds conservation easements over a substantial amount of real and other property for its own benefit and for that of its residents. This includes 65,316 acres of publicly owned "open space", i.e., County-owned public land preserved for recreation, conservation, and agricultural purposes. The County has a duty to preserve and maintain this

open space for future generations. The County also holds conservation easements over roughly 40,000 acres of privately owned land, which protect agricultural land, wildlife habitat and scenic open space from development.

26. The County leases 25,000 acres of its open space to sixty-seven agricultural tenants, generating approximately $125,000 in annual net income. In addition, the County also owns, leases, and maintains and/or operates more than 45 public buildings, and the County housing authority owns more than 800 units of affordable or subsidized housing.

27. People and property (including County-owned property) and infrastructure within Boulder County have been and will continue to be damaged on account of human-caused climate change. Boulder County has taken substantial steps to abate these hazards, and will and must continue to do so.

SAN MIGUEL COUNTY

28. Plaintiff San Miguel County is a body corporate and politic of the State of Colorado empowered to sue and be sued. It lies in southwest Colorado, on the western slopes of the Rocky Mountains, encompassing 1,289 square miles. The County encompasses the high mountain communities of Telluride (the County seat) and Mountain Village at the eastern end of the County and arid ranching communities in the County's western end. In 2017, San Miguel County had an estimated population of 7,967. Telluride, the County's largest town, had an estimated population of approximately 2,500.

29. San Miguel County has historically valued preservation of natural resources and land stewardship, starting with the land ethic of the early ranching pioneers who established the Town of Norwood, and continuing through its commitment to preserving wild lands for

recreational opportunities and ecosystem services. The San Miguel River connects the communities of the County from the high alpine headwater towns dependent on consistent snow pack, forested landscapes and a healthy river system to the agricultural communities dependent on healthy spring run-off and summer flows.

30. In 2001, voters approved a mill levy for open space and historic preservation. In 2005, San Miguel County partnered with local governments to establish a regional sustainability program whose mission was to reduce GHG emissions through an inventory and education program. The mission of the San Miguel County Board of Commissioners is to "ensure our residents are healthy and flourishing and that our communities are safe and vibrant by: providing essential community services, practicing responsible stewardship of our environment, prioritizing long-term fiscal stability, and partnering with others to enhance the quality of life in San Miguel County and the region."

31. San Miguel County provides emergency response services in the event of wildfires, floods, road washouts and other threats to public health and safety. In addition, the County is responsible for maintaining hundreds of miles of roads, including paved and gravel roads, dozens of bridges, numerous culverts, and public buildings.

32. People, property (including County-owned property) and infrastructure within San Miguel County have been and will continue to be damaged on account of human-caused climate change. San Miguel County has taken substantial steps to abate these hazards, and will and must continue to do so.

THE CITY OF BOULDER

33. The City of Boulder is a home rule municipality in the State of Colorado

empowered to sue and be sued. It lies in Boulder Valley at the foothills of the Rocky Mountains, 25 miles northwest of Denver. The City's 25.8 square miles is surrounded by over 70 square miles of preserved City public land and parks space. It is bordered on one side by the iconic Flatirons rock formations and on the other side by the Great Plains.

34. The City of Boulder sits 5,430 feet above sea level and is surrounded by a greenbelt of City trails and open spaces. It is known for its natural beauty, outdoor recreation, natural product retailers and restaurants, outstanding alternative transportation options, diverse businesses, and technological and academic resources.

35. The City is home to roughly 108,000 people. It serves as both the seat and the most populous municipality in Boulder County and is home to approximately one-third of the County's residents. The City is also home to the main campus of the University of Colorado and boasts a high concentration of employment in STEM fields. In addition to the well-renowned researchers at the University of Colorado Boulder, the City hosts a number of science and environmental organizations, including research facilities for the National Center for Atmospheric Research and the National Oceanic and Atmospheric Administration.

36. The City and its residents have a long history of planning for the challenges of tomorrow and fostering sustainability. For decades, the City has taken, and the community has supported, some of the most progressive sustainability activities in the country, including a 40-plus year legacy of open space preservation and pioneering commitments to climate action goals. Stewardship and sustainability are part of the Boulder community DNA. The City not only protects the health, security and livelihoods of its residents, it is a steward that protects the fabric of the community, its ecosystems and way of life, including for future generations.

37. The City of Boulder owns and/or maintains hundreds of miles of paved roads, over 40 major bridges, fourteen reservoirs, two water treatment plants, sewage and stormwater drainage systems, and other critical infrastructure.

38. The City provides myriad services that are essential to the health, safety and welfare of its residents, including: emergency services; public utilities, such as water supply and treatment; transportation infrastructure; fire protection; flood controls; and parks and public outdoor space.

39. The City also owns a substantial amount of real and other property for its own benefit and for the benefit of its residents. This includes over 45,000 acres of "open space." The City leases 15,000 acres of that open space to 26 agricultural tenants. In addition to its open space holdings, the City owns, leases, maintains, and/or operates many buildings and other structures.

40. Plaintiff City of Boulder also owns substantial and senior water rights, which it uses to supply water to its residents and businesses, as well as to others outside the City limits, from which it derives revenue.[3]

41. The City's water supply comes from both the East and West Slopes of the Continental Divide of the Rocky Mountains. The City's East Slope sources are diverted from North Boulder Creek and Middle Boulder Creek through City infrastructure; its West Slope

[3] Over the course of a year, the majority of the water supplied by the City goes towards indoor uses, i.e., drinking and sanitation, with a smaller share going towards irrigation. The balance shifts based on seasons and water availability: a greater portion of the water goes towards irrigation in the warmer and drier summer months though water for irrigation purposes is curtailed when water is in shorter supply. The City also leases some of the water for agricultural purposes, when supplies permit.

sources are conveyed from the upper Colorado River and delivered to the City for treatment through Northern Colorado Water Conservancy District facilities.

42. The City stores its water in fourteen different City-owned and -operated reservoirs. The City treats its water at two City-owned and -maintained facilities and the City transports its water – including, ultimately to residents – through City-owned and -operated infrastructure.

43. Populations, property and transportation infrastructure within the City of Boulder (including City owned property) has been and will continue to be damaged on account of climate change. The City of Boulder has taken substantial steps to abate the hazards facing its residents, public property and infrastructure, and will and must continue to do so.

B. Defendants

44. The Defendants in this case are Suncor Energy, Inc. ("Suncor Energy"), Suncor Energy (U.S.A.) Inc. ("Suncor USA"), Suncor Energy Sales, Inc. ("Suncor Energy Sales"), and Exxon Mobil Corporation ("Exxon"). Hereafter, Suncor Energy, Suncor USA, and Suncor Energy Sales are referred to collectively the "Suncor Defendants."

SUNCOR

45. Defendant Suncor Energy is a Canadian corporation with its registered and head office located in Calgary, Alberta. Suncor Energy does business in Colorado through its numerous subsidiaries.

46. Suncor Energy began as the Sun Company of Canada, a subsidiary of Sun Oil, an American company. Suncor Energy was later known as Suncor Inc., an entity formed in 1979 by the amalgamation under the *Canada Business Corporations Act* of Sun Oil Company Limited,

incorporated in 1923, and Great Canadian Oil Sands Limited, incorporated in 1953. In 1997, Suncor Energy adopted its current name, Suncor Energy, Inc. In 2009, Suncor Energy amalgamated with Petro-Canada to form a single corporation continuing the same name, which has to date operated as an independent company. Suncor Energy benefited from, continues to benefit from and is responsible for the actions of its predecessor entities.

47. Suncor Energy is the parent company of a multinational, integrated oil and gas enterprise that explores for, produces, refines, markets and sells fossil fuels (including oil, natural gas, petroleum coke and other products). Suncor Energy publicly has stressed the "integrated" nature of its operations stating that "the integration of our business, both financially and physically, creates the conditions for our success." Suncor Energy files consolidated regulatory filings on behalf of the family, claiming profit and responsibility for the production, refining and fossil fuel sales of its subsidiaries.

48. Suncor Energy controls and directs those fossil fuel activities – including the production, refining, promotion, marketing and selling of fossil fuels, particularly Canadian tar sands – across its corporate family, which include many other subsidiaries and joint ventures, and which act as its agents.

49. Suncor Energy refers to and directs its subsidiaries as a single enterprise:

- Suncor Energy refers to the refinery, operated by Suncor USA in Colorado, as "our Commerce City refinery";
- Suncor's CEO describes the Commerce City, Colorado refinery as "giv[ing] us increased control of our product from production straight through to the consumer";
- Suncor Energy publicly describes its "U.S. businesses" as a "vital link between the company's large scale oil sands resource base and the growing U.S. energy market;"

- Suncor Energy further notes that "[t]he various parts of Suncor's businesses are tightly connected";
- Suncor Energy "100% guarantee[s]" its crude oil marketing and trading business under Suncor Energy Marketing Inc.; and
- Suncor Energy describes its "Supply & Trading" function in a consolidated unified way that is directed by Suncor Energy: "We are Suncor Energy Inc.'s commercial centre of excellence for sales and marketing of selected energy products and services. With offices in Calgary, Alta., Denver, Colo., and London, England . . . ."

50. Defendant Suncor USA, a subsidiary of Suncor Energy, is a citizen and resident of Colorado, headquartered in Denver, and incorporated in Delaware. Suncor USA operates a refinery in Commerce City, Colorado, which produces 98,000 barrels per day of gasoline and diesel fuel. The Commerce City refinery processes Canadian tar sands crude from Suncor Energy's mining operations in Canada, and products from fractured oil and gas production in Colorado.

51. Defendant Suncor Energy Sales, a subsidiary of Suncor Energy, is a Colorado corporation with its principal place of business in Denver. Suncor Energy Sales operates 47 retail gasoline and/or diesel fuel stations in Colorado under the following trade names: Coastal Mart, Exxon and Phillips 66.

52. References to Suncor, unless otherwise specified, will be to the collective Suncor corporate enterprise, including the Suncor Defendants.

53. Suncor conducts activities – including the production, refining, promotion, marketing and selling of fossil fuels, particularly Canadian tar sands – according to a common design across the corporate family, which is set by Suncor Energy. On information and belief, the other members of the Suncor corporate family – subsidiaries, affiliates and other agents – do

not have the ability to deviate from the common design and cannot refuse to produce, promote, refine, sell and/or transport Suncor fossil fuels.

54. Suncor claims it is "the fifth largest North American energy company and has a place on the global stage as one of the largest independent energy companies in the world." In 2017, Suncor produced approximately 685,000 barrels of oil per day and refined approximately 441,000.

55. As a result of their fossil fuel activities, the Suncor Defendants are responsible for billions of tons of excess GHG emissions. Based on the GHG emissions that can be traced solely to fossil fuels produced by Suncor and its subsidiaries between 1988 and 2015, the Suncor Defendants are responsible for the emission of approximately 2 billion tons of CO_2 into the atmosphere. Based on the fossil fuels it has brought to market, Suncor is one of the largest sources of historic and present-day GHG emissions.

56. A substantial amount of Suncor's fossil fuel products are derived from its Canadian tar sands operations. Approximately 20 percent of the products produced at the Commerce City refinery are derived from Suncor's Canadian tar sands operations. Suncor trumpets its plans to increase tar sands development over the coming decades.

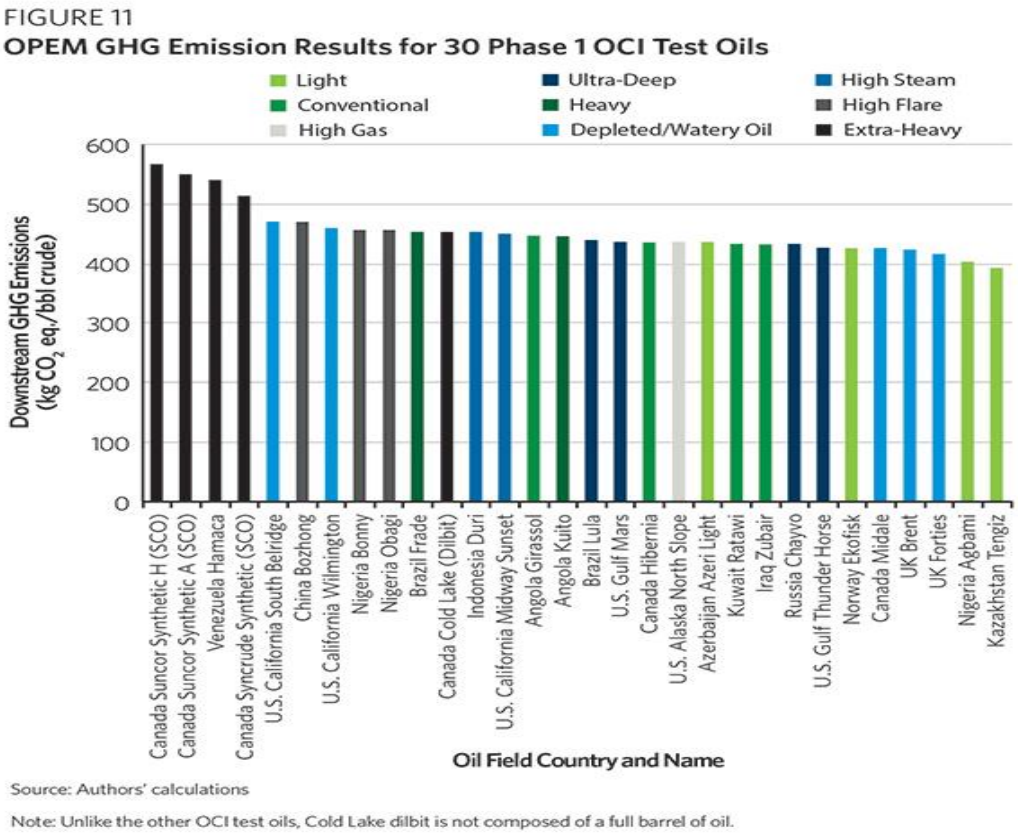
57. Suncor Energy publicly states that it has around 8 billion barrels of recoverable oil, the majority of which comes from the Canadian tar sands.

58. With its focus on tar sands, Suncor's fossil fuel products produce a proportionally greater amount of GHG emissions than most fossil fuel companies do.

59. Tar sands are deposits of a petroleum-like substance known as bitumen. Mining and developing bitumen requires a huge amount of energy and releases enormous amounts of

GHGs.[4] Barrels of converted bitumen also have a higher concentration of carbon, as compared to typical petroleum.

60. The chart below, which was produced by the Carnegie Institute as part of a report, "Know Your Oil: Creating a Global Oil-Climate Index," shows the number of downstream emissions – those created by combustion of the fuels – for different companies' oil products.



61. Additionally, the process of turning tar sands deposits into useable fuel produces huge amounts of petroleum coke ("petcoke"), a coal-like substance. When combusted, petcoke

[4] In 2014, Suncor's production and refining operations emitted more than 20 million tons of GHGs, a number which they now expect to increase to more than 25 million tons by 2019, as its tar sands operations continue to grow.

produces substantially greater GHG emissions per unit of energy produced, as compared to other fossil fuels (including coal). Suncor is one of the largest sources of petcoke and has sold millions of tons of it.

62. Suncor is a very profitable fossil fuel company, deriving profits – in the tens of billions of dollars since the late 1980s – primarily from the production and sale of fossil fuels.

63. From no later than the late 1960s, Suncor knew that its fossil fuel products would, when burned, release CO_2 and other GHGs into the atmosphere, resulting in and exacerbating changes in the planet's climate.

64. On information and belief, through at least 2016, Suncor was a member of, had access to information held by, participated in, directed, benefited from, agreed with, consented to, and ratified and/or adopted positions and actions taken by the American Petroleum Institute (API).[5]

EXXON

65. Exxon is a New Jersey corporation headquartered in Texas. Exxon has done business in Colorado since at least the 1930s.

66. Exxon is a multinational, vertically integrated, fossil fuel company. While Exxon has many predecessor companies, its current incarnation was formed in 1999 with the merger of Exxon Corp. (originally the Standard Oil Company of New Jersey) and Mobil Corp. (originally the Standard Oil Company of New York). Exxon has benefited from, and is responsible for, the

[5] For example, in its 2016 "Sustainability Report" Defendant Suncor stated that it was "a participant in the development of policy positions and contributes to the outcomes of [API] meetings" and that API's and Suncor's positions on climate change were "consistent."

actions of its many predecessor entities.

67. Exxon controls and profits from fossil fuel activities – including the production, refining, promotion, marketing and selling of fossil fuels – across its corporate family, which includes many subsidiaries and joint ventures.

68. On information and belief, the fossil fuel activities across Exxon's entire corporate family are pursued according to a common design set and controlled by Exxon. According to that common design, the members of the corporate family – subsidiaries, affiliates and other agents – do not have the ability to deviate from the common design and cannot refuse to produce, promote, refine, and sell and/or transport Exxon's fossil fuels.

69. Exxon's filings with the U.S. Securities and Exchange Commission and other public statements consolidate production, refining and fossil fuel sales figures across the corporate family. (Further references to "Exxon" will be references to the entire corporate enterprise, unless otherwise specified).

70. Exxon has provided a substantial portion of all fossil fuels used worldwide. Since the 1960s, it has sold billions of barrels of oil, trillions of cubic feet of natural gas and millions of tons of coal. Historically, Exxon supplied nearly 10 percent of global oil demand.[6]

71. As a result of these activities, Exxon is responsible for billions of tons of GHG emissions. For example, based on the GHG emissions that can be traced solely to fossil fuels *produced* by Exxon *between 1988 and 2015*, it is responsible for nearly 16 billion tons of carbon

[6] For example, in 2001, Exxon sold nearly 8 million barrels of oil per day, more than 10 percent of the approximately 75-million-barrel global demand.

dioxide (CO_2).[7] Based on the fossil fuel products it brought to market, Exxon is one of the largest sources of historic and present-day GHG emissions.

72. Exxon now publicly purports to accept some of the truth of climate change – i.e., that it is largely caused by human activity, primarily fossil fuel use, and that increasing atmospheric temperatures will harm public health and property. Nonetheless, Exxon's business plans include increased sales of fossil fuels and the development of more carbon-intensive fossil fuels, such as shale oil and tar sands. Its reported fossil fuel reserves exceed 20 billion barrels of oil equivalent ("BOE").

73. Exxon is one of the world's most profitable companies, deriving profits – in the hundreds of billions of dollars since the late 1980s – primarily from the production and sale of fossil fuels.

74. From no later than the late 1960s, Exxon knew that its fossil fuel products would, when burned, release CO_2 and other GHGs into the atmosphere, resulting in and exacerbating changes in the planet's climate.

75. On information and belief, at all relevant times, Exxon was a member of, had access to information held by, participated in, directed, benefited from, agreed with, consented to, and ratified and/or adopted positions and actions taken by the American Petroleum Institute.

II. JURISDICTION AND VENUE

76. Venue is proper in this Court pursuant to Colorado Revised Statutes § 16-13-307(2) and Colorado Rule of Civil Procedure 98 because the nuisance and trespass to which

[7] Exxon is responsible for far more than 16 billion tons of CO_2 because it sells far more than it produces, and because it sold billions more barrels of fossil fuels before 1988. The precise amount will be revealed during discovery and trial.

Defendants significantly contributed to exists in Boulder County and because Defendants have committed a tort in Boulder County, including carrying out deceptive practices.

77. Each Defendant is subject to personal jurisdiction in Colorado pursuant to Colorado Revised Statutes § 13-1-124 because it transacts business, committed and continues to commit tortious acts, and has caused substantial injury to Plaintiffs in Colorado.

78. Each ton of CO_2 that can be traced to the Defendants' fossil fuel operations in and contacts with Colorado, including production, refining, and sale, contributed to bringing about climate change, and exacerbates the impacts of climate change and Plaintiffs' injuries.

SUNCOR ENERGY

79. Personal jurisdiction is proper over Suncor Energy because it has substantial contacts and affiliations with Colorado, which make it essentially at home in the state. Personal jurisdiction is also proper over Suncor Energy because it has substantial contacts with Colorado by and through its fossil fuel business operations in the state – including through the sale, promotion, transportation, and/or refining of fossil fuels in Colorado – and because Plaintiffs' injuries arose out of, were caused and/or exacerbated in part by, and/or relate to those activities.

80. Throughout the time period relevant to this litigation, Suncor Energy has operated and done business in Colorado through several agents. These agents include, but are not limited to: Defendants Suncor USA, a Delaware corporation headquartered in Colorado, and Suncor Energy Sales, a Colorado corporation with its principal offices in the state; Suncor Energy (U.S.A.) Pipeline Co., a Colorado corporation with its principal offices in the state; Suncor Marketing Inc., a Delaware corporation, headquartered in Colorado; and Suncor Energy Services, a Canadian corporation doing business in Colorado.

81. Suncor Energy does not just do business in Colorado; it is actually at home in the state. Suncor Energy's affiliations with Colorado are more substantial than with any other state in the United States.

82. Suncor Energy – through its own direct actions and through the activities of its subsidiaries and agents acting pursuant to a common design coordinated and directed by Suncor Energy – has substantial contacts with Colorado relating to the claims in this case, including activities that give rise to the claims in this case.

83. With the knowledge that fossil fuel use caused climate change and is exacerbating the impacts of climate change in Colorado, Suncor Energy has engaged in the following activities in Colorado:

- promoted and continues to promote fossil fuel use in Colorado with the intent that its fossil fuels be used and combusted;
- sold, sells and plans to continue selling fossil fuels to customers in Colorado through a network of gas stations and other suppliers – by its own admission, Suncor's products account for "35% of Colorado's gasoline and diesel fuel demand," half of Colorado's diesel, and a third of the jet fuel supplies for Denver International Airport;
- operated, and continues to operate, "Colorado's only petroleum refinery" in Commerce City, Colorado, which produces over 100,000 barrels per day – approximately 20 percent of the products produced at the Commerce City refinery are derived from Suncor's Canadian tar sands operations; and
- operates pipeline systems that transport crude oil from Cheyenne, Wyoming, to Commerce City.

84. Suncor has also directly emitted substantial amounts of GHGs in Colorado from its fossil fuel operations, including refining and transportation activities. Suncor's operations in Colorado emitted approximately one million metric tons of GHGs in 2016 alone.

85. On its own, and/or through agents – including API and the company's affiliates –

Suncor Energy has conspired to, funded and participated in efforts to mislead people and consumers in Colorado about, among other things, climate change and the risks of fossil fuel use.

SUNCOR USA

86. Defendant Suncor USA, a subsidiary of Suncor Energy, is a citizen and resident of Colorado with its principal place of business located in Denver, and incorporated in Delaware. Suncor USA is registered with the Office of the Colorado Secretary of State and does business in Colorado. As a citizen of the state, Suncor USA is subject to general jurisdiction in Colorado.

SUNCOR ENERGY SALES

87. Defendant Suncor Energy Sales, a subsidiary of Suncor Energy, is a Colorado corporation, with its principal office located in Denver. Suncor Energy Sales is registered with the Office of the Colorado Secretary of State and does business in Colorado. As a citizen of the state, Suncor Energy Sales is subject to general jurisdiction in Colorado.

EXXON

88. Exxon is a New Jersey corporation with its principal place of business in Irving, Texas. Exxon has a registered agent for service of process in Colorado and has done business in Colorado since at least the 1930s.[8]

89. Personal jurisdiction is proper over Exxon because it has substantial contacts with Colorado by and through its fossil fuel business operations in the state – including through the sale, promotion, extraction, and/or refining of fossil fuels in Colorado – and because Plaintiffs' injuries arose out of, were caused and/or exacerbated in part by, and/or relate to those activities.

[8] Its registered agent is Corporation Service Company, 1900 W. Littleton Boulevard, Littleton, Colorado.

90. Throughout the time period relevant to this litigation, Exxon has operated and done business in Colorado through several agents. Those agents include, but are not limited to, XTO Energy Inc., an Exxon subsidiary that has developed and continues to develop fossil fuels in Colorado, and which has registered an agent for service of process in Colorado. XTO purports to be an expert "in developing tight gas, shale gas, coal bed methane and unconventional oil resources," and its western division is headquartered in Denver, Colorado.

91. Those agents also include, but are not limited to, ExxonMobil Coal USA Inc., a subsidiary that developed fossil fuels in Colorado between 1979 and 2002, and which registered an agent for service of process in Colorado. The company's purpose was to "acquire, mine, and sell coal; maintain shale, water, oil and gas interests, [and to] [d]evelop [the] capability to produce synthetic liquids and gas, including research and development programs."

92. Exxon has substantial contacts with Colorado relating to the claims in this case, including activities that give rise to the claims in this case. With knowledge that fossil fuel use would cause, has caused, and is exacerbating climate change impacts, including the impacts in Colorado, Exxon has engaged in the following activities:

- promoted, promotes and plans to continue promoting fossil fuel use with the public and customers in Colorado;
- sold, sells and plans to continue selling its fossil fuels in Colorado through its own gas stations, and through agreements with other retail distributors[9] – there are approximately 50 Exxon-branded gas stations in Colorado;
- produced a substantial amount of natural gas in Colorado through its agent, XTO, in three Colorado counties, which produce 130 million cubic feet of gas per day,

[9] The quantity of Exxon's product, which is sold in this state is information that is uniquely in Exxon's possession.

making XTO – on information and belief – the state's seventh largest gas producer;

- produced approximately a million barrels of crude oil in Colorado;
- produced a significant amount of coal in Colorado; and
- caused a substantial amount of GHG emissions derived from the use of these fuels produced in Colorado, when burned.

93. Exxon has sought to develop and has continuing plans to develop unconventional fossil fuels in Colorado, such as oil shale (i.e., kerogen), and coal-to-liquid and coal-to-gas synthetics.

94. Exxon has also directly emitted substantial amounts of GHGs in Colorado from its production and transportation activities. The company emitted more than 420,000 metric tons of GHGs in Colorado between 2011 and 2015 alone.

95. On its own, and/or through agents – including API – Exxon has also conspired to, funded and participated in efforts to mislead people and consumers in Colorado about, among other things, the existence of climate change and the risks of fossil fuel use.

SHARED CONTACTS WITH COLORADO

96. Exxon and Suncor's contacts with Colorado also substantially overlap. Exxon and Suncor jointly own Syncrude Canada Ltd. – a large, if not the largest, tar sands developer in Canada – which promotes and sells in Colorado synthetic crude derived from Canadian tar sands. Suncor Energy Sales also has agreements with Exxon, through which it markets and sells Exxon fuels at wholesale and retail sites across Colorado.

III. STATEMENT OF FACTS

A. Defendants' actions have altered the climate in Colorado.

97. Climate change is real and its cause is not in doubt: the emission of GHGs into the atmosphere, primarily from the combustion of fossil fuels, has increased the concentration of those gases in the atmosphere, trapping heat in the climate system, and warming the planet.[10] As the U.S. Government reports, "there is no convincing alternative explanation" for the observed warming trends. As a result of climate change – and as evidence of the reality of the climate crisis – all five of the warmest years on record have occurred since 2010; 2016 and 2017 were the warmest.

1. *The climate has been altered because of fossil fuel use.*

98. Earth has a natural "greenhouse" effect: solar energy, primarily in the form of light, passes through the atmosphere; the Earth re-radiates some of that energy back into space as thermal radiation – essentially, heat; and GHGs in the atmosphere, like carbon dioxide, trap some of that heat inside the Earth's climate system, thereby warming the atmosphere and oceans.

99. The natural greenhouse effect has been altered and exacerbated by human greenhouse gas emissions. Abnormally high concentrations of atmospheric GHGs, primarily CO_2 but also methane and other trace gases, are trapping more heat, artificially intensifying the greenhouse effect.

100. GHGs have rapidly accumulated in the atmosphere because of the increasing use and combustion of fossil fuels. Fossil fuels produce GHGs, primarily CO_2, when they are

[10] According to the U.S. Environmental Protection Agency, "almost all of the increase is due to anthropogenic emissions."

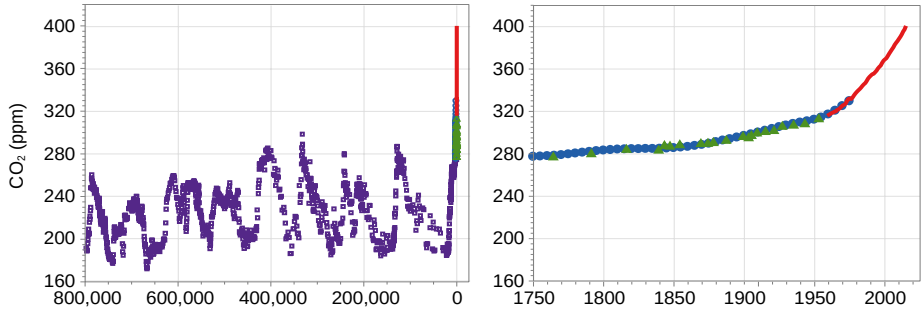
combusted. In addition, as fossil fuel use has grown, GHG emissions have risen at an unparalleled rate. The normal processes by which GHGs are re-absorbed by the Earth's plants, land and oceans cannot keep up with this rapid emission rate, and the concentration of GHGs in the atmosphere has therefore increased.

101. Fossil fuel combustion is responsible for the majority of emissions that have caused GHG concentrations to reach hazardous and unprecedented levels. For example, CO_2 emissions – by far the most prevalent and problematic GHG because of its long-lived warming impact – have increased roughly 90 percent since 1970, with fossil fuel combustion and industrial processes contributing to roughly 78 percent of total GHG emission increases from 1970 to 2011.

102. As a result of those emissions, atmospheric CO_2 now stands at 408 parts per million (ppm), a level which is unprecedented in human history. The last time atmospheric CO_2 reached this level was approximately 3 million years ago, when average temperatures were considerably warmer (3.6 to 6.3°F, or 2 to 3.5°C) than today's temperatures, and sea levels were at least 30 feet higher.

103. Atmospheric CO_2 levels continue to rise. Defendants' activities contributed to a rise in energy-related carbon emissions of around 32 billion tons in 2017, as emissions increased by 1.4 percent. Each year more CO_2 is being pumped into the atmosphere.

104. The graph on the left depicts atmospheric CO_2 concentrations over the last 800,000 years. The spike on the far right side of the graphs shows the trend in the past few centuries. The graph on the right has the same scale of CO_2 concentration, but focuses only on atmospheric concentrations from 1750-2015.



105. The Intergovernmental Panel on Climate Change (IPCC) is widely recognized (including by the Defendants) as a leading scientific authority on climate change. According to the IPCC, as a result of rising CO_2 and other GHGs, "[w]arming of the climate system is unequivocal." The IPCC also reports that "[t]he atmosphere and oceans have warmed, the amounts of snow and ice have diminished, and sea levels have risen."

106. According to the best available science, annual average temperatures over the contiguous United States have increased by 1.8°F (1.0°C) since 1895, with the majority of the increase occurring since the 1980s. The western parts of the United States have been harder hit; Colorado has seen average temperatures rise by 2.5°F over the last 50 years alone.

107. Not only have temperatures increased, but also Defendants' actions have increased the rate of warming. While global average temperatures rose at an average rate of 0.13°F (0.07°C) per decade since 1880, they have risen at an average rate of 0.31°F (0.17°C) per decade since 1970.

108. Once CO_2 enters the atmosphere, a significant portion of it remains there, with a warming influence that lasts for hundreds (if not thousands) of years. It also cannot feasibly be removed from the atmosphere with existing technology, "commit[ting] the world to some degree of irreversible warming and associated climate change resulting from emissions to date."

109. According to the most recent report from the U.S. Government, "under all

plausible future climate scenarios" – regardless of the trajectory of future fossil fuel emission rates in the near-term[11] – annual average temperatures are expected to rise by at least an additional 2.5°F (1.4°C) by 2050. These projections[12] apply to Colorado, where temperatures are expected to rise an additional 2.5° to 5°F by 2050.

110. While the floor for warming has been established, the ceiling – how bad it can get – will grow depending on future emissions. Under a lower-intermediate emissions scenario,[13] global temperatures are projected to rise by approximately 5.0°F (2.8°C) over pre-industrial averages by the end of the century. Under a high-emissions scenario, temperatures are projected to rise by 8.7°F (4.8°C) by the end of the century. Defendants' current conduct and planned increases in production of fossil fuels are consistent with at least the higher emission scenario, and may well be outside of any projected scenario.

111. A 5.0°F (2.8°C) warming would have devastating impacts on people, property, the economy and the environment. An 8.7°F (4.8°C) warming would be catastrophic, leading, according to the IPCC, to "substantial species extinction, global and regional food insecurity, consequential constraints on common human activities and limited potential for adaptation in some cases."

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[11] Even if *all* emissions from human sources suddenly *stopped*, there would still be another 0.5°F increase expected over the next few decades.

[12] "Projections" in this Complaint are based on and supported by data generated by General Circulation Models, which are approved by the IPCC, and which are the best available scientific representation of future climate scenarios, including their physical impacts.

[13] Emissions scenarios are often categorized into four different types—or Representative Concentration Pathways (RCP)—by the IPCC: RCP2.6, RCP4.5, RCP6, and RCP8.5. The scenarios are used to compute and predict different climate futures based on a possible range of anthropogenic GHG emissions. RCP4.5 represents a lower-intermediate emissions scenario, while RCP8.5 represents a high emissions scenario.

2. *The impacts of a climate altered by Defendants' conduct are being felt in Plaintiffs' communities.*

112. The seriousness of human-caused climate change is not in question. In a 2013 Executive Order, the President of the United States recognized that "[t]he impacts of climate change – including an increase in prolonged periods of excessively high temperatures, more heavy downpours, an increase in wildfires, more severe droughts, permafrost thawing, ocean acidification, and sea-level rise – are already affecting communities, natural resources, ecosystems, economies, and public health across the Nation." As the Governor of Colorado recently reaffirmed, "climate change presents a broad range of challenges" that "will affect everyone" in the state.

113. Colorado is experiencing and is extremely vulnerable to the impacts of climate change, including increases in extreme hot summer days and minimum nighttime temperatures, precipitation changes, larger and more frequent wildfires, increased concentrations of ground-level ozone, higher transmission of viruses and disease from insects, altered stream-flows, bark beetle outbreaks, ecosystem damage, forest die-off, reduced snowpack, and drought.

114. The U.S. Environmental Protection Agency (EPA) has noted "[t]hroughout the western United States heat waves are becoming more common, snow is melting earlier in spring, and less water flows through the Colorado River."

115. The consequences of these changes are enormous. As the EPA found, "[r]ising temperatures and recent droughts in the region have killed many trees by drying out soils, increasing the risk of forest fires, or enabling outbreaks of forest insects. In the coming decades, the changing climate is likely to decrease water availability and agriculture yields in Colorado, and further increase the risk of wildfires." These changes have already begun, and they have

injured and will continue to injure people, property and the economy of Colorado, including in the Plaintiffs' jurisdictions.

116. Colorado's economy depends on snow, water, and cool weather. For example, the state's $41 billion agriculture industry is imperiled by rising temperatures and drought, while the $5 billion ski industry is in jeopardy as a result of "low-snow" winters and shorter seasons.

Plaintiffs are experiencing rising temperatures and extreme heat.

117. Defendants' actions have already caused or contributed to rising temperatures in Colorado. Colorado has seen average temperatures rise by 2.5°F over the last 50 years, with over a 2° F rise since 1983. Daily minimum temperatures and nighttime lows have also risen, limiting relief for humans and plant life subjected to heat waves, especially in the summer months.

118. The rise in temperature is occurring across all seasons. Specifically, Colorado is experiencing some of the fastest warming summers in the United States.

119. Temperatures in Colorado are projected to increase substantially by 2050 under all emission scenarios. According to research by the University of Colorado and others, under even an increasingly unlikely lower-intermediate emission scenarios, annual temperatures are projected to rise an additional 2.5 to 5° F (above a 1971-2000 baseline) by mid-century; "the typical year by 2050" is projected to be "warmer [than] the very warmest years of the past century."

120. A high emissions scenario is now far more likely, where annual temperatures in Colorado are projected to warm another 3.5 to 6.5° F by 2050. A 6°F temperature rise would turn future Denver into the temperature equivalent of today's Albuquerque, New Mexico.

121. In addition to increasing average temperatures, there has already been a notable

increase in the frequency of heat waves across the U.S. These are projected to become more frequent and more severe. Across the southwestern U.S., and Colorado, *a five- to ten-fold increase in heat waves* is projected by mid-century. All Plaintiff communities will suffer comparable temperature rises.

122. Under an intermediate emissions scenario, average August maximum temperatures are expected to increase in San Miguel County. The traditional cooling buffer months of March and October are projected to see increases in minimum temperatures, meaning that nighttime lows will offer less relief from heat and less of the cooler temperatures needed to preserve spring snowpack.

123. The remote, western edge of San Miguel County is predicted to see a significant increase in extreme heat days. Climate change is projected to increase average temperatures in southwest Colorado an additional 1.5 to 2.5^{o} F by 2025, and 2.5 to 5.5^{o} F by 2050. The desert climate of the western portions of the County are projected to migrate up into the valleys.

124. The average temperature in the Boulder area is anticipated to rise an additional 1.5 to 4^{o} F by 2040, and 4.3 to 9.6^{o} F by 2100 under intermediate-emissions models. The number of extreme heat days and daily minimum temperatures – which have *already* increased in Boulder – are projected to rise dramatically, particularly and dangerously in summer months. Specifically, while Boulder averaged 5 days per year with temperatures of 95^{o} F or above across the 20th century, it is expected to see at least 25 days a year above that mark by the mid-21st century, and 49 days by the end of the 21st century, *even under a lower-intermediate emissions scenario*.

125. Warming temperatures and heat waves are a threat to health, property, and

infrastructure.

Plaintiffs are experiencing shifts in precipitation patterns and water availability.

126. Rising temperatures also leads to changes in precipitation patterns, rainfall intensity and water availability. These changes all have substantial implications for the people, property and infrastructure within Plaintiffs' jurisdictions.

127. Colorado has already started to see a greater proportion of its precipitation falling as rain rather than snow, a trend that will continue as temperatures rise further. This has caused a decline in snowpack, particularly at lower elevations, and further decline is projected due to warming.

128. Any snowpack loss has significant consequences in Colorado, where snowpack is the largest reservoir and the source of 70 percent of the state's surface water; many areas depend on mountain glaciers and snowpack for their water supply, including for irrigation purposes.

129. Earlier snowpack melt is also a serious concern; as EPA has recognized, "with increased runoff in the winter and early spring," there are "increase[d] flood concerns" and "substantially decreased summer flows." This risk is compounded by projected precipitation changes, including the time of year for peak precipitation, and the intensity with which that precipitation falls.[14]

130. San Miguel County faces increasing intensity of rainfall events. Climate change is projected to increase the rainfall intensity of 5-year storm events, with the greatest intensity increases, in terms of inches of rainfall per hour, predicted for 15-minute storm levels. This

[14] A warmer atmosphere holds more moisture than a cooler one, which can mean heavier precipitation during rainfall events, causing more intense flooding.

means that the County is projected to see increases in the intensity of short-duration rain events.

131. The Boulder area is expected see an increase in winter precipitation and a decrease in spring precipitation. An increase in heavy precipitation events is expected during both seasons. Climate change is projected to increase the rainfall intensity of 5-year storm events and 100-year storm events. While storms under one-quarter inch of rainfall per day are projected to stay the same or decrease in frequency under future scenarios in Boulder, storms of one-quarter to one-half inch, and one-half to one inch are projected to increase on average, under all future emissions scenarios.

132. The greatest intensity increases in Boulder, in terms of inches of rainfall per hour, are predicted for 15-minute storms. This means that Boulder is projected to see an increase in the intensity of short duration rain events.

133. Increases in high-intensity, short-duration rainfall events in excess of current infrastructure capacity are likely to have substantial impacts on drainage systems and other infrastructure, and creates an increased risk of flooding, which threatens people, property and infrastructure in all Plaintiff communities.[15]

Plaintiffs are experiencing an increased risk of drought.

134. Rising temperatures and shifting precipitation patterns exacerbate the risk of drought.

135. Total summer rainfall is more likely to decrease than increase in Colorado, with longer rainless periods also expected. The higher temperatures will also lead to more

[15] Built in the mouth of canyons, the City of Boulder already rates as the number one flash flood risk community of Colorado's Front Range.

evaporation, intensifying droughts when they occur. The frequency and severity of droughts are projected to increase in many parts of Colorado.

136. Because of climate change, over the next three decades, San Miguel County and the Boulder area are projected to see a significant increase in the expected number of months of drought and a shift away from mild droughts, towards more moderate, severe and extreme droughts. Droughts that were once mild will become more severe.

137. The Plaintiffs are already experiencing these trends. Increasing drought months and drought severity, in turn, has substantial implications for agriculture, wildfires, and water availability.

Plaintiffs are experiencing an increased risk of wildfires.

138. More rain in winter, less snowpack, earlier snowmelt, drier spring soils and summers, and increasing occurrence and intensity of drought all increase wildfire risk by setting the table for longer, more severe wildfire seasons and a general increase in wildfire vulnerability.

139. Increasing temperatures and drought have already led to increased wildfires in recent decades. A recent study estimated that climate change has doubled the area of forest burned in the western United States since 1984.

140. There has been a significant rise in the number of large fires in Colorado. While there were only six fires larger than 1,000 acres in the 1970s, there were 35 in the 2000s, and 19 in just the three years between 2010 and 2012 – a five-fold increase over 40 years. This trend is expected to continue, with projections of a substantial increase in wildfire occurrence, duration, and acres burned, as well as a longer fire season.

141. Increased wildfire risk and occurrence is perilous in a state where over 2 million

homes exist in the "Wildland-Urban Interface" (WUI) – where homes and other structures exist in and adjacent to wildfire-prone wildland.

142. In San Miguel County, where many communities live in the WUI, the number of wildfire occurrences, as well as the acres of area burned, is expected to increase over the next three decades, and the wildfire threat will extend to higher elevations where historically there was a much lower wildfire risk, and where mitigation has not been as high a priority.

143. Almost 20 years ago, over 170,000 acres of San Miguel qualified as moderate to high hazard for wildfire. Even under an intermediate-low emissions scenario, San Miguel County is projected to see more than 300 additional wildfires (over a historic average) between 2020 and 2049, with the burn area projected to increase by over 40 percent.

144. In the Boulder area, wildfires over the last three decades have destroyed over 260 structures and burned over 16,000 acres, much of it on public lands that the County and the City manage.

145. Indeed, the majority of Boulder County already qualifies as a high-risk fire area, and is described as an "environment prone to extreme wildfire behavior." Based on some metrics, the Boulder area has the highest wildfire risk in the state, and has the tenth highest risk in the entire West.

146. In recent years, the Boulder area has seen trends towards a decrease in shoulder seasons that traditionally provided a buffer from the May-September fire season. Now, major fires are occurring nearly every month of the year.

147. Boulder's wildfire risk is also projected to spread to areas that previously experienced low incidence of wildfire, such as higher elevation areas of the County. Boulder is

already seeing trends towards these higher altitude fires, which are particularly worrisome as they present a new threat to water reservoirs that provide water to the City, and runoff that travels into the Boulder watershed.

148. Fires are already occurring dangerously close to Boulder's water supplies, and it is predicted that a wildfire of a large scale could seriously impact higher-elevation water supplies. For example, the Fourmile Fire of 2010 almost forced the closure of a water treatment plant for the City of Boulder that provides a substantial portion of the City's drinking water.

149. The number of wildfire occurrences in the Boulder area, as well as acres of area burned, is expected to increase over the next three decades. Under even the increasingly unlikely intermediate-low emissions scenario, an additional 150 wildfires (over a historic average) on average are predicted between 2020 and 2049, with the burn area projected to increase by nearly 40 percent on average in the Boulder area.

Plaintiffs are experiencing increased risks to forest health.

150. Beyond fire, increasing temperatures and drought conditions pose other risks to forest health. Across the Southwest, trees are dying because of increasing temperatures and drought as a result of climate change. This trend will continue.

151. Trees generally die faster when drought is accompanied by higher temperatures, so short droughts, which occur more frequently than long droughts, can trigger mortality if temperatures are higher. Even without an increase in drought frequency, rising temperatures alone lead to substantially greater tree mortality. This not only affects forested land, but urban tree canopies that serve to improve air quality, promote stormwater management, decrease runoff into watersheds, and reduce the effects of rising temperatures.

152. These conditions can also lead to more severe insect outbreaks, such as the bark beetle epidemics seen across Colorado. As the U.S. Forest Service reports, climate change has *already* led to an increase in bark beetle-induced damage. In the last two decades, the mountain pine beetle affected trees across 4 million acres of forested watersheds in Colorado. These recent outbreaks "have exceeded the frequencies, impacts, and ranges documented" in the last century, and the most recent outbreak in Colorado's Rocky Mountain National Park was the most severe ever seen.

153. A growth in native beetle populations, and the resulting devastation, is directly linked to climate change, and an increase in both summer and winter temperatures. Warmer temperatures result in higher survival rates and faster development; beetles can now thrive where they were previously constrained by cold temperatures. Under temperature increases of 4 to 5^{o}F, certain bark beetle species have doubled both their reproductive and tree consumption rates.

154. With rising temperatures, increased drought predictions, and heavily forested lands, climate conditions in San Miguel County and the Boulder area will increasingly favor larger mountain pine and spruce beetle populations and outbreaks.

155. Boulder has already experienced mountain pine beetle impacts in a recent epidemic linked to a warmer and drier climate. Between 1996 and 2010, 122,455 acres of forest within Boulder County saw some level of damage related to mountain pine beetle.

Plaintiffs are experiencing increased threats to public health.

156. From an emergency management perspective, climate change impacts threaten human life as a result of the projected increase in extreme weather events, floods and wildfires.

157. The rising temperatures also jeopardize human health in several other ways. For

example, according to a 2015 report commissioned by the State of Colorado, there are "[m]ajor public health areas of concern related to the effect of current . . . and future clim[a]te change . . . ," including heat-related illnesses, negative air quality effects, and changes in the occurrence and incidence of infectious and vector-borne diseases.

158. Higher temperatures are problematic in a high-elevation, low-humidity state that is historically accustomed to cool nights, which provide relief during heat waves. Buildings throughout Colorado – including in the San Miguel County and Boulder area – which were built based on historic climate patterns, often lack air-conditioning. As temperatures rise and extreme events increase, operating without air conditioning may no longer be feasible, which would make new cooling systems necessary to protect vulnerable populations, or provide alternative sources of respite, such as central cooling centers where people could go for relief.

159. Higher temperatures and the presence of sunlight are also associated with increased formation of ozone, which at the ground level is a pollutant that can cause respiratory damage. According to the Colorado Climate Plan, "climate change is likely to result in higher ozone concentrations."

160. Even short-term exposure to ozone is associated with severe health consequences such as respiratory inflammation, pulmonary function decrements, increased emergency department visits, and premature mortality. These consequences are all the more severe for already-vulnerable populations, including children and the elderly.

161. Ground-level ozone is at its highest levels during summer days that reach the upper 80s and mid-90s. More warm summer days, plus warming spring and fall seasons, will extend the ozone season.

162. Ground-level ozone concentrations are already a serious problem in Boulder. Climate change is making the problem worse. Boulder is already within the EPA's ozone nonattainment area. In addition, the ability to come within the necessary federal ozone attainment goals will become more difficult under new climate realities.

163. As stated in a report to the Colorado Energy Office, "[c]limate [also] plays a role in outbreaks of vector-borne and zoonotic infectious diseases and in the transmission of these diseases to humans." For example, warmer weather and drought conditions may lead to animal migrations, an increase in mosquito populations, mosquito-borne illnesses and the need for increased mosquito control. In addition, multiple cases of the mosquito-borne West Nile Virus have occurred in Boulder County. While San Miguel County has not yet seen cases of West Nile Virus, County officials recognize that all areas of the County can be affected by the virus, especially with warmer temperatures.

164. The threat of an increase in such harmful diseases creates the need for additional monitoring and surveillance. For example, Boulder County public health staff expressed concerns, in the County's Climate Change Preparedness Plan, that increases in plague and tularemia (spread by ticks and deer flies) are expected if winters become warmer and rainier, as projected.

165. Prevention, monitoring, and reporting costs associated with the spread of such illnesses will likely increase due to increased surveillance and treatment of mosquito-infested and other areas where humans have likelihood of contact with infected animals.

B. Plaintiffs have acted to prevent climate change, but are still being harmed by, and must act to mitigate, its impacts on their property and residents.

1. *Plaintiffs have made substantial efforts to reduce their own GHG emissions.*

166. Plaintiffs have been national leaders in environmental sustainability and mitigating GHG emissions. For example, "[r]ecognizing that local governments are the first responders in the fight against climate change, Boulder County has taken numerous steps to reduce its own heat-trapping emissions and to assist its residents and businesses to do the same."

167. Boulder County, San Miguel County, and the City of Boulder are all members of Colorado Communities for Climate Action, which advocates for state and federal actions to protect Colorado's climate for current and future generations. Sustainability is at the very core of the Plaintiffs' identities, each of which takes seriously its responsibility for stewardship of the natural environment.

Boulder County has made efforts to reduce GHG emissions.

168. Boulder County's guiding values include "sustainability" which includes a commitment to environmental sustainability. "Environmental protection and sustainability" is listed as one of the County's priority areas. General environmental sustainability and management of public lands and natural resources for the future are listed as guiding principles of the County's 2017 State Legislative Agenda; supporting climate change preparedness and resiliency efforts, wildfire mitigation, and protection of public lands served as legislative priorities.

169. These are principles and ideals that Boulder County aggressively puts into place financially and through incentive programs.

170. In 2017 the County budgeted for funds such as the Clean Energy Options Local

Improvement District Fund, and the Qualified Energy Conservation Bonds Fund, which was earmarked "for the creation of cost-effective programs aimed at reducing energy use and preventing climate change." Conservation and sustainability expenditures under the 2017 adopted budget amounted to $38,787,781.

171. As part of a larger effort toward achieving Kyoto Protocol targets, the Boulder County Sustainable Energy Plan sets forth recommendations to achieve a reduction of greenhouse gas emissions 40 percent below the County's 2005 levels by the year 2020.

172. In order to meet this goal, Boulder County has carried out numerous programs and initiatives. EnergySmart assists families and businesses in increasing their energy efficiency, offering discounted energy efficiency evaluations to homeowners; over 15,000 homes and over 4,000 businesses have participated. BuildSmart is Boulder County's residential green building code, which promotes the building of energy efficient structures and requires zero net energy for certain new homes. Benefits Boulder County facilitates discounts on rooftop solar installations and electric vehicles.

173. The Transportation Department works to help Boulder County residents and visitors with alternative modes of travel such as biking, walking, and transit, and it is a County objective to "[f]oster a transportation system that reduces demand for and reliance upon petroleum."

San Miguel County has made efforts to reduce GHG emissions.

174. San Miguel County produced its first Sustainability Inventory in 2006, its first Greenhouse Gas Inventory in 2010, and issues an Annual County Energy Report which tracks the County's energy use and CO_2 emissions.

175. In 2007, San Miguel County joined with its towns and other groups to create the New Community Coalition (TNCC), which developed a 2007 baseline of CO_2 emissions for San Miguel County. Since 2007, San Miguel County has spent approximately $560,000 on this effort.

176. In 2012, TNCC changed its name to EcoAction Partners, which continues to be funded by San Miguel County and its towns. It implements several programs to reduce GHG emissions, including providing free energy assessments to low- and middle-income households in order to prioritize and implement cost effective energy efficiency improvements; school programs that teach saving energy and reducing waste by establishing sustainable life habits; and the Greenlights LED lightbulb rebate program to encourage energy efficiency and save businesses and residents money. EcoAction Partners also runs a Green Business Certification program, to help businesses realize the financial benefits of energy efficiency.

177. In 2009, San Miguel County adopted Colorado's Climate Action Plan, setting CO_2 emissions reduction targets of 20 percent below 2005 levels by 2020. Also in 2009, San Miguel County signed on to the Cool Counties Initiative, setting a goal to reduce county GHG emissions 80 percent below 2009 levels by 2050.

178. As part of the 2018 Board of County Commissioner goals, San Miguel County "will work towards becoming a carbon neutral organization." In 2015, the Board of Commissioners approved $10,000 to hire an independent contractor to establish test sites in San Miguel County for a carbon sequestration project.

179. San Miguel County works with numerous partners to reduce private sector energy consumption and CO_2 emissions as well.

180. San Miguel County is initiating a Payments for Ecosystem Services pilot program that provides incentives to landowners in exchange for managing their land to provide an ecological service, including carbon sequestration to support cleaner air; it participated in the C-PACE program, which provides low-cost financing for renewable energy and energy efficient installations in commercial developments; and it has used County-owned land for a solar power installation.

181. San Miguel County was a partner in the 2017 Upper San Miguel Basin Forest Health Landscape Assessment (which deals with, among other things, the effects of climate change on forest health and wildfire risks), and is a member of the West Region Wildfire Council, a consortium of local, county, state and federal agencies that addresses wildfire risks in six counties in southwestern Colorado.

The City of Boulder has made efforts to reduce GHG emissions.

182. In addition to collaborating with Boulder County on joint climate initiatives, the City of Boulder minimizes its own contributions to global climate change.

183. The City established policies to reduce its GHG emissions to align itself with the goals of Kyoto as early as 2002. The City was the first community in the United States to tax itself to preserve open space, and the first to establish a carbon tax. In 2006, Boulder residents voted to authorize the City Council to level a tax to fund a climate action plan with the goal of GHG reduction.

184. In 2016, the Boulder City Council adopted the City's Climate Commitment, which includes commitments to transition to 100 percent renewable energy by 2030 and reduce the City's GHG emissions to 80 percent below 2005 levels by 2050.

185. In order to meet its goal, the City is investing in a number of ongoing energy and climate efforts, including the 2017 Energy Conservation Code that guides the effort to achieve net zero energy for the City's residential and commercial buildings, SmartRegs ordinances that require certain housing in Boulder to meet energy efficiency standards by the year's end, and solar rebate and grant programs that support businesses and individuals in financing solar installations.

186. The City's transportation department focuses extensive efforts on reducing single-occupancy vehicle use and building miles of bikeways and pedestrian-friendly routes. These and other efforts kept over 50,000 metric tons of emissions out of the atmosphere by 2015.

187. The City is also exploring its own locally owned municipal electric utility in an effort to achieve its GHG and clean energy goals.

188. Boulder County and the City of Boulder's Open Space Department have also begun to study the ability of carbon sequestration on agricultural lands and in forests to absorb extra carbon from the atmosphere. In the words of a County Commissioner, "inaction is not an option."

189. Nonetheless, "Boulder County and the City of Boulder have also realized that despite their best efforts to reduce GHG emissions, climate change impacts are inevitable and have the potential to exacerbate many of the challenges faced by Boulder County and its municipalities."

2. *Plaintiffs and their residents have already been injured because of climate change. They are mitigating current climate impacts, and will be forced to continue mitigating and adapting to climate change for the foreseeable future.*

190. Plaintiffs and their communities have already suffered the impacts of Defendants'

actions altering their climate. Recent events have highlighted the costs to Plaintiffs of responding to extreme events, which will become more frequent with climate change.

191. For example, in 2010, the Fourmile Canyon Fire swept through parts of Boulder County near Boulder, destroying 162 homes within the first 12 hours, and 6,181 acres in total. Fighting the fire required 900 firefighters and first responders. In spite of those efforts, the losses totaled hundreds of millions of dollars, making it the most expensive fire in Colorado's history at the time. In 2013, Boulder received nearly a year's worth of rain in 8 days, which caused over $2 billion in property damage across the Front Range, and in Boulder County alone destroyed or damaged more than 150 miles of roads and 30 bridges at a cost well in excess of $100 million. Municipal property damage in the City of Boulder amounted to $27 million.

192. In response, the County administered a flood-damaged property buyout program amounting to $24.6 million to reduce the risk of future flood danger.

193. Boulder County's 2017 State Legislative Agenda summarizes the reality:

> Data and forecasting reinforces recent experiences of communities along Colorado's Front Range – we will continue to be burdened by the negative effects of climate change, from drought to wildfires to floods. These ecosystem disruptions deeply affect residents and communities, and demand swift action and response on the part of local governments. With local emergency response agencies in place, county response is typically well-managed and triaged; however, the growing scale of disasters means that more programs and staff are necessary to aid in responding.

194. Similarly, the Mayor of the City of Boulder has told the U.S. EPA that climate change "will affect Boulder's ability to deliver services including fire protection and other emergency services, flood control and public works projects, and health care and social services for vulnerable populations."

195. As the 2012 Boulder County Climate Change Preparedness Plan recognizes, a

"sense of urgency" is needed in the implementation of hazard mitigation projects such as wildfire fuels treatments, stormwater infrastructure improvements, and floodplain property acquisitions "to offset the potential impacts of climate change."

196. All the Plaintiffs are expending considerable taxpayer dollars and undertaking adaptation measures to plan for, understand, and protect their land, infrastructure, and residents from current and future anticipated climate impacts.

The costs of climate change impacts monitoring and assessment.

197. Assessing and understanding the severity of current and projected impacts within the Plaintiff communities has been a substantial and expensive undertaking. All Plaintiffs have had to spend staff time to better understand and respond to the impacts of climate change, and this will only increase along with climate change impacts. In addition to taxing their internal resources, all Plaintiffs have also expended money on outside experts to help understand existing and projected vulnerabilities.

198. In 2012, Boulder County and the City of Boulder jointly spent nearly $75,000 apiece to hire a consultancy group to conduct a climate change preparedness study.

199. Boulder County has also already spent thousands of additional dollars on additional studies and experts, including, but not limited, to:

- $14,000 in 2017, to study to analyze the economic impacts of climate change on, among other things, County infrastructure;
- a consultant to identify high-risk property acquisitions and develop prospective approaches to reducing public and private risk to river-related hazards; and
- a study of floodplain management and transportation system resiliency.

200. Similarly, the City of Boulder has also already spent thousands of additional dollars on additional studies and experts including, but not limited, to:

- $45,000 to analyze the impacts of extreme heat;
- approximately $15,000 to study the impacts of climate change on just two City-owned facilities;
- thousands of dollars on several studies to analyze the impact of climate change on water issues;
- approximately $15,000 to study forest vulnerability to disturbances and climate change; and
- approximately $20,000 to study drought adaptation and sensitivity of plant species.

201. And San Miguel County, which operates with a much smaller annual budget, has likewise spent thousands of dollars on additional studies and experts in order to understand its risks, including but not limited to:

- approximately $5,000 for a forest health assessment that involved climate change projections;
- approximately $32,500 for an analysis of debris flow hazards to the County, which occur after heavy rainfall due to the County's steep topography;
- a watershed study that considered, among other things, the impact of climate trends on the San Miguel Watershed.

202. These monitoring and assessment costs will continue to be necessary as the severity and timing of impacts will change as projected future emissions become actual emissions.

Plaintiffs face damage and added costs to protect residents and drainage systems from flood and precipitation.

203. All Plaintiffs are susceptible to flooding, and climate change will exacerbate the

risk of such flooding, due to changes in rainfall intensity, storm frequency, the timing of snowpack melt, and other extreme events.

204. Increased temperatures and more extreme events associated with climate change also threaten ecosystems and vegetation that reduces runoff rates and flow velocities.

205. San Miguel County is extremely susceptible to riverine flooding given the steep mountainous terrain and the multitude of creeks and streams that eventually flow into the San Miguel River. The Town of Telluride and unincorporated community of Placerville are especially vulnerable to flooding and debris flows. San Miguel County also experiences flash flooding due to intense cloudburst storms over small and steep watersheds in the summer monsoon season and early fall, and spring snow runoff can also cause riverine flooding with the combination of warmer spring temperatures and spring rain.

206. In light of the increased precipitation projections and enhanced flood risk discussed above, Boulder County may need to upgrade its drainage and stormwater infrastructure or take other precautions to protect its residents from precipitation events.

207. Both Counties will have to spend additional sums to assess the need and cost of future flood mitigation. These assessments will reveal additional costs. Boulder County has already hired a consultant to determine if additional property acquisitions need to be made due to increased flood risk.

208. The City of Boulder has made significant investments in flood conveyance facilities over the last several decades and has identified approximately $170 million in additional investments – needed to accommodate industry standard one percent probability storms – based on historic data. Projected changes – in storm frequency and intensity, and

changes in the timing of peak snowpack melt, and the occurrence of other extreme events – may impact both the utility of prior investments and feasibility of planned future mitigation. The City will have to spend additional sums to monitor and assess these impacts.

209. The 15 major drainageways that run through the City of Boulder rely heavily on the presence of healthy ecosystems and vegetation to mitigate impacts by encouraging infiltration that reduces peak runoff rates, reducing flow velocities, and providing channel stability that reduces erosion and sediment transport. Increased temperatures and more extreme events associated with climate change increase the risk of degrading the health and stability of these systems, which in turn results in more frequent and severe impacts during major precipitation events. For example, wildfire has the potential to increase the damage associated with even small precipitation events, which would have historically had only small runoff.

210. The City updates the floodplain mapping and mitigation studies on its 15 major drainageways on a periodic basis to reflect changes due to land development, new study technologies and the impacts of major floods that have occurred. Changes in the base hydrology used for flood modeling, due to climate change, result in increased costs to maintain accurate mapping of hazards and require reevaluation of associated mitigation plans.

211. Additionally, the City will likely need to take more proactive steps to respond to the increased flood risk. For example, the City budgeted $500,000 annually for a program to reduce the dangers of flooding by purchasing and removing structures with the greatest life safety risk. The program further prevents reconstruction in high risk areas after a flood event through the City's purchase of private properties with flood-damaged structures. To adequately mitigate the risks associated with increased flooding on account of climate change, the City will

need more money for this program.

Plaintiffs face damage and added costs to protect transportation infrastructure.

212. Transportation infrastructure is critical, and vulnerable to climate change. All Plaintiffs maintain hundreds of miles of roads, and in the face of climate change, they face a choice: they can either spend millions of dollars to upgrade and improve roads, or spend money to maintain and repair roads as they are degraded by the effects of climate change.

213. Expected increases in temperature, rainfall intensity, and flooding can all damage roads, increasing maintenance costs. The precise future maintenance costs are uncertain, but Plaintiffs face the risk of increased expenditures on maintenance and reconstruction, and thus it is entirely reasonable for the Plaintiffs to spend money now and in the immediate future on upgrades and improvements.

214. Increased temperatures and altered precipitation patterns lead to more potholes and general asphalt degradation – intensifying the need for road repairs – because road materials are generally designed for the historic climate.[16] According to a climate vulnerability study commissioned by the Colorado Energy Office, road buckling increases at sustained temperatures over 90^{o} F, which also shortens pavement life and causes bridge expansion; "[t]hese changes will necessitate increased maintenance and construction resulting in higher associated costs."

215. With conservative estimates projecting an average temperature rise in Boulder of 4^{o}F by 2040, temperatures are projected to more frequently exceed pavement mix design standards used for asphalt roads. These, as well as cracking and erosion caused by altered

[16] As Boulder County's Climate Change Prepared Plan recognizes, altered patterns from climate change have "the potential to alter freeze-thaw cycles and shrink-swell soil cycles."

precipitation patterns, are projected to cost the City of Boulder and Boulder County tens of millions of dollars, and San Miguel County millions of dollars.

216. Roads may also be damaged by flooding, especially because many roads in western Boulder County tend to run adjacent to creeks, placing them at risk with any increase in flooding potential. Flooding and major storm events also place significant stress on bridges, necessitating more repairs and/or bridge upgrades to prevent bridge failure.

217. Boulder County and the City of Boulder have already spent over $100 million on repairs to roads and other infrastructure damaged by the 2013 flood, which is an example of the costs that it will increasingly bear in the future as climate change impacts increase.

218. Whether they spend money on adaptation efforts now to upgrade and improve roads and bridges, or wait to bear the increased maintenance costs later, all Plaintiffs are projected to spend millions on their roads and/or bridges due to climate change.

The City of Boulder faces damage and added costs to protect its water supply.

219. The City of Boulder supplies water to thousands of people, mostly in the City's limits, and it owns substantial and valuable water rights. It has faced and will continue to face to substantial additional costs to provide and to continue to provide water – an essential need – to its residents and other users on account of climate change.

220. Climate change impacts, including rising temperatures, earlier snowmelt runoff, precipitation changes, droughts, and wildfires have affected and are projected to continue to affect water supply and quality, as well as the infrastructure that the City uses to supply water. The City has spent and will be forced to spend substantial additional dollars to account for these impacts in added maintenance, monitoring, and proactive adaptation costs. The costs to the City

from not being able to provide water for a single day are estimated to be as high as $6.2 million.

221. The City has spent, is spending, and will continue to spend substantial staff resources and dollars to study the impacts of climate change on the adequacy and quality of its water supply. In 2008, the City commissioned a report, costing thousands of dollars, on how climate change will affect its water supply. In 2017, the City commissioned a new report, again looking at how climate change would affect its water supply and quality, costing $210,000. Since 2016, the City has spent tens of thousands of dollars to study how wildfires would affect the local watersheds.

222. While the City has been historically able to supply water to users, climate change will likely impact its ability to so in the future.[17] The City will have to continue expending money and staff resources to monitor and analyze whether the City will have to expand its water supply and/or storage capacity.

223. The City also faces increased challenges and will face additional costs associated

[17] While projections concerning overall precipitation diverge relative to the location of Boulder's water supply watersheds, there is a strong possibility that precipitation may decline. But even if overall precipitation remains constant, water supply may still be threatened. As peak snowpack melt occurs earlier in the year and summers become hotter and drier, water demand may increase, and stored water may be insufficient and the specific months when Boulder's most senior water rights are legally available may result in reduced water yield due to the change in runoff timing. Similarly, the water the City receives from the West Slope may become scarcer as a result of changes in flows, precipitation and demand in the regions supplied by the Colorado River. The City's water supply, watersheds and infrastructure will also be subject to an increased threat of damage from events such as wildfire and floods that are projected to increase with climate change.

with treating the water it supplies.[18] Warmer water is more expensive to treat and the City will be forced to bear those costs in the future. The debris and ash created from wildfires also poses a substantial risk to the quality of the City's water.[19]

224. The City has already taken substantial steps to proactively protect its ability to treat water, in light of climate change risks. Specifically, the City spent $40 million to cover a canal that transports West Slope water, in order to preserve water quality. That decision was driven, in part, by the need to ensure that water supply infrastructure would be more resistant to the impacts of climate change. Similarly, the City has expanded the emergency electrical generators at its critical water treatment facilities, in part, because of increasing extreme events – like floods, fires and storms – associated with climate change.

225. The City will also likely face increased funding challenges due to the rising costs of water treatment and maintaining its water supply infrastructure on account of climate change. The City's water users pay for water based on their use and those funds go towards maintaining the water supply infrastructure. If, as appears likely, the City must limit water supply – for example, on account of projected drought brought on by climate change – it may have less revenue to offset the costs associated with the operation and maintenance of its critical infrastructure.

[18] The city currently has the ability to manage seasonal variation in source water quality and choose between different sources in order to optimize treatment and reduce associated costs; in the future, climate change may reduce such flexibility.

[19] Even minor precipitation events can flood the City's reservoirs, creeks, streams and canals with that ash and debris, leading to additional and sometimes insurmountable treatment costs, which the City will be forced to bear in the future.

Plaintiffs face damage and added costs to protect residents and property from wildfires.

226. All Plaintiffs expect increased costs from increased wildfire risk due to climate change. The Plaintiffs' response, prevention, mitigation and/or recovery costs are increasing and will continue to increase.

227. The higher temperatures and extended periods of droughts that San Miguel County will face as a result of climate change will substantially increase its risk of wildfire and its consequential damages. The number of wildfires and the size of the area burned are expected to increase over the next three decades, and the wildfire threat will extend to higher elevations, where historically there was a much lower wildfire risk, which could potentially include areas where mitigation has not been as high a priority.

228. Since San Miguel County is the first responder for wildfires that start on private or state land, and its anticipated response costs for such fires can reach hundreds of thousands of dollars *per day*, the County faces enormous financial liabilities from increased wildfire risk.

229. San Miguel County is already seeing a trend of larger, more frequent fires. In 2002, the Burn Canyon fire, started by lightning, consumed a devastating 31,300 acres of forest, costing $35.3 million to fight. In 2014, the Board of County Commissioners recognized that a "warming climate has accentuated" wildfire occurrence from natural patterns.

230. San Miguel County also faces the likelihood of increased premiums for wildfire insurance it carries for County property as a result of this increased risk.

231. Boulder County has responsibility for wildfire mitigation planning in a County where in just one of its two wildfire management zones, over 8,700 households exist in wildfire prone areas – in homes valued at over $3 billion. Much of the City's invaluable water supply also

comes from high-elevation forested watersheds and reservoirs.

232. The City of Boulder's Fire-Rescue Department is tasked with protecting life and property through fire prevention, education and risk reduction activities, fire suppression, emergency medical and rescue services, and coordination with neighboring fire districts. The Department is responsible for "[p]rotecting more than $21 billion dollars' worth of property within Boulder." As of 2007, the value of fire-prone structures and estimated contents in the City of Boulder's wildland-urban interface alone was $2.5 billion.

233. Both Boulder County and the City of Boulder have already suffered substantial and additional costs related to the increasing wildfire risk associated with current trends, including general suppression costs, prevention costs, and rehabilitation costs (of roads, forests, watersheds). These costs are significant, and Plaintiffs face the risk of continuing and increasing costs in the future as wildfires are likely to increase.

234. With current trends and predicted increases in drought and heat combined with earlier snowmelt, the frequency of wildfires is increasing and will continue to do so, further endangering a high-risk area filled with homes, water reservoirs, ecological hotspots, and wildlife.

235. The Plaintiffs have already had to, or will need to, increase their fire mitigation and firefighting response costs due to the increased risk of wildfire caused by climate change. The Boulder County Sheriff's Office has likewise increased staff in recent years.

236. Boulder County is also facing costs to adapt to and reduce wildfire risk, such as through its Wildfire Partners Program, which was created in 2014 in acknowledgment of an increased risk of fire from climate change. This Program assists County homeowners to protect

their homes against wildfire.

Plaintiffs face damage and added costs to protect and preserve their forests.

237. Related to but distinct from their responsibility for wildfire, Boulder County and the City of Boulder both own and have responsibility for thousands of acres of forest. As discussed above, Boulder's forests have been damaged and will continue to be threatened in numerous ways by climate change trends. Boulder County and City have expended and will continue to expend substantial additional resources, including staff time, to preserve forest health, and manage the impacts of dead trees and insect outbreaks.

238. For example, between 1996 and 2010, 122,455 acres of forest in Boulder County saw some level of damage related to mountain pine beetle, which forced the County to hire extra staff to manage their forests.

239. Because removal of beetle-killed trees reduces risk of wildfire in areas, Boulder County set up, and will continue to run at increasing cost, "sort yards" to provide a location to dispose of wood, in order to facilitate the removal of dead trees to protect homes and public infrastructure. Two main reasons that residents bring wood to the yards have been to mitigate wildfire risk and to remove trees killed by mountain pine beetle.

240. Boulder County will see even more severe beetle outbreaks decimating its forests and in turn creating the potential for increased watershed debris due to climate change, necessitating additional forest maintenance and management demands – specifically, removal of beetle-killed trees (which threaten public safety by increasing wildfire risk, damaging utility lines, private property, and public infrastructure), and a potential increase in insecticide spraying. In the face of a significant beetle outbreak, the County and the City will have to expend

significant costs to hire contractors to remove beetle-killed trees.

241. San Miguel County has partnered to fund a community-driven mapping effort to understand forest change in response to climate warming and drought trends, and to model potential climate change impacts on forest conditions given the potential for climate change to alter the landscape through beetle kill, disease, and wildfire. The information will be used to inform forest health and fire mitigation decisions. According to the Project, "Douglas-fir in the upper San Miguel basin are experiencing mortality from an outbreak of the Douglas-fir beetle and defoliation from spruce budworm, both climate change-related disturbances."

242. In addition to traditional forest space, the City of Boulder's Urban Forestry Division of the Parks and Recreation Department also directly manages approximately 51,000 public trees – out of an estimated total of 650,000 trees that form the City's "urban tree canopy" – in City parks and street rights-of-way.

243. Climate change has increased both the need for and the costs of maintaining this tree canopy. The tree canopy helps to cope with increasing temperatures due to climate change; trees help to combat the "urban heat island" effect and serve to slow and manage stormwater runoff.

244. In the face of tree die-off from insect infestation, the City has an overarching goal to maintain the tree canopy in the developed portions of the City that are shaded by trees to moderate extreme temperatures, among other benefits. Nevertheless, extreme weather and other events exacerbated by climate change, including significant temperature swings, insect outbreaks, floods, drought, and late snowstorms, also harm the tree canopy and increase the costs of maintaining it.

245. The costs of maintaining the urban forest can be enormous. For example, during springtime snowstorms in 2016, City urban forestry staff had to hire contractors at a cost of over $500,000 for pruning, hauling, and chipping. Extreme temperature fluctuations in November 2014 caused the mortality of over 500 elm trees that the City had to remove at the cost of $150,000.

Plaintiffs face damage and added costs to maintain their open space.

246. All Plaintiffs maintain parks and open space areas which will be damaged by the effects of climate change.

247. Boulder County Parks and Open Space ("Boulder County Open Space") manages over 100 miles of trails, and 30,000 acres of forests – forests that act as carbon sinks and provide a habitat for over ninety species of birds and large mammals, including bears and mountain lions. It also owns water rights valued at approximately $200 million, and an interest in more than 100,000 acres of land, the geological diversity of which spans alpine tundra, sweeping plains and grasslands, and wooded mountains. Boulder County Open Space is also responsible for weed control on over 30,000 acres of land.

248. San Miguel County Parks and Open Space ("San Miguel Open Space") manages hundreds of acres of land, miles of trails, and fairgrounds that are used for rodeos. The Open Space Program also encompasses the Land Heritage Program, which uses County funds to place conservation easements on important lands for preservation purposes.

249. The City of Boulder's Open Space and Mountain Parks Department ("City Open Space") manages over 45,000 acres of protected and preserved land, which includes wildlife habitats, floodplains, farm and ranchland, unique geologic features, cultural sites, greenways,

and over 150 miles of trails. The City also owns water rights in the four major creek drainages in the Boulder Valley, including many senior water rights that provide reliable sources of irrigation in most years. Its open space water portfolio is valued at $60-70 million.

250. These public lands and water resources exists for the use and enjoyment of residents and visitors, and serves as a vital spot for ecosystem protection, agricultural production, tourism, citizen health and wellness, and revenue. Boulder County Open Space has set policy and strategic goals of minimizing "impacts to open space resources . . . from oil and gas . . . and other third-party impacts," and adapting to human-caused climate change. The San Miguel Open Space Commission's mission is "to seek to protect and conserve open space for people, natural habitat for flora and fauna, and agricultural lands for the farming and ranching communities throughout San Miguel County for this and future generations."

251. With temperature rise, increases in precipitation intensity, and increased duration and intensity of wildfires due to climate change, all Plaintiffs are already taking or will need to take substantial and expensive protective and restorative measures on their public lands, including increased staff time to mitigate, repair, remove hazards, and restore open space lands.

252. Addressing climate change hazards to Open Space in Boulder means that Open Space has to adjust the way it designs trails, treats its forests, protects its diverse plant and animal species, manages invasive plans, and supports its agricultural tenants. Past events illustrate how significant these costs can be. All of the City Open Space trails were damaged in the 2013 flood, with 64 percent of the trails experiencing significant to severe damage. Facilities suffered from damage to fences, ditches, bridges, and water irrigation delivery systems. The estimated cost for all City Open Space infrastructure repair due to the flood was over $7 million.

In addition, 25 percent of Boulder County Open Space trails experienced damage, amounting to a repair cost of over $2 million.

253. The City of Boulder is already spending large amounts of staff time and money on consultants to understand the impacts of climate change to ecosystems and currently has a climate change vulnerability study for plants underway.

254. San Miguel Open Space is also initiating a Payments for Ecosystem Services program, which is a pilot to help farmers and ranchers improve soil ability to retain water and ease drought effects, and in 2017 committed $20,000 to study the ability of carbon sequestration on agricultural lands.

Boulder County and City face damage and costs to maintain their agricultural property.

255. Both Boulder County and the City of Boulder have significant agricultural property that is vulnerable to climate change.

256. Boulder County Open Space owns 25,000 acres of agricultural land, which it manages through its Agricultural Resources Division. That land is divided into 120 leases and 67 agriculture tenants, who grow sugar beets, beans, alfalfa, grains, and more, generating roughly $125,000 in profits for the County every year.

257. City Open Space owns nearly 15,000 acres of lands that it currently leases to 26 local farmers and ranchers. The land is primarily used for hay and forage production and livestock grazing. Annual crops grown on 300 to 600 acres of the land currently include wheat, corn and barley.

258. Climate change will increase heat waves, droughts, wildfires, and shifts in spring runoff, all of which negatively affect agricultural lands, including by reducing water availability.

Climate change is expected to decrease the nutritional quality of grain crops, increase growth of some weeds, decreased the efficacy of herbicides, decrease the availability of irrigation water, decrease crop yields, and bring higher winter minimum temperatures that could increase pest survival and the number of generations of insects that traditionally reproduced once per growing season.

259. Not only is climate change jeopardizing the existing water supply, but it is also likely to increase future agricultural water demand. Specifically, projected temperature increases, along with other changes in the climate, could increase water consumption by 2 to 26 percent, as soils and plants transpire more of their water. Other climate-related changes to agriculture include that earlier growing seasons could leave crops more susceptible to late frosts, weeds may become more common due to rising CO_2 levels and temperatures, and crop yields may otherwise decrease due to heat stress and increased drought severity.

260. As early as 2012, in part due to climate change predictions, consultants recommended that Boulder County "continue to emphasize investments in water-efficiency improvements on irrigated agricultural land owned by the county." These improvements are and will continue to be expensive; in 2016, for example, it cost the County nearly $75,000 to build four center-pivot sprinkler systems, which are expected to cut water usage in half.

261. The City of Boulder has expended resources to develop its Agricultural Resources Management Plan, which recognizes the numerous risks posed by climate change and the need to "[i]dentify agricultural management practices that help prepare for a more arid future" and to "[r]esearch the potential for agricultural practices to mitigate climate change." This research will likely include costly crop substitution studies and other assessments.

262. Boulder County Open Space has already expended resources in the planting of more water-efficient crops. City Open Space is also planning to increase the efficiency of water distribution, explore storm water retention strategies, and increase use of more water efficient crops.

Plaintiffs face damage and increased costs to provide emergency management services.

263. The Plaintiff communities face increasing costs to provide emergency management services as a result of climate change, and the impacts discussed above, including increased wildfires, heavy rainfall, and other extreme weather events.

264. The Boulder Office of Emergency Management (OEM) is a joint office that provides emergency management for both the County and the City and exists to create and coordinate a comprehensive emergency management program that enables "effective preparation for, efficient response to, and effective recovery from . . . disasters, in order to save lives . . . protect resources and develop a more resilient community." OEM has recognized climate change as a significant threat.

265. With increasing trends of extreme events such as wildfires, drought, and intense rainfall, more volatility from a warming climate, and the impending threat of an even greater frequency of extreme events in the future, OEM has had to hire more paid staff, needs to hire still more staff to handle future events, and engages in supplemental community preparation efforts.

266. Additionally, climate change contributes to OEM's need to make significant upgrades to its existing emergency management space, or build a new, fully built-out emergency operations center. The upgrades or new center will cost in the millions to tens of millions of dollars.

267. The City of Boulder is currently spending money to create sites and resilience centers in various parts of the city for sheltering purposes during severe storms due to an anticipated increase in extreme weather events.

268. San Miguel County Emergency Management's mission is to "support [the] community's disaster preparedness, response, recovery and mitigation needs." During the planning process for the newest version of its Multi-Hazard Mitigation Plan, encouragement of public involvement included educating the community on "potential mitigation and climate adaptation strategies." Among the other natural risks San Miguel deals with, power outages from severe weather is an ongoing concern.

269. San Miguel County Emergency Management does not have the resources to respond to increasingly severe weather events brought on by climate change, and is already expending funds to increase its capacity. In recent years, San Miguel County has added a new full-time staff member, expanded its Emergency Management Operations Center, and expanded its outreach and training programs.

Plaintiffs face increased costs to abate public health hazards in their communities.

270. All Plaintiffs have faced and will continue to face increased costs to abate climate change related public health hazards in their communities caused by, for example, increases in rainfall intensity, heat, wildfires, smoke, ground-level ozone, exposure to toxic materials, increase in vector-borne disease, and housing displacement.

271. Preparedness for outbreaks of disease and heat or other extreme events is crucial, and the public costs of mitigating and responding to these health hazards are extremely high.

272. Due to the expected continued heat rise in Boulder County, a place that

historically rarely saw days above 95 degrees, Boulder County and the City of Boulder are expected to see increased public health heat risks, such as heat stroke, and their associated costs.

273. Heat increase will affect everyone, but particularly vulnerable populations such as children, the elderly, and those with existing medical conditions. The number of heat-related mortalities in the Boulder area is expected to increase above the historic average.

274. Plaintiffs Boulder County and the City of Boulder will have increased costs connected with abating this public health hazard. For example, both may need to take steps to ensure that proper cooling systems are in place, especially in areas with vulnerable populations, given that Colorado has a high number of non-air-conditioned buildings due to its moderate temperature history.[20]

275. Cooling centers that are available during heat waves, and/or assisting with home air-conditioning installation, could cost Boulder County and the City of Boulder millions of dollars by mid-century.

276. Ground-level ozone – already a problem for the Boulder area – is also expected to increase with rising temperatures. The risk of increased ground-level ozone from warm temperatures may push San Miguel County, which is on the cusp of EPA non-attainment, into non-compliance.

277. Exposure to ozone is associated with respiratory inflammation and even

[20] Cooling costs for buildings can be incredibly high, reaching into the millions of dollars. For example, $37.7 million from a $575.5 million school construction bond for the Boulder Valley School District is being used to provide air-conditioning and better ventilation. This was done because of rising August temperatures and related health concerns for students. The schools had been built for open air cooling, in light of the area's historic climate.

premature mortality; an increase may alter public health employee workloads and the number of emissions reduction programs the Boulder area requires in order to meet federal requirements for ozone attainment.

278. All Plaintiffs will also face increasing costs to monitor and reduce ozone. According to the Climate Change Preparedness Plan, Boulder County "will likely need to expend more time and money in the future to avoid the monetary and health-related costs of being out-of-compliance with ozone attainment."

279. Boulder County has already spent resources studying ground-level ozone, including how it is affected by climate change. Moreover, all Plaintiffs have enacted a number of expensive GHG reduction programs, in part, because of the need for cleaner air in a changed/changing climate.

280. Boulder County is also responsible for providing vaccination services and general disease control to residents, including mosquito control; the County needs to prepare for increasing costs to provide these services in light of climate change. The City of Boulder uses ecosystem services to regulate mosquitos – ecosystems that will be damaged by human-caused climate change.

281. Because disease outbreaks are linked to increased temperature, Colorado may see a spread in infectious diseases in the future. For example, a trend towards warmer weather could lead to an increase in mosquito and other species and, thus, mosquito-borne illnesses or other arthropod-borne (e.g., ticks-borne) illnesses, which would in turn lead to the need for increased or adjusted vector control. With warmer weather, mosquito and tick populations have increased in San Miguel County.

282. Due to changing climate patterns such as warmer seasons, and increased drought, there is also the potential for animals to hibernate less, resulting in more human-animal interactions, which can increase incidence or risk of diseases, such as rabies.

283. The costs of responding to and monitoring these health risks can be substantial.

284. The spread of West Nile virus is instructive. West Nile virus first appeared in Colorado in 2002. By 2003, Colorado had the highest number of West Nile virus deaths and cases in the country. Prior to 2002, the City of Boulder did not have a mosquito control program. Now, the City's mosquito management costs are increasing annually, amounting to a budget of roughly $250,000 for 2018. In 2017, the budget for mosquito control in Boulder County was similarly high: $397,151.

285. Both Boulder County and the City of Boulder have experienced increased monitoring and costs to educate the public about these public health hazards, as they inspect areas where animals live and collect species (including mosquitos) to test for disease rates.[21] County public health officials in San Miguel have similarly spent time and resources to educate the public about West Nile virus, and work with local agencies to track and test mosquito populations. Last year, San Miguel engaged in Zika outreach and education.

286. The City of Boulder recently hired a consultant to study, among other things, alterations to ecosystems and species migration patterns due to a shifting climate, which will help the City understand public health risks. Warmer weather and shorter hibernation seasons

[21] Although predictions for vector-borne illness spread are difficult because they are also highly dependent on shifts in human behavior and human levels of immunity, the consequences of increases in such illnesses are dire enough that increases in monitoring and surveilling of the situation may be warranted.

could result in more human-animal exposure, including to species that typically carry rabies, such as skunks.

287. The City is also currently reviewing an adaptive management approach to its mosquito control program to address challenges from climate change, and has acknowledged that "[a] process needs to be developed in the event that a new mosquito-borne disease occurs in Boulder that could impact the community, particularly with the potential of new disease emergence with changing climate."

* * *

288. The programs and adaptation measures that the Plaintiffs have undertaken – such as new irrigation systems and stormwater infrastructure, increased wildfire defensive spaces, and more emergency management staff – are only the beginning of an adequate response to dealing with increased risks from climate change.

289. These costs are occurring now and being borne by taxpayers in order to protect the safety, health, and lives of residents, and the property and infrastructure of the Plaintiffs. The costs will continue to grow for decades to come to adapt to new conditions.

290. As detailed below, each of these costs and risks is a result of the Defendants' actions in causing and contributing to the alteration of the climate.

C. Defendants are responsible for Plaintiffs' injuries.

291. Exxon and the Suncor Defendants are responsible for causing and increasing the harms from human-caused climate change, which are injuring Plaintiffs.

292. They sold, sell and plan to continue selling an enormous amount of fossil fuels, while actively promoting their use. Those fossil fuels were used, are used and will continue to be

used by their consumers in the intended, foreseeable, and natural way: combustion.

293. Since the 1960s, moreover, Defendants sold and promoted fossil fuels knowing that climate impacts were substantially certain to occur if unchecked fossil fuel use continued. They concealed this knowledge from their consumers and the public, contributing to ongoing overreliance on fossil fuels.

294. In addition, through the 1990s and 2000s – critical decades when fossil fuel use needed to be brought under control and alternatives needed to come into the market – Defendants affirmatively misrepresented what they knew about the causes and consequences of climate change.

295. Defendants continue to produce, refine, promote and sell fossil fuels, and do not plan to stop or substantially reduce those activities. Their plans include selling *more* fossil fuels, including fuels that have an even more significant impact on climate. This is so even though Defendants, at least publicly, profess to acknowledge the dangers of climate change.

296. Defendants' conduct substantially contributed to, and was a substantial factor in bringing about, climate change, and continues to do so. It also accelerated, aggravated, and continues to accelerate and aggravate the impacts of climate change.

1. *Defendants knew fossil fuel use would result in dangerous changes in the climate.*

297. Decades ago, Exxon and Suncor knew that climate change was real, that it was being caused primarily by the combustion of fossil fuels, that it was irreversible, and that it posed a serious danger to people and property, including in Colorado.

298. Beginning in the 1960s, Defendants spent years studying climate change. Defendants' research *never* suggested that fossil fuel use was safe, that impacts were unlikely, or

that those impacts would be insubstantial.

299. Instead, Defendants' research demonstrated that their continued actions would cause significant alteration of the climate. Beginning in the 1960s, and throughout the 1970s and 1980s, their own scientists were telling Defendants that, while modeling may be imperfect, there was a growing consensus that fossil fuel use would result in likely catastrophic changes to the climate.

300. During this time period, Suncor and Exxon also knew what had to be done to prevent and/or lessen the impacts of anthropogenic climate change: that GHG emissions had to be reduced, the growth of fossil fuel use needed to be stopped, and energy needed to be supplied by fossil fuel alternatives. Defendants were warned that these actions needed to be taken imminently and that the transition would be too late if they delayed until the warming effects were significant.

301. In later years, the Defendants would emphasize what they claimed was the "uncertainty" of climate change, and its impacts. This was disingenuous.

302. During the 1970s and 1980s, Defendants were told that one (if not the primary) cause for any "uncertainty" was the extent of future fossil fuel use and growth. In other words, if fossil fuel use were greatly curtailed, then the predicted climate impacts might not happen. But such impacts were substantially certain if fossil fuel use continued to grow – exactly the path that Defendants took. So, Defendants' own plans and conduct were to blame for the problem they would complain about.

303. Defendants also knew that "uncertainty" did not mean human-caused climate change would necessarily be *less* serious than projected; it was simply uncertain whether the

impacts of their alteration of the climate would be merely disastrous or truly catastrophic. As an Exxon scientist warned the company in 1978, "there is no guarantee that better knowledge will lessen rather than augment the severity of the predictions."

Defendants knew fossil fuel use was causing CO_2 in the atmosphere to rise.

304. In 1958, the American Petroleum Institute began research on "gaseous compounds in the atmosphere *to determine the amount of carbon of fossil fuel origin*."

305. On information and belief – at that time and all other relevant times – Defendants or their predecessors were members of API, and commissioned, funded, participated in or, at a minimum, were aware of this and subsequent API research.

306. Defendants' and API's research continued through the 1960s culminating in a 1968 report, commissioned from the Stanford Research Institute (SRI), titled "Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants." One of the report's conclusions was that atmospheric CO_2 was rising, and that fossil fuel combustion was by far the most likely "source [ ] for the additional CO_2 now being observed in the atmosphere." The authors went on to explain that the increase in the concentration of CO_2 in the atmosphere was because "[t]*he natural scavenging processes for removing CO_2 from the atmosphere are not sufficient to maintain a stable equilibrium in the atmosphere in the presence of this increase in emissions.*"

307. This point was underscored in a 1969 supplement that confirmed for API that "none of [the carbon sinks, e.g., the oceans and biosphere] [are] capable of counter-balancing" the "extremely large" CO_2 emissions resulting from fossil fuel combustion.

308. From the early stages, this information – that atmospheric CO_2 was rising fast, and that fossil fuels were to blame – was shared with and known by top company managers. For

example, Wilburn T. Askew, the president of Sun Company of Canada, Suncor's direct predecessor, served on API's technical committees. An internal Exxon memo from 1977 – reporting that "current scientific opinion overwhelmingly favors attributing atmospheric carbon dioxide increase to fossil fuel combustion" – was circulated to the "Corporate Management Committee," which included Exxon's highest-level managers.

309. As the years went on, Defendants' managers were continually reminded that fossil fuel use was causing a rise in atmospheric CO_2. A 1980 API report confirmed that there was "strong empirical evidence that . . . fossil fuel burning" was causing the rise in atmospheric CO_2 and that more than half of emitted CO_2 was remaining in the atmosphere. On information and belief, this report was shared with API member companies, including Defendants.

310. The implications of the rise in atmospheric CO_2 were obvious and Defendants were told what was needed next: a reduction of CO_2 emissions. The 1968 API Report summarized this recommendation: "Past and present studies of CO_2 are detailed and seem to explain adequately the present state of CO_2 in the atmosphere. *What is lacking, however, is an application of these atmospheric* CO_2 *data to air pollution technology and work toward systems in which* CO_2 *emissions would be brought under control."*

Defendants knew climate alteration would likely cause adverse and hazardous impacts.

311. Defendants' interest in the rise in atmospheric CO_2 was not academic. Defendants understood that rising CO_2 would trap heat and energy in the atmosphere, increasing

temperature,[22] and bringing about changes in the climate – i.e., drought, heatwaves, flooding, and sea level rise, etc. – that would have a profound effect on human lives, property and livelihoods.

312. In the same 1968 API report, Defendants were told that "there seems to be *no doubt* that the potential damage to our environment could be severe" and that the lack of attention on CO_2 emissions was "ironic" because they "may be the cause of serious world-wide environmental changes." Based on "[t]he latest available data", Defendants were warned that temperatures might increase by between 1.1°F and 7°F if the concentration of atmospheric CO_2 increased 25 percent (something they expected in 2000), and that temperature increases would "be three times this figure" if CO_2 levels doubled. The 1968 report concluded that – even if these projections were somewhat imprecise – "[s]ignificant temperature changes *are almost certain* to occur by the year 2000 and these could bring about climatic changes."

313. Defendants spent the next two decades enhancing their understanding of the likely effects of continued fossil fuel. At no point during that time were Defendants told that unchecked fossil fuel use would result in insignificant changes.

314. To the contrary, throughout this time period Defendants recognized that – as one 1980 document notes – even if there is some uncertainty, "[t]he physical facts agree on the probability of large effects 50 years away." Thirty-eight years after that statement, the Plaintiffs, and others, are experiencing those effects.

315. In 1979, API formed a task force to analyze climate impacts.

[22] For example, SRI's 1968 paper for API reported that the "concern[ ] with the possible changes in atmospheric CO_2 content [is] because CO_2 plays a significant role in establishing the thermal balance of the earth."

316. As was the case during API's research efforts during the 1960s and 1970s, both Suncor and Exxon (or their predecessor companies) were members of the task force, and participated in the creation of or had access to the information produced by or available to the task force.

317. The task force circulated a commissioned report in 1980, on "The CO_2 Problem," which added alarming projections to those contained in the 1968 report. The 1980 report predicted a 4.5°F (2.5°C) temperature rise by 2038, which would have "major economic consequences." Indeed, the rise would effectively "halt" "world economic growth" by 2025. By 2067, the report predicted a 9°F (5°C) temperature rise – bringing "globally catastrophic effects."

318. The report warned that uncertainty might mean the impacts would happen even *faster* than initially recognized: there was a "1 in 10 chance [of a 4.5°F temperature rise] by 2005," not 2038.

319. The 1980 report recognized that the severity of the climate problem would be measured, at least in part, on the ability of society to withstand and adapt to the impacts, what the API task force dubbed "building in resilience." The costs of adaptation were thus a foreseen response to human-caused climate change.

320. The API taskforce appeared, at least internally, to take these warnings seriously.

321. As reflected in task force meeting minutes, additional research was suggested to "investigate the market penetration requirements of introducing a new energy source into world wide use" and one of the suggested "overall goal[s]" of the task force was to "develop ground rules for energy release of fuels and the cleanup of fuels as they relate to CO_2 creation."

322. In 1982, API commissioned another report, this time from Columbia University,

on the matter of climate modeling. The Columbia report noted that despite some variation among climate models, the various models "*all* predict some kind of increase in temperature within a global mean range of 4C [7.2°F]." The report also recognized that "[s]uch a warming can have serious consequences for man's comfort and survival since patterns of aridity and rainfall can change, the height of the sea level can increase considerably, and the world food supply can be affected."

323. In addition to its participation in API's work, Exxon conducted its own climate research (some of which has been made public).[23] Much of this confirmed the research conducted for API and its members, but it also adds more detail.

324. Exxon scientists warned in 1982 that a "*clear scientific consensus* ha[d] emerged" that the "well-documented increase in CO_2" would result in "global temperature rise" and there was "*unanimous* agreement in the scientific community that [the projected] temperature increase [ ] would bring about significant changes in the earth's climate, including rainfall distribution and alterations in the biosphere."

325. Two years earlier, Exxon was warned that those changes would "have a dramatic impact on soil moisture, and, in turn, on agriculture." Specifically, the "American Midwest" was projected to "become drier should there be a temperature increase of the magnitude postulated for a doubling of atmospheric CO_2," with "weeds and pests" also projected "to thrive with increasing average global temperature."

[23] Over the last few years, information about Exxon's awareness of and research into climate change has become public. Suncor may have also undertaken independent research into climate and its impacts, which will assumedly be revealed during the course of this litigation.

326. Exxon was separately warned that climate change could bring about "a northward migration of the desert areas of the United States" with "corn and wheat belts . . . migrat[ing] to Canada." At CO_2 levels of 500 ppm, Exxon projected that "[t]he flow of the Colorado River would diminish" making water shortages in the southwest "much more acute," and "[t]here would be less of a winter snow pack in the . . . Rockies, necessitating a major increase in storage reservoirs."

327. Privately, Exxon also clearly recognized that society would have to adapt to climate change, and that it would cost billions of dollars. While an internal Exxon memo describes the threat of climate change as less "significant . . . [than] a nuclear holocaust or world famine," the required adaptation would be measured in percentage points "of the gross national product estimated in the middle of the next century."

328. Two other revelations from the internal Exxon statements from the 1970s and 1980s are particularly relevant in light of their later contrary and misleading statements. First, it was clear to Exxon that low range temperature change projections were not credible. For example, in 1980, Exxon employees noted – with seeming agreement – that projections of a temperature increase "on the order of 0.25C [.45°F] for a doubling of CO2" were "not held in high regard by the scientific community."

329. Second, Exxon employees noted that there might be "time lags" which would mask "much more significant effects" in the future. In other words, the temperature increases due to CO_2 buildup might occur substantially later than the emission themselves, such that once they were felt, it would be too late to stop or reverse the impacts.

330. In August 1981, an Exxon scientist gave comments on a planning department

document that had indicated that the "observable effects [of rising CO_2] in the year 2030" would likely not be catastrophic (without defining that term). The reviewing scientist, concerned that this language would lull company officers into a false sense of confidence, suggested edits, warning that "it is distinctly possible" that Exxon's projections of fossil fuel use "will later produce effects which will indeed be catastrophic (at least for a substantial fraction of the earth's population)," because of "time lags" and natural climate variability, which might hide the effects of an enhanced greenhouse effect.

Defendants knew fossil fuel use reduction was needed.

331. Exxon and the Suncor Defendants have known for years that if fossil fuel use continued at the same rate (or grew), the impacts of climate change would come faster and harder. Specifically, the Defendants were told that the transition away from fossil fuels had to begin, that substantial shares of recoverable fossil fuels could not be exploited, and that more carbon-intensive fuels should not be promoted or sold, at least not if the impacts of climate change were to be prevented or kept manageable.

332. As early as 1968, API's members, including Exxon and Suncor, were warned that a substantial percentage of the known recoverable fossil fuels could not be burned because, if they were, atmospheric CO_2 concentrations would to rise to 830 ppm – a catastrophic level. And, although this was obvious, API members were told that *use* rates would affect how fast climate change happened, and how severe it might be.

333. Specifically, the Defendants were told that if the "use of fuel continues to expand at about the 5% rate experienced more recently" then CO_2 concentrations would be "30% higher than in 1950 by the year 2000" and that "a 25% increase in CO_2 concentrations [was] realistic."

334. Similarly, in 1980, API's climate task force recognized "the probability of large [climate] effects 50 years away," but that the "immediate problem [would be] considerably eased" "[i]f fossil fuel rates are reduced." This they understood implicated "the 50-year future of fossil fuel use" and the "roles" that "different categories of fossil or synthetic fuel play in future projections."

335. The 1980 report made an additional and important point about the need for immediate action: because replacing fossil fuels with energy sources that did not emit such high amounts of GHGs would take time, "there [was] no leeway" in the "time for action."

336. Throughout the 1980s, Exxon (including top company managers) continued to recognize and be told that "[m]itigation of the 'greenhouse effect' would require major reductions in fossil fuel combustion."

337. Additionally, Exxon knew that waiting to act would exacerbate the problem – and indeed that, by the time the effects were felt, it would be too late. In 1980, Exxon scientist Henry Shaw told the company that "there [would be] no likely technological 'fixes' (e.g., emission control devices or techniques) that will provide practical means of controlling CO_2 emissions resulting from combustion," and if "policy actions to control the increased CO_2 loading of the atmosphere are delayed until climate changes resulting from such an increase are discernible, then it is likely that they will occur too late to be effective."

Nothing changed Defendants' minds about the causes and consequences of climate change, in spite of the uncertainty they professed publicly.

338. While Defendants have often – at least for the last 25 years or so – publicly claimed that the causes and consequences of human-caused climate change are uncertain, they never abandoned or doubted what research had uncovered and what they had been told by their

own experts throughout the 1960s, 1970s and 1980s.

339. An internal industry memo from 1995 – drafted by a former Mobil employee and shared with API – said clearly that "[t]he scientific basis for the Greenhouse Effect and the potential impact of human emissions of greenhouse gases such as CO2 on climate is well established and cannot be denied." Moreover, "contrarian theories" – which the Defendants present to the public – for global warming were not considered credible and did "not offer convincing arguments against the conventional model of greenhouse gas emissions-induced climate change."

340. Defendants' own business operations also took into account the very climate hazards that they told the rest of the world not to worry about. In 1996, while building offshore exploration facilities in Canada, Mobil Oil "made structural allowances for rising temperatures and sea levels." The engineering consultant hired for the project admitted he "used the engineering standards of the day to incorporate potential impacts of Global warming on sea-level rise."

341. Defendants also used climate change as a means of planning future fossil fuel development. Exxon and its affiliates, for example, saw disappearing sea ice in the Arctic as a boon for oil production because it would substantially reduce the costs of development.

342. Between 1986 and 1992, Exxon's research team was looking "at both the positive and negative effects that a warming Arctic would have on oil operations." Those findings showed that warming would "only help lower exploration and development costs" in Arctic waters. The basis for those findings was the same global climate change models that Exxon publicly claimed were unreliable.

343. Defendants knew that the existence and likely consequences of anthropogenic climate change were certain enough for Defendants to plan their business operations around them.

2. *Defendants substantially contributed to, accelerated, and exacerbated climate change by promoting and selling huge amounts of fossil fuels.*

344. In spite of their knowledge, Suncor and Exxon produced, refined, promoted and sold massive amounts of fossil fuels. In addition, despite recognizing the severity and imminence of climate change, both Defendants developed and sold fossil fuels that contribute even more significantly to climate change than fuels refined from traditional crude oil. Through this course of intentional conduct, Defendants caused billions of tons of excess CO_2 emissions and substantially contributed to the dangerous and inexorable rise in atmospheric CO_2.

345. While Defendants likely knew about the consequences of fossil fuel use even before the 1960s, the vast majority of CO_2 emissions have taken place since the 1960s, after they unquestionably knew about the dangers. Indeed, nearly 75 percent of all industrial emissions were released since the 1960s, with more than half since the late 1980s, causing atmospheric CO_2 to rise. Moreover, the growth rate of CO_2 emissions and CO_2 concentrations in the atmosphere is still rising. While CO_2 concentration rose by 1 ppm per year between 1965 and 1975, it is now increasing by more than 2 ppm per year.

346. The Defendants' actions that have most substantially contributed to climate change and Plaintiffs' injuries were taken with full knowledge of, or reckless indifference to, their effects.

347. Even now, Exxon and Suncor are continuing their efforts toward massive growth of fossil fuel usage. Both of their business plans – while playing lip service to the reality of

climate change – include providing more fossil fuels through the middle of the century, including from more carbon-intensive sources. Far from bringing emissions under control, and helping to mitigate the impacts of climate change, this conduct will ensure and exacerbate the severity of impacts.

Since the 1960s, Exxon has knowingly provided a substantial portion of the fossil fuels causing and aggravating climate change, and it plans to continue doing so – causing continuing harm to Plaintiffs.

348. Since the 1960s, Exxon has sold trillions of cubic feet of natural gas, billions of barrels of oil, and millions of tons of coal and petroleum coke.

349. On information and belief, its share of the fossil fuel market has been substantially the same or has increased over time, which means that it has sold greater absolute amounts of fossil fuels over time as overall consumption has increased.[24]

350. Exxon intended its consumers to burn these fossil fuels, which it knew would, and did in fact, result in the release of billions of tons of CO_2 and other GHGs into the atmosphere. The emissions traceable to Exxon's products substantially contributed to the overall rise in atmospheric CO_2, were a substantial factor in bringing about and aggravating the resulting climate change impacts and will continue to contribute to warming and climate change impacts for the foreseeable future.

351. Exxon is one of the largest sources of GHG emissions both globally and historically.

352. Moreover, and despite its knowledge of the grave threats fossil fuels pose to the

[24] For example, in 2016, Exxon's petroleum product sales were around 5.5 million barrels of oil equivalent per day.

climate as far back as the 1950s, Exxon increased the development of dirtier fuels that contributed even more substantially to the concentration of atmospheric CO_2.Since the 1970s, Exxon has been a player in developing the Canadian tar sands. Canada's tar sands do not contain traditional crude oil. Instead, they are made up of bitumen.

353. Bitumen is extracted, typically by mining, before it can be refined into useable fuel products. The process of turning bitumen into useable fuel creates enormous CO_2 emissions – around 3.2 to 4.5 times the emissions generated from conventional oil produced in North America.

354. Moreover, the bitumen itself contains substantially more carbon than a comparable and conventional oil.

355. Much of that carbon is found in petroleum coke, a byproduct of the refining process, around 80 percent of which is sold for fuel. When it is burned, petroleum coke produces even more CO_2 than coal – 5-10 percent more CO_2 than coal relative to the energy provided – and is one of the dirtiest fuels around in terms of air quality. By 1999, Exxon was one of the world's largest petroleum coke producers, making thousands of tons a day.

356. Since the 1970s, Exxon's tar sands reserves have ballooned from under 1 billion barrels to 5.14 billion in 2015. In the last decade, tar sands as a percentage of Exxon's liquid holdings have increased from 17 percent to 35 percent.

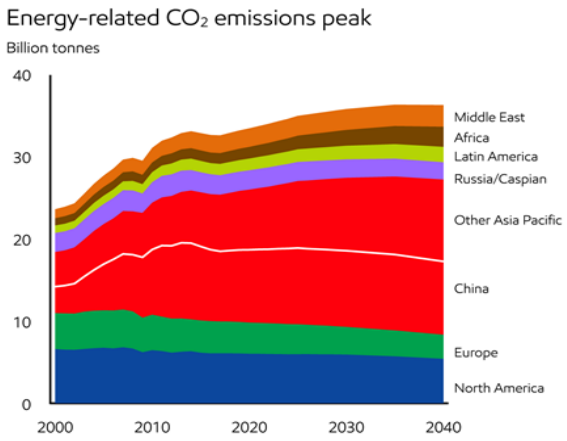
357. Beginning in the late 1960s Exxon also moved to acquire coal assets, and by the mid-1970s, it started coal mining in Latin America. By the early 1990s, Exxon was producing around 37 million metric tons of coal a year. Exxon maintained operational coal mines in the United States until 2009, and it continues to report profits from "coal and power" operations in

its filings to the U.S. Securities and Exchange Commission.

358. Exxon has also helped breathe new life into coal-fired power generation. Because petroleum coke is often cheaper than conventional coal and can be burned in coal-fired power plants, Exxon's petroleum coke production has helped to make coal-fired power generation dirtier and cheaper globally.

359. Exxon has also been a leader in efforts to produce commercially viable liquid fuels from coal since the 1960s, and it has continued this effort despite its recognition, in internal documents, that "liquid fuels from coal produce substantially more CO_2 than gasoline from petroleum."

360. Exxon plans to continue its reckless and tortious conduct. Exxon predicts that oil and gas will account for an even larger share of the world's energy supply in 2040, a figure it has a direct role in determining. Even under its rosy projections, which assume substantial emissions reductions through "efficiency," Exxon projects rising emissions through 2040 (see chart below).



361. Exxon is planning accordingly, hoping to supply a quarter of the Americas' oil by then.

362. Exxon confidently states in its most recent company-wide review that five major start-ups will contribute to an additional 250,000 BOE per day of working interest production, and that "several long-cycle project start-ups are anticipated in 2018 in Angola, Canada, Qatar, Russia and the United Arab Emirates, contributing about 340 thousand oil-equivalent barrels per day of working interest."

363. Exxon also plans to continue increasing production of even dirtier fuels. Exxon states on its website that "oil sands production offers a unique opportunity to increase North American oil supplies," and is currently expanding its tar sands operations there, aiming to access around 4.6 billion barrels of tar sands oil for more than 40 years with the expansion of its Kearl project. Exxon's related petroleum coke business will likewise continue apace.

Since the 1960s, the Suncor Defendants have knowingly provided a substantial portion of the fossil fuels causing and aggravating climate change; and Suncor plans to continue doing so, causing harm to Plaintiffs.

364. Since the 1960s, Suncor has sold trillions of cubic feet of natural gas, more than a billion barrels of oil, and millions of tons of petroleum coke.

365. In 2016, Suncor was one of the world's largest oil producers, supplying more than 600,000 barrels of oil every day, almost entirely from the Canadian tar sands.

366. On information and belief, Suncor's share of the fossil fuel market has increased since the 1960s. For example, between 2004 and 2016, Suncor's tar sands production increased 120 percent.

367. Suncor intended its consumers to burn these fossil fuels, which it knew would and in fact did result in the release of billions of tons of CO_2 into the atmosphere. The emissions traceable to Suncor's products substantially contributed to the overall rise in atmospheric CO_2,

were a substantial factor in bringing about and aggravating the resulting climate change impacts, and will continue to contribute to those impacts for the foreseeable future. Suncor is one of the largest sources of GHG emissions both globally and historically.

368. Moreover, and despite its knowledge of the grave threats fossil fuels pose to the climate as far back as the 1950s, Suncor produced and promoted dirtier fuels that contributed even more substantially to the rise in the concentration of atmospheric CO_2.

369. Indeed, according to an oil index recently established by the Carnegie Institute, Suncor's oil produces *the highest* GHG emissions in the world, whether one looks at the fuel's entire production lifecycle, or at combustion emissions alone.

370. Suncor was substantially responsible for the development of the Canadian tar sands. Despite the enormous costs and climatic risk, Suncor confidently states on its website, "skeptics said Canada's oil sands could never be developed commercially . . . [but] Suncor Energy proved them wrong."

371. Suncor began developing one of the dirtiest fuels on the planet in 1967. At the latest, Suncor was told a year later about the dangers of unchecked fossil fuel use, but plunged forward to this day regardless.

372. Like Exxon, Suncor has taken advantage of its business's dirty by-product – petroleum coke. Indeed, by 2008, Suncor was shipping "a half-million tons a year through Prince Rupert Ridley [Island] to Asian and Mexican ports." By 2016, "[a]pproximately half of all coke produced [from the Canadian tar sands] . . . came from Suncor's operations."

373. Suncor plans to continue producing and promoting more fossil fuels. As its CEO, Steve Williams, recently said, "In 100 years time, the oilsands will still be being developed and

still operating."

374. Suncor is doing its best to continue growing its production of this dirty fuel source, which enables it to sell such dirty fuels. Suncor plans to increase tar sands production in 2018 to more than 600,000 barrels a day, up from 505,000 barrels in 2016. And it plans to keep going in the near future: a tar sands project at Fort Hills, Alberta, Canada, will yield an additional 194,000 barrels a day, and 10 smaller projects, set for 2022, would add another 360,000 barrels a day to the company's production.

3. *Defendants concealed and misrepresented to the public what they knew about climate change and the dangers of continued and increasing fossil fuel use.*

375. Defendants promoted, marketed and sold fossil fuel products without disclosing (and in spite of) the climate-altering dangers that they knew – and have long known – were associated with their use.

376. In addition to concealing the known risks, Exxon and Suncor – separately, jointly and in coordination with others, such as API – directed, participated in, and benefited from efforts to misleadingly cast doubt about the causes and consequences of climate change, including: (1) making affirmative and misleading statements suggesting that continued and unabated fossil fuel use was safe (in spite of internal knowledge to the contrary); and (2) attacking climate science and scientists that tried to report truthfully about the dangers of climate change.

377. For example, in 1996, when opposing efforts to cut fossil fuel use, Exxon CEO Lee Raymond wrote that "scientific evidence remains inconclusive as to whether human activities affect global climate."

378. The Defendants undertook this course of conduct to confuse the public and consumers about the risks of alterations to the climate from fossil fuel use, in order to maintain fossil fuel demand and their fossil fuel business. The Defendants succeeded. Through the 1990s, at a critical point when the fossil fuel usage needed to be brought under control, public concern about the risks and causes of climate change waned.[25]

379. The Defendants' actions substantially contributed to the unchecked growth in fossil fuel use, GHG emissions, and the atmospheric concentration of GHGs that they knew would cause alterations in the climate.

Defendants acted in groups that concealed and misrepresented the dangers of fossil fuel use.

380. Defendants acted with and through groups and industry associations, such as API.

381. Defendants set up, and have funded, directed, and participated in efforts by such groups to mislead the public and fossil fuel consumers about the connection between unchecked fossil fuel use and dangerous climate alteration.

382. Defendants used such groups to spread information that they knew to be false, and to give the impression that there was "independent" science that doubted the causes and consequences of climate change.

Defendants promoted fossil fuels as necessary and responsible, while concealing their danger.

383. Defendants have promoted fossil fuels as safe, environmentally friendly and necessary. They have done this in their own commercial advertisements and marketing materials, and through third-party advertisements and marketing materials designed to encourage fossil fuel

[25] In 1992, 88 percent of American believed that global warming was a serious problem, but by 1997 that number had fallen to 42 percent (with only 28 percent of Americans thinking immediate action was needed).

use more generally. At no point did the Defendants or their associations disclose that continued reliance on and the unchecked use of fossil fuels was threatening the climate.

384. For years, API has also blanketed the airwaves and print media, including in Colorado and Boulder County, with misleading statements about the safety of, need for and benefits of fossil fuel use. At no point did API disclose that continued reliance on and unchecked use of fossil fuels was threatening the climate.

Defendants affirmatively misrepresented the causes and consequences of climate change.

385. By the late 1980s, the public was taking notice of changes to the climate, as well as the role of fossil fuels in bringing it about. In June 1988, James Hansen – then Director of the Goddard Institute of Space Studies at NASA – testified at a congressional hearing that "the greenhouse effect has been detected, and it is changing our climate now."

386. In spite of their recognition that climate change posed a serious threat decades earlier, Defendants saw public awareness of climate change and its causes as a threat to their business and sought to undermine public awareness and understanding through misleading advertising and other communications that cast doubt on the existence, causes and dangers associated with alterations to the climate, in order to preserve and promote fossil fuel use at levels Defendants knew to be dangerous.

387. Exxon and its predecessors directly ran multiple advertisements downplaying the risks of climate change and emphasizing uncertainty, contrary to its own internal documents. For example, in 1997 Mobil ran advertisements in the New York Times claiming, "Scientists cannot predict with certainty if temperatures will increase, by how much and where changes will occur. We still don't know what role man-made greenhouse gases might play in warming the planet."

388. Exxon continued these advertisements after its merger with Mobil.

389. One 2000 Exxon advertisement claimed that climate science was "unsettled." A 2001 Exxon advertisement criticized "the unrealistic and economically damaging Kyoto process." A 2004 Exxon advertisement again emphasized "[s]cientific uncertainties" that "limit our ability to make objective, quantitative determinations regarding the human role in recent climate change, or the degree and consequence of future change."

390. Defendants also communicated through API, and groups that were created, organized or controlled by API.

391. For example, the Global Climate Coalition (GCC) – formed in the late 1980s as the self-described "voice of U.S. businesses and industries that have a stake in the outcome of the global climate change debate" – was largely run and directed by API.

392. The GCC spent millions of dollars on advertising that tried to discredit climate science, and cast doubt on the dangerous consequences of climate change. In 1992, when 130 nations came together to sign the U.N. Framework Convention on Climate Change at the Rio de Janeiro "Earth Summit," GCC spent millions in misleading marketing to discredit the science. They distributed videos claiming that climate change would not be a problem, and that more atmospheric carbon dioxide would actually be beneficial for the world. Similarly, throughout the 1990s and early 2000s, GCC and its members spent millions more and distributed similarly deceptive materials designed to undermine support for the Kyoto Protocol, the follow-up to the Framework Convention.

393. These GCC advertisements were intentionally misleading because its members knew that climate change was ongoing, and that its impacts were increasingly posing serious

risks to the public. In a 1995 memo (also discussed above), a Mobil (now Exxon) representative told the GCC that "[t]he scientific basis for the Greenhouse Effect and the potential impact of human emissions of greenhouse gases such as CO2 on climate is well established and cannot be denied," and that "contrarian theories" to explain global warming were not credible.

394. Another front group organized by API was the Global Climate Science Communications Team (GCSCT), through which Defendants acted to mislead the public about climate change.

395. The GCSCT was organized in the late 1990s, largely in response to the signing of the Kyoto Protocol, including by the United States. Its stated goal was to get "[a] majority of the American public" to "recognize[ ] that significant uncertainties exist in climate science" and to make climate change "a non-issue, meaning that the Kyoto Protocol is defeated and there are no further initiatives to thwart the threat of climate change."

396. Defendants, through GCSCT, sought to achieve this by spreading misinformation about human caused climate change and the credibility of climate science – in the media, to their consumers, and in classrooms across the United States. While the Defendants, per the GCSCT's "action plan", suggested that there was uncertainty about "whether (a) climate change actually is occurring, or (b) if it is, whether humans really have any influence on it," they clearly knew otherwise.

397. The Defendants also acted through a cadre of claimed climate scientists, who they paid, directly or indirectly, to cast doubt on climate science.

398. In the early 1990s, both API and Exxon funded and promoted the work of Fred Seitz, Fred Singer, and Singer's Science and Environmental Policy Project (SEPP). Neither Seitz

nor Singer was trained in climate science, but both had previously been hired by industry, including tobacco companies, to create doubt in the public mind (where there should have been none).

399. Seitz, Singer, and SEPP were used to attack climate science, and specifically the IPCC conclusions and process. At first, Seitz and Singer claimed there was no climate warming or alteration. When the evidence of warming of the climate became too hard to deny, they claimed the warming was simply natural variation.

400. As just one example of their tactics, in 1998, Seitz helped to organize and distribute a sham petition "refuting" global warming. The petition was formatted to look like it was sanctioned by the National Academy of Scientists and sent to thousands of American scientists. Supposedly signed by 17,000 "scientists," the petition claimed to find "no convincing scientific evidence that human release of greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate." The list of signatories was filled not with 17,000 actual scientists, but fictitious names, deceased persons, and celebrities.

401. The industry later turned to Wei-Hock (Willie) Soon, an aerospace engineer at the Harvard-Smithsonian Center for Astrophysics, who received over $1.2 million from Exxon, API and other fossil fuel interests from 2001-2012. Soon wrote numerous papers suggesting non-fossil fuel causes of climate change, and is best known for promoting the widely discredited idea that solar variability is responsible for climate change. Soon's papers were rejected in the scientific community, for good reason.

402. In 2015, it came to light that Soon was being funded by fossil fuel companies – a

fact he had not disclosed – and that those funders were given the right to review his work before it was published. Soon described his supposedly "academic" work for the Smithsonian as a "deliverable" to his funders, i.e. produced in exchange for their funding.

403. Defendants, and their agents, such as API, routinely referenced the work of Singer, Seitz and Soon when casting doubt on and/or trying to undermine public recognition of the scientific consensus around climate change.

Doubt won Defendants years of inaction.

404. Despite the scientific consensus around the existence and causes of climate change, uncertainty in the minds of the American public and Defendants' consumers grew throughout the 1990s and 2000s as a result of Defendants' efforts.

405. A poll reported in Time magazine in 2006 found that only 56 percent of Americans thought that average global temperatures had risen – despite the fact that a clear majority of climate scientists thought it had, and despite the IPCC's unequivocal statement that average temperatures had risen in its 2001 report.

406. An ABC poll the same year found that while more than 80 percent of Americans believed that global warming was "probably happening," 64 percent did not believe the science was settled, perceiving "a lot of disagreement among scientists." Defendants concealed the knowledge that would have demonstrated that the science of climate change had been settled since at least the 1960s.

407. The Pew Research Center in 2006 found that only 41 percent of Americans believed human activity such as burning fossil fuels was causing global warming – approximately equal to the number of people who said either that it was caused by natural

patterns (21 percent) or that there was no solid evidence of warming (20 percent).

408. By 2009, Pew Research Center found the number of Americans who said there was solid evidence that global temperatures are rising had *declined* to 57 percent, down from 71 percent in 2008. Only 35 percent of people thought the issue was very serious.

409. There was a similar decline in the number of Americans who said temperatures are rising as a result of human activity, such as burning fossil fuels – down from 47 percent in 2008 to just 36 percent in 2009.

410. In 2012, in response to the survey question: Do scientists believe that earth is getting warmer because of human activity? 43 percent replied no, 12 percent did not know, and only 45 percent of the U.S. public accurately reported the scientific community's overwhelming consensus.

IV. PLAINTIFFS' CLAIMS

FIRST CAUSE OF ACTION
(Public Nuisance)

411. Plaintiffs reallege and reaffirm each and every allegation set forth in all the preceding paragraphs as is fully stated herein.

412. The Defendants' conduct – i.e., knowingly supplying a substantial portion of all used fossil fuels and misrepresenting the dangers associated with their use – has caused, created, substantially contributed to, and/or exacerbated dangerous alterations in the climate.

413. The alterations in the climate caused and contributed to by Defendants constitute a present and continuing public nuisance in Plaintiffs' communities. Plaintiffs have to mitigate the impacts and severity of the public nuisances within their respective jurisdictions.

414. Plaintiffs are specially injured by the public nuisance brought about Defendants'

actions altering the climate because of their special responsibility to respond to and abate its hazards, and because they and their property and assets are especially vulnerable to the impacts of climate change, including, specifically but not exlusively their:

- transportation infrastructure, include roads, bridges, and culverts;
- flood, storm-water and water supply infrastructure;
- agricultural and open space lands; and
- high elevation properties, including reservoirs and park lands.

415. The impacts of climate change caused by the Defendants' actions have interfered and will continue to threaten and interfere with public rights in the Plaintiff communities, including the right to use and enjoy public property, spaces, parks, ecosystems, and the environment; the right to public health, safety, emergency management, comfort and well-being; and the right to safe and unobstructed trasportation and intercourse.

416. The interference with and threat to public rights caued by the Defendants' actions is substantial, and includes, but is not limited to:

- increasing, longer duration, wider burning and more intense wildfires, including in areas where wildfire risk had previously been low or non-existent;
- increasing extreme precipitation events;
- rising temperatures and an increasing numbers of extreme temperature events;
- prolonged and more severe drought conditions;
- the spread of pests, disease, and increasing threats to public health by, among other things, increasing allergens and ozone, as well as diminishing air quality.

417. The harms caused by the Defendants are and will continue to be borne by Plaintiffs and residents of the Plaintiff communities in the form of serious personal injury;

damage to property (valued in the billions of dollars); impairment of health; obstructed movement within their communities; the loss of use and enjoyment of public property, the environment and local eco-systems, and infrastructure; as well as added costs to protect, repair, and remediate the harms caused by the Defendants' alteration of the climate.

418. The Defendants have substantially contributed to and continue to substantially contribute to the creation and exacerbation of the nuisance, in that the intended and foreseeable combustion of Defendants' fossil fuels has produced and will continue to produce a substantial amount of GHG emissions, measured in billions of excess tons of CO_2 and other GHGs. Those excess tons have caused, contributed to, and/or exacerbated the impacts of climate change. Additionally, the Defendants' promotion of fossil fuels and misrepresentation of the risk known to them of the intended use of their product has also resulted in a substantial amount of excess GHG emissions, which caused, contributed to, and/or exacerbated the impacts of climate change.

419. The Defendants intentionally, negligently and/or recklessly created the interference incurred by Plaintiffs and the Plaintiff communities**.** From decades ago, Defendants knew or should have known that climate change impacts – including those affecting the Plaintiff communities – were substantially certain to result when they put their fossil fuel products into the stream of commerce to be combusted by their users. Defendants knew or should have known that climate change impacts – including those affecting the Plaintiff communities – were substantially certain to result when they concealed and affirmatively misrepresented the truth about climate change and fossil fuel use to the public and their consumers.

420. The inteference with public rights is unreasonable. For decades, Defendants have largely internalized the benefits of fossil fuel use, i.e., their profits, and externalized its costs, i.e.,

the impacts of climate change. Defendants knew or should have known the costs to Plaintiffs and their communities of placing fossil fuel products into the stream of commerce and have not compensated Plaintiffs or their communities for those foreseen harms. Defendants continue to put fossil fuels into the stream of commerce, continue to profit from those sales, and continue to not compensate Plaintiffs or their communities for the continued and added impacts that they suffer and will continue to suffer from as a direct and proximate result of Defendants' nuisance.

421. Plaintiffs and their residents have been damaged, including in their exercise of public and common rights, as a direct and proximate result of the public nuisance created by the Defendants. Plaintiffs have spent and will have to spend substantial dollars to mitigate this interference. Plaintiffs' damages and losses include but are not limited to:

- costs to analyze and evaluate the future impacts of climate alteration, the response to such impacts and the costs of mitigating, adapting to, or remediating those impacts;
- costs associated with wildfire response, management, and mitigation;
- costs of responding to, managing, and repairing damage from bark beetle and other pest infestations;
- costs associated with increased drought conditions including alternate planting and increase landscape maintenance costs;
- costs associated with additional medical treatment and hospital visits necessitated by extreme heat vents, increased allergen exposure and exposure to vector-borne disease, mitigation measures and public education programs to reduce the occurrence of such health impacts;
- costs associated with repairing and replacing existing flood control and drainage measures, and repairing flood damage;
- costs of repair, maintenance, mitigation and rebuilding and replacement of road systems to respond to the impacts of climate alteration;
- costs associated with alteration and repair of bridge structures to retain safety due

to increases in stream flow rates;

- costs of repair of physical damage to buildings owned by Plaintiffs;
- costs of analysis of alternative building design and construction and costs to implement such alternative design and construction;
- loss of income from property owned by Plaintiffs due to reduced agricultural productivity or lease or rental income while property is unusable;
- costs of public education programs concerning responses to climate alteration;
- costs of reduced employee productivity.

422. These damages and losses are the direct and proximate result of climate alteration by Defendants in excess of historical trends in climate variation.

423. Wherefore, the Plaintiffs pray for an award of damages, restitution for their costs of abating the nuisance, and remediation by the Defendants as set forth below.

SECOND CAUSE OF ACTION
BY ALL PLAINTIFFS AGAINST ALL DEFENDANTS
(Private Nuisance)

424. Plaintiffs reallege and reaffirm each and every allegation set forth in all the preceding paragraphs as is fully stated herein.

425. The Plaintiffs own, lease, occupy, manage, control and/or are otherwise in lawful possession of extensive real property within their jurisdictions.

426. As a direct and proximate result of Defendants' conduct, as set forth above, the Plaintiffs' property rights and interests, including their rights to the free and unthreatened use and enjoyment of that property, have been and will be unreasonably interfered with.

427. Defendants, and each of them, by causing and/or substantially contributing to climate change through their acts and omissions described above, have created conditions on

and/or set in motion forces that cause interference with the Plaintiffs' property, and permitted those conditions and forces to persist, which constitute a nuisance.

428. The Plaintiffs' property has been and/or will be substantially harmed by the effects of climate change. The conditions and forces Defendants created substantially and unreasonably interfere with, and will substantially interfere with, Plaintiffs' use and quiet enjoyment of rights to and interests in their real property, including by increasing the frequency and intensity of flooding, storms, the spread of invasive species, and wildfire.

429. The harms to and interference with Plaintiffs' property have become and/or will continue to be regular and severe.

430. Plaintiffs have not consented to Defendants' conduct in creating the condition that has interfered with Plaintiffs' property.

431. All of their harms will actually be borne by the Plaintiffs as loss of use and enjoyment of public property and infrastructure. The burden on Plaintiffs to mitigate, repair, remediate and prevent further grave interferences with their property is significant and severe.

432. The Defendants' conduct was and is negligent, reckless and intentional because Defendants knew or should have known their actions were substantially certain to interfere with Plaintiffs' property rights and interests. Defendants have known for decades, or reasonably should have known, that their conduct was substantially certain to alter or contribute to alterations in the climate and is exacerbating climate change.

433. Defendants' conduct was and is unreasonable because they have created and are creating the interference with Plaintiffs' property rights without compensating Plaintiffs for the harm they knowingly, recklessly or negligently created or will create.

434. Defendants' conduct is continuing and has produced and will produce ongoing effects.

435. Defendants' actions are a direct and proximate cause of Plaintiffs' damages and losses.

436. Plaintiffs' real property has been damaged and their use and enjoyment of that property has been threatened by the nuisance created by the Defendants; Plaintiffs have spent and will have to spend substantial dollars to mitigate this interference. Plaintiffs' damages and losses include but are not limited to:

- costs to analyze and evaluate the future impacts of climate alteration, the response to such impacts and the costs of mitigating, adapting to, or remediating those impacts;
- costs associated with wildfire response, management, and mitigation;
- costs of responding to, managing, and repairing damage from pine beetle and other pest infestations;
- costs associated with increased drought conditions including alternate planting and increase landscape maintenance costs;
- costs associated with repairing and replacing existing flood control and drainage measures, and repairing flood damage;
- costs of repair, maintenance, mitigation and rebuilding and replacement of road systems to respond to the impacts of climate alteration;
- costs associated with alteration and repair of bridge structures to retain safety due to increases in stream flow rates;
- costs of repair of physical damage to buildings owned by Plaintiffs;
- costs of analysis of alternative building design and construction and costs to implement such alternative design and construction;
- loss of income from property owned by Plaintiffs due to reduced agricultural productivity or lease or rental income while property is unusable.

437. These damages and losses are the direct and proximate result of climate alteration by Defendants in excess of historical trends in climate variation.

438. Wherefore, Plaintiffs pray for an award of damages, restitution of their costs to abate the nuisance, and remediation of the nuisance by the Defendants as set forth below.

THIRD CAUSE OF ACTION
(Trespass)

439. Plaintiffs reallege and reaffirm each and every allegation set forth in all the preceding paragraphs as is fully stated herein.

440. Plaintiffs are the owners, in lawful possession, of real property.

441. Defendants have each intentionally engaged in conduct that has caused and contributed to climate change, thus causing flood waters, fire, hail, rain, snow, wind and invasive species to enter Plaintiffs' property.

442. Defendants knew, with substantial certainty, that the use of their fossil fuel products would both cause climate change and cause these invasions of Plaintiffs' property.

443. This trespass is recurring, and will continue.

444. Plaintiffs did not give Defendants permission for these invasions of their property.

445. Defendants' trespasses are the direct and proximate cause of damages and losses to the Plaintiffs.

446. Defendant's actions are and have been a substantial factor in causing the injuries and damages to Plaintiffs' property.

447. Plaintiffs' real property has been and will be damaged by Defendants' trespasses and Plaintiffs have spent and will spend substantial dollars to mitigate the damage caused by the

trespasses. Such damages and losses include but are not limited to:

- costs to analyze and evaluate the future impacts of climate alteration, the response to such impacts and the costs of mitigating, adapting to, or remediating those impacts;
- costs associated with wildfire response, management, and mitigation;
- costs of responding to, managing, and repairing damage from pine beetle and other pest infestations;
- costs associated with increased drought conditions including alternate planting and increase landscape maintenance costs;
- costs associated with repairing and replacing existing flood control and drainage measures, and repairing flood damage;
- costs of repair, maintenance, mitigation and rebuilding and replacement of road systems to respond to the impacts of climate alteration;
- costs associated with alteration and repair of bridge structures to retain safety due to increases in stream flow rates;
- costs of repair of physical damage to buildings owned by plaintiffs;
- costs of analysis of alternative building design and construction and costs to implement such alternative design and construction;
- loss of income from property owned by plaintiffs due to reduced agricultural productivity or lease or rental income while property is unusable;

448. These damages and losses are the direct and proximate result of climate alteration by Defendants in excess of historical trends in climate variation.

449. Wherefore, Plaintiffs pray for damages and other relief as set forth below.

FOURTH CAUSE OF ACTION
(Unjust Enrichment)

450. Plaintiffs reallege and reaffirm each and every allegation set forth in all the preceding paragraphs as is fully stated herein.

451. Defendants profited from the manufacture, distribution and/or sales of fossil fuel products, and continued to do so long after they were aware of the harms that have resulted and would result from the Defendants' alteration of the climate.

452. Further, Defendants have profited from and continue to profit from the manufacture, distribution and/or sale of fossil fuels with that knowledge and have benefited from not incurring the costs necessary to reduce the impacts of Defendants' contributions to climate change.

453. Defendants received benefits from their actions and it would be unconscionable and contrary to equity for Defendants to retain those benefits.

454. Defendants have profited at the expense of Plaintiffs and the Plaintiff communities who have been damaged and must abate the hazards created by Defendants' fossil fuel products.

FIFTH CAUSE OF ACTION
(Violation of the Colorado Consumer Protection Act,
Colo. Rev. Stat. § 6-1-105(1), *et seq*.)

455. Plaintiffs reallege and reaffirm each and every allegation set forth in all the preceding paragraphs as if fully stated herein.

456. Defendants engaged in and caused others to engage in deceptive trade practices in Colorado, including in Plaintiffs' communities.

457. Defendants' deceptive trade practices included but were not limited to:

- knowingly making false representations as to the characteristics, ingredients, uses, or benefits of their fossil fuel products and services;
- failing to disclose material information concerning their goods and services, which information was known at the time of an advertisement or sale, including: the true cost and harms from the use of their products; the damage to the climate

that the use of their goods and services would cause; and the impacts of the use of their fossil fuels and fossil fuel derived products and services on Plaintiffs' property, social services, and infrastructure.

458. Defendants' failure to disclose such information was intended to induce the public and consumers at large to enter into transactions for the continued and expanding use of fossil fuels and fossil fuel products.

459. Defendants' misrepresentations, false representations, concealment and omissions concerning their goods and services were materially false statements that induced the persons to whom they were made to act or to refrain from acting and had the capacity to deceive the recipient.

460. The material information Defendants failed to disclose was information Defendants knew at the time of their advertisement or sale of their fossil fuels and fossil fuel derived products.

461. Defendants' deceptive trade practices occurred in the course of Defendants' business.

462. Defendants' deceptive trade practices significantly impacted the public as actual or potential consumers of Defendants' goods and services. A large number of consumers in Colorado were and continue to be directly affected by Defendants' deceptive trade practices. The consumers directly affected by the deceptive trade practices had minimal if any bargaining power. The deceptive practices have previously impacted other consumers. Defendants' deceptive trade practices have a significant potential to impact other consumers in the future.

463. Defendants engaged in bad faith conduct in their deceptive trade practices meaning they acted fraudulently, willfully, knowingly, and/or intentionally causing damages and

losses to Plaintiffs.

464. Colorado residents that were the targets of these deceptive trade practices were, and are, actual and potential consumers of Defendants' goods or services.

465. Plaintiffs and their residents were injured in the course of their business as a result of such deceptive trade practice. Defendants' deceptive trade practices directly and proximately caused actual damages and losses to Plaintiffs and their residents. Such damages and losses include but are not limited to:

- costs to analyze and evaluate the future impacts of climate alteration, the response to such impacts and the costs of mitigating, adapting to, or remediating those impacts;
- costs associated with wildfire response, management, and mitigation;
- costs of responding to, managing, and repairing damage from pine beetle and other pest infestations;
- costs associated with increased drought conditions including alternate planting and increased landscape maintenance costs;
- costs associated with additional medical treatment and hospital visits necessitated by extreme heat events, increased allergen exposure and exposure to vector-borne disease, as well as mitigation measures and public education programs to reduce the occurrence of such health impacts;
- costs associated with repairing and replacing existing flood control and drainage measures, and repairing flood damage;
- costs of repair, maintenance, mitigation and rebuilding and replacement of road systems to respond to the impacts of climate alteration;
- costs associated with alteration and repair of bridge structures to retain safety due to increases in stream flow rates;
- costs of repair of physical damage to buildings owned by plaintiffs;
- costs of analysis of alternative building design and construction and costs to implement such alternative design and construction;

- loss of income from property owned by plaintiffs due to reduced agricultural productivity or lease or rental income while property is unusable;
- the cost of public education programs concerning responses to climate alteration;
- the cost of reduced employee productivity.

466. These damages and losses are the direct and proximate result of Defendants' deceptive trade practices.

V. RELIEF REQUESTED

467. Plaintiffs are entitled to the following relief:

468. Monetary relief to compensate Plaintiffs for their **past** and **future** damages and costs to mitigate the impact of climate change, such as the costs to analyze, evaluate, mitigate, abate, and/or remediate the impacts of climate change. These costs include, but are not limited to:

- costs to analyze and evaluate the future impacts of climate alteration, the response to such impacts and the costs of mitigating, adapting to, or remediating those impacts;
- costs associated with wildfire response, management, and mitigation;
- costs of responding to, managing, and repairing damage from pine beetle and other pest infestations;
- costs associated with increased drought conditions including alternate planting and increased landscape maintenance costs;
- costs associated with additional medical treatment and hospital visits necessitated by extreme heat events, increased allergen exposure and exposure to vector-borne disease, as well as mitigation measures and public education programs to reduce the occurrence of such health impacts;
- costs associated with repairing and replacing existing flood control and drainage measures, and repairing flood damage;

- costs of repair, maintenance, mitigation and rebuilding and replacement of road systems to respond to the impacts of climate alteration;
- costs associated with alteration and repair of bridge structures to retain safety due to increases in stream flow rates;
- repair of physical damage to buildings owned by Plaintiffs;
- costs of analysis of alternative building design and construction and costs to implement such alternative design and construction;
- loss of income from property owned by Plaintiffs due to reduced agricultural productivity or lease or rental income while property is unusable;
- the cost of public education programs concerning responses to climate alteration;
- the cost of reduced employee productivity.

469. Damages to compensate Plaintiffs for past and reasonably certain future damages, including but not limited to decreased value in water rights; decreased value in agricultural holdings and real property; increased administrative and staffing costs; monitoring costs; costs of past mitigation efforts; and all other costs and harms previously described in this Complaint.

470. Plaintiffs seek remediation and/or abatement of the hazards discussed above by the Defendants by any other practical means.

471. Plaintiffs seek costs and disbursements of this action as permitted by law.

472. Plaintiffs seek attorneys' fees as permitted by law.

473. Plaintiffs seek pre- and post-judgment interest as permitted by law.

474. Pursuant to C.R.S.§ 6-1-113(2), Plaintiffs seek three times the amount of actual damages sustained, plus the costs of the action together with reasonable attorneys' fees as determined by the court.

475. Additionally, Plaintiffs seek any other applicable remedies and any other relief as

this Court deems just and proper.

476. Plaintiffs **do not** seek to enjoin any oil and gas operations or sales in the State of Colorado, or elsewhere, or to enforce emissions controls of any kind. Plaintiffs **do not** seek damages or abatement relief for injuries to or occurring on federal lands. Plaintiffs **do not** seek damages or any relief based on any activity by the Defendants that could be considered lobbying or petitioning of federal, state or local governments.

477. None of the relief requested is inconsistent with any obligation of the U.S. under the United Nations Framework Convention on Climate Change, the Paris Agreement, or any other U.S. international commitment.

VII. JURY TRIAL DEMANDED

478. Plaintiffs demand a trial by jury for all issues triable by a jury.

Dated: April 17, 2018

Respectfully submitted,

/s/ Kevin S. Hannon
Kevin S. Hannon, #16015
DULY AUTHORIZED SIGNATURE OF KEVIN S. HANNON ON FILE AT THE HANNON LAW FIRM, LLC

Co-Counsel to be admitted *pro hac vice*

Plaintiffs' Addresses

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Boulder County Courthouse
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Board of County Commissioners of San Miguel County
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Telluride, CO 81435

City of Boulder
1777 Broadway
Boulder, CO 80302

Fisherman Nuisance/Products Liability Complaint

From:	Alexandra Klass <aklass@umn.edu>
To:	Michael Noble <Noble@fresh-energy.org>
Sent:	December 3, 2018 9:41:50 PM CST
Attachments:	Fisherman Nuisance Complaint 11 2018.pdf

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1. Fisherman Nuisance Complaint 11 2018.pdf

Type:	application/pdf
Size:	2 MB (2,492,885 bytes)

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ENDORSED
FILED
San Francisco County Superior Court
NOV 14 2018
CLERK OF THE COURT
BY: ROSSALY DE LA VEGA
Deputy Clerk

SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF SAN FRANCISCO

PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS, INC.;

Plaintiff,

vs.

CHEVRON CORP.; CHEVRON U.S.A. INC.; EXXON MOBIL CORP.; EXXONMOBIL OIL CORP.; BP P.L.C.; BP AMERICA, INC.; ROYAL DUTCH SHELL PLC; SHELL OIL PRODUCTS CO. LLC; CITGO PETROLEUM CORP.; CONOCOPHILLIPS; CONOCOPHILLIPS CO.; PHILLIPS 66; TOTAL E&P USA INC.; TOTAL SPECIALTIES USA INC.; ENI S.P.A.; ENI OIL & GAS INC.; ANADARKO PETROLEUM CORP.; OCCIDENTAL PETROLEUM CORP.; OCCIDENTAL CHEMICAL CORP.; REPSOL S.A.; REPSOL ENERGY NORTH AMERICA CORP.; REPSOL TRADING USA CORP.; MARATHON OIL CO.; MARATHON OIL CORP.; MARATHON PETROLEUM CORP.; HESS CORP.; DEVON ENERGY CORP.; DEVON ENERGY PRODUCTION CO., L.P.; ENCANA CORP.; APACHE CORP.; and DOES 1 through 100, inclusive,

Defendants.

Case No. CGC-18-571285

COMPLAINT FOR:

1. NUISANCE;
2. STRICT LIABILITY – FAILURE TO WARN;
3. STRICT LIABILITY – DESIGN DEFECT;
4. NEGLIGENCE; and
5. NEGLIGENCE – FAILURE TO WARN.

JURY TRIAL DEMANDED

TABLE OF CONTENTS

I. INTRODUCTION

1. The world's oceans are changing, and commercial fishermen and -women, their businesses, their communities, and their families are paying the price. Climate change is impacting the oceans by increasing average sea temperatures, increasing the frequency and intensity of marine heatwaves, destabilizing and disturbing marine wildlife populations, affecting ocean circulation, and increasing the frequency and severity of harmful algal blooms. These changes threaten both the productivity of commercial fisheries and safety of commercially harvested seafood products. In so doing, they also threaten those that rely on ocean fisheries and ecosystems for their livelihoods, by rendering it at times impossible to ply their trade. With this action, the largest commercial fishing industry trade group on the west coast seeks to hold responsible parties accountable for acute changes to the ocean off of California and Oregon that resulted, over the last three years, in prolonged regulatory closures of the Dungeness crab fisheries—the most lucrative and reliable fisheries on the west coast. Such closures will recur, as the conditions giving rise to them increase in frequency and magnitude as the oceans continue to warm. Accordingly, the crab fishing industry brings this action to force the parties responsible for this severe disruption to fishing opportunity, and the consequent impacts on fishing families, to bear the costs of their conduct.

2. Defendants, major corporate members of the fossil fuel industry, have known for nearly a half century that unrestricted production and use of their fossil fuel products create greenhouse gas pollution that warms the planet, changes our climate, and disrupts the oceans. They have known for decades that those impacts could be catastrophic and that only a narrow window existed to take action before the consequences would be irreversible. They have nevertheless engaged in a coordinated, multi-front effort to conceal and deny their own knowledge of those threats, discredit the growing body of publicly available scientific evidence, and persistently create doubt in the minds of customers, consumers, regulators, the media, journalists, teachers, and the public about the reality and consequences of the impacts of their fossil fuel pollution. At the same time, Defendants have promoted and profited from a massive increase in the extraction and consumption of oil, coal, and natural gas, which has in turn caused an enormous, foreseeable, and

avoidable increase in global greenhouse gas pollution and an accompanying increase in the concentration of greenhouse gases,[1] particularly carbon dioxide ("CO_2") and methane, in the atmosphere. Those disruptions of Earth's otherwise balanced carbon cycle have substantially contributed to a wide range of dire climate-related effects, including global warming, rising atmospheric and ocean temperatures, ocean acidification, melting polar ice caps and glaciers, more extreme and volatile weather, sea level rise, and marine heatwaves with concomitant harmful algal blooms. Families and businesses that depend on the health and productivity of the Dungeness crab fishery to earn their livings suffer the consequences.

3. Defendants are vertically integrated extractors, producers, refiners, manufacturers, distributors, promoters, marketers, and sellers of fossil fuel products. Decades of scientific research show that pollution from the production and use of Defendants' fossil fuel products plays a direct and substantial role in the unprecedented rise in emissions of greenhouse gas pollution and increased atmospheric CO_2 concentrations since the mid-20th century. This dramatic increase in atmospheric CO_2 and other greenhouse gases is the main driver of the gravely dangerous changes occurring to the global climate.

4. Anthropogenic (human-caused) greenhouse gas pollution, primarily in the form of CO_2, is far and away the dominant cause of global warming and the observed increase in ocean temperatures,[2] including marine heatwaves.[3] The primary source of this pollution is the extraction, production and consumption of coal, oil, and natural gas, referred to collectively in this Complaint as "fossil fuel products."[4]

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[1] As used in this Complaint, "greenhouse gases" refers collectively to carbon dioxide, methane, and nitrous oxide. Where a source refers to a specific gas or gases, or when a process relates only to a specific gas or gases, this Complaint refers to them by name.

[2] *See IPCC, Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland (2014), at 6, Figure SMP.3, https://www.ipcc.ch/report/ar5/syr (hereinafter, "IPCC 2014 Synthesis Report").

[3] *See, e.g.*, Emanuele Di Lorenzo & Nathan Mantua, *Multi-year persistence of the 2014/15 North Pacific marine heatwave*, 6 NATURE CLIMATE CHANGE, 1 (July 11, 2016), https://www.nature.com/articles/nclimate3082; Eric C.J. Oliver et al., *The unprecedented 2015/16 Tasman Sea marine heatwave*, NATURE COMMUNICATIONS 8:16101, 1 (July 14, 2017).

[4] *See* C. Le Quéré et al., *Global Carbon Budget 2016*, EARTH SYST. SCI. DATA 8, 632 (2016), http://www.earth-syst-sci-data.net/8/605/2016. Cumulative emissions since the beginning of the industrial revolution to 2015 were 413 GtC attributable to fossil fuels, and 190 GtC attributable to land use change. *Id.* Global CO_2 emissions from fossil fuels

5. The rate at which Defendants have extracted and sold fossil fuel products has exploded since the Second World War, as have emissions from those products. The substantial majority of all anthropogenic greenhouse gas emissions in history has occurred since the 1950s, a period known as the "Great Acceleration."[5] About three quarters of all industrial CO_2 emissions in history have occurred since the 1960s,[6] and more than half have occurred since the late 1980s.[7] The annual rate of carbon dioxide emissions from production, consumption, and use of fossil fuels has increased by more than 60% since 1990.[8]

6. Defendants have known for nearly 50 years that greenhouse gas pollution from their fossil fuel products has a significant impact on Earth's climate, including a warming of the oceans. Defendants' awareness of the negative implications of their own behavior corresponds almost exactly with the Great Acceleration, and with skyrocketing greenhouse gas emissions. With that knowledge, Defendants took steps to protect their own assets from these threats through immense internal investment in research, infrastructure improvements, and plans to exploit new opportunities in a warming world.

7. Instead of working to reduce the use and combustion of fossil fuel products, lower the rate of greenhouse gas emissions, minimize the damage associated with continued high use and combustion of such products, and ease the transition to a lower carbon economy, Defendants concealed the dangers, sought to undermine public support for greenhouse gas regulation, and engaged in massive campaigns to promote the ever-increasing use of their products at ever greater volumes. Thus, each Defendant's conduct has contributed substantially to the buildup of CO_2 in the environment that drives ocean warming.

8. As an actual and proximate consequence of Defendants' conduct, the crab fishing industry has been deprived of valuable fishing opportunities, and consequently suffered severe

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and industry remained nearly constant at 9.9 GtC in 2015, distributed among coal (41%), oil (34%), gas (19%), cement (5.6%), and gas flaring (0.7%). *Id.* at 629.

[5] Will Steffen et al., *The Trajectory of the Anthropocene: The Great Acceleration*, 2 THE ANTHROPOCENE REVIEW 81, 81 (2015).

[6] R.J. Andres et al., *A synthesis of carbon dioxide emissions from fossil-fuel combustion*, 9 BIOGEOSCIENCES, 1845, 1851 (2012).

[7] *Id.*

[8] *Global Carbon Budget 2016*, *supra* note 4, at 630.

financial hardships. These injuries derive from rising ocean temperatures in the eastern Pacific Ocean generally and periodic extreme marine heatwaves—the results of anthropogenic ocean warming caused by the foreseeable and intended use of Defendants' products. Recent marine heatwaves along the United States' west coast created the ideal conditions for the toxic algal group *Pseudo-nitzschia* to increase in abundance and invade the marine regions that correspond with some of the most productive Dungeness crab fishery grounds. The massive *Pseudo-nitzschia* bloom generated unprecedented concentrations of the neurotoxin domoic acid, a compound which, when ingested by humans, causes "amnesic shellfish poisoning" which induces symptoms including vomiting, diarrhea, cramps, and other gastrointestinal upset, permanent short-term memory loss, and, in severe cases, death.

9. Rising ocean temperatures and the resultant *Pseudo-nitzschia* blooms allow domoic acid to enter the marine food web and accumulate in crab flesh, rendering it at times dangerous and unfit for human consumption.

10. In response to this public health crisis, the California Department of Fish and Wildlife ("CDFW"), in coordination with the California Department of Public Health ("CDPH"), closed—for the first time ever—significant portions of the California coast to commercial Dungeness crab fishing in the 2015–16 fishing season, and again in 2016–17. The Oregon Department of Fish and Wildlife ("ODFW") and the Oregon Department of Agriculture ("ODA") similarly closed large areas of the Oregon coast to commercial crabbing during the 2015–16, 2016–17, and 2017–18 commercial crab seasons because of domoic acid toxicity. Because of those closures, hundreds of commercial fishermen and -women holding Dungeness crab permits could not untie their boats or deploy their crab traps until crabs became safe to consume. Additional precautionary measures and stigma from negative publicity related to domoic acid contamination have deprived the crab industry of the full value of its harvests these last three seasons by depressing the market demand for crab products.

11. Plaintiff represents commercial Dungeness crab harvesters and onshore crab processors and wholesalers that have suffered, and continue to suffer, substantial economic losses due to those lost fishing opportunities. The severe curtailment of the crab fishery, which is among

the most productive, lucrative, and reliable fisheries on the west coast, had damaging ripple effects throughout California's and Oregon's fishing families and communities, creating severe hardships that many fishermen and fishing businesses, including Plaintiff's members, have struggled to overcome. The severity of the economic loss endured by the crabbing community prompted the federal government to declare the 2015–16 California crab season a federal fishery disaster under the Magnuson–Stevens Fishery Management and Conservation Act.

12. Domoic acid incidents on the west coast, and consequent injuries to the fishing industry and west coast fishing communities generally, are the new normal. These phenomena will increase in severity and frequency as the oceans continue to change with anthropogenic global warming. Indeed, California's 2018–19 crab season—set to begin on November 15, 2018—will be delayed in parts of the fishery because of domoic acid toxicity.

13. Additional crab fishery closures will occur in the future, with increasing frequency and severity, with concomitant impacts on the fishing families, fishing communities, and the west coast fishing industry at large.

14. Defendants are directly responsible for a large and substantial portion of total CO_2 emissions between 1965 and 2015. For example, based on Defendants' direct extractions of fossil fuels, they are responsible for more than two hundred gigatons of emissions representing over 15% of total emissions of that potent greenhouse gas during that period. Defendants are responsible for significantly larger shares of emissions based on their production, wholesale and retail sales of their products. Accordingly, Defendants are directly responsible for a substantial portion of elevated ocean temperatures that caused the domoic acid contamination on the west coast, which in turn caused the substantial and material economic injuries described herein.

15. Defendants' production, promotion, marketing, and use of fossil fuel products, simultaneous concealment of the known hazards of those products, and their championing of anti-regulation and anti-science campaigns, actually and proximately caused Plaintiff's injuries.

16. Accordingly, Plaintiff in its own name, in a representative capacity on behalf of its members and the west coast fishing community, and as the assignee of claims arising from domoic

acid impacts on the crab fishery, brings this action against Defendants for Nuisance, Strict Liability for Failure to Warn, Strict Liability for Design Defect, Negligence, and Negligent Failure to Warn.

17. By this action, the Plaintiff seeks to ensure that the parties responsible for the fishery closures bear the costs of its impacts, rather than Plaintiff and the men, women, families and businesses of the west coast crab industry.

II. PARTIES

A. Plaintiff

18. Plaintiff the **Pacific Coast Federation of Fishermen's Associations, Inc.** ("PCFFA") is the largest trade association of commercial fishermen on the West Coast. PCFFA has led the fishing industry in protecting the rights of west coast fishermen and fishing communities since 1976. PCFFA fights for the long-term survival of commercial fishing—including commercial Dungeness crab fishing—as a productive livelihood and way of life. PCFFA is a 501(c)(5) not-for-profit trade organization incorporated in California and headquartered in the city and county of San Francisco, California. PCFFA represents, *inter alia*, crab fishermen and local fishermen's marketing associations.

19. PCFFA brings these claims in its own name; as a representative of its members that are and will continue to be injured financially and otherwise by Defendants' conduct and consequent domoic acid incidents and domoic acid-induced crab fishery closures; and as assignee of claims assigned to it by individuals and businesses that derive income from the California and Oregon Dungeness crab fisheries that have suffered and will continue to suffer financial and other injuries because of Defendants' conduct and consequent domoic acid blooms and domoic acid-induced crab fishery closures. As used hereinafter, the term "Plaintiff" refers to PCFFA, its members, and businesses that have assigned PCFFA claims arising from the facts described herein.

20. PCFFA has diverted resources to addressing domoic acid impacts on the commercial crab fishery, including by dedicating staff time and energy to address these outbreaks in the media, working with state agencies to determine crab fishery closure and reopening procedures, sharing information on domoic acid and closures with its members, and appealing to state and federal entities for fishery disaster relief, among other activities. Domoic acid outbreaks

and resultant fishery closures have frustrated and will continue to frustrate PCFFA's mission of ensuring that commercial fishing remains a sustainable livelihood, by damaging markets and preventing trade in crab harvested on the west coast.

B. Defendants

21. Defendants are responsible for a substantial portion of the total greenhouse gases emitted since 1965. Defendants, individually and collectively, are responsible for extracting, refining, processing, producing, promoting, and marketing fossil fuel products, the normal and intended use of which has led to the emission of a substantial percentage of the total volume of greenhouse gases released into the atmosphere since 1965. Indeed, between 1965 and 2015, the named Defendants extracted enough fossil fuel materials (i.e. crude oil, coal, and natural gas) to account for more than one in every five tons of carbon dioxide and methane emitted worldwide. Accounting in addition for their wholesale and retail sales of products, as well as their wrongful promotion and marketing activities, Defendants bear a dominant responsibility for global warming generally and for Plaintiff's injuries in particular.

22. When reference in this complaint is made to an act or omission of the Defendants, unless specifically attributed or otherwise stated, such references should be interpreted to mean that the officers, directors, agents, employees, or representatives of the Defendants committed or authorized such an act or omission, or failed to adequately supervise or properly control or direct their employees while engaged in the management, direction, operation or control of the affairs of Defendants, and did so while acting within the scope of their employment or agency.

23. **Chevron Entities**

a. Chevron Corporation is a multinational, vertically integrated energy and chemicals company incorporated in the State of Delaware, with its global headquarters and principal place of business in San Ramon, California.

b. Chevron Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Chevron Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Chevron U.S.A. Inc. is a Pennsylvania Corporation with its principal place of business located in San Ramon, California. Chevron USA is a wholly owned subsidiary of Chevron Corporation that acts on Chevron Corporation's behalf and subject to Chevron Corporation's control. Chevron U.S.A. Inc. was formerly known as, and did or does business as, and/or is the successor in liability to Gulf Oil Corporation, Gulf Oil Corporation of Pennsylvania, Chevron Products Company, Chevron Chemical Company, Chevron Energy Solutions Company, ChevronTexaco Products Company, Chevron U.S.A. Production Company, and Chevron U.S.A. Products Company.

e. "Chevron" as used hereafter, means collectively, Defendants Chevron Corp. and Chevron U.S.A. Inc.

f. Chevron operates through a web of U.S. and international subsidiaries at all levels of the fossil fuel supply chain. Chevron's and its subsidiaries' operations consist of exploring for, developing, and producing crude oil and natural gas; processing, liquefaction, transportation, and regasification associated with liquefied natural gas; transporting crude oil by major international oil export pipelines; transporting, storage, and marketing of natural gas; refining crude oil into petroleum products; marketing of crude oil and refined products; transporting crude oil and refined products by pipeline, marine vessel, motor equipment and rail car; basic and applied research in multiple scientific fields including of chemistry, geology, and engineering; and manufacturing and marketing of commodity petrochemicals, plastics for industrial uses, and fuel and lubricant additives.

g. Chevron directs and has directed substantial fossil fuel-related business to California. A substantial portion of Chevron's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in California, from which Chevron derives and has derived substantial revenue.

24. **Exxon Entities**

a. Exxon Mobil Corporation is a multinational, vertically integrated energy and chemicals company incorporated in the State of New Jersey with its headquarters and principal place of business in Irving, Texas. Exxon is among the largest publicly traded international oil and gas companies in the world. Exxon Mobil Corporation was formerly known as, did or does business as, and/or is the successor in liability to ExxonMobil Refining and Supply Company, Exxon Chemical U.S.A., ExxonMobil Chemical Corporation, ExxonMobil Chemical U.S.A., ExxonMobil Refining & Supply Corporation, Exxon Company, U.S.A., Exxon Corporation, and Mobil Corporation.

a. Exxon Mobil Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. Exxon Mobil Corporation recently represented that its success, including its "ability to mitigate risk and provide attractive returns to shareholders, depends on [its] ability to successfully manage [its] overall portfolio, including diversification among types and locations of our projects."[9]

b. Exxon Mobil Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. Exxon Mobil Corporation's Board, or an individual/sub-set of the Board, or another committee appointed by the Board, holds the highest level of direct responsibility for climate change policy within the company. Exxon Mobil Corporation's Chairman of the Board and Chief Executive Officer, its President and the other members of its Management Committee are actively engaged in discussions relating to greenhouse gas emissions and the risks of climate change on an ongoing basis. Exxon Mobil Corporation requires its subsidiaries to provide an estimate of greenhouse gas-related emissions costs in their economic projections when seeking funding for capital investments.

[9] ExxonMobil, "Factors affecting future results" (Feb. 2018), https://cdn.exxonmobil.com/~/media/global/files/investor-reports/2018/2018-factors-affecting-future-results.pdf.

c. ExxonMobil Oil Corporation is wholly-owned subsidiary of Exxon Mobil Corporation that acts on Exxon Mobil Corporation's behalf and subject to Exxon Mobil Corporation's control. ExxonMobil Oil Corporation is incorporated in the State of New York with its principal place of business in Irving, Texas. ExxonMobil Oil Corporation is qualified to do business in California. ExxonMobil Oil Corporation was formerly known as, did or does business as, and/or is the successor in liability to Mobil Oil Corporation.

d. "Exxon," as used hereafter, means collectively defendants Exxon Mobil Corporation and ExxonMobil Oil Corporation, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions.

e. Exxon consists of numerous divisions and affiliates in all areas of the fossil fuel industry, including exploration for and production of crude oil and natural gas; manufacture of petroleum products; and transportation, marketing, and sale of crude oil, natural gas, and petroleum products. Exxon is also a major manufacturer and marketer of commodity petrochemical products.

f. Exxon directs and has directed substantial fossil fuel product-related business to California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. Among other operations, more than 540 Exxon-, Mobil-, or Esso-branded gas stations operate throughout the state, and Exxon owns and operates a petroleum storage and transport facility in the San Ardo Oil Field in San Ardo, Monterey County, California. From 1966 to 2016, Exxon owned and operated an oil refinery in Torrance, Los Angeles County, California. Exxon Co. USA, an Exxon subsidiary, operated a petroleum refinery in Benicia, Solano County, California, from 1968 to 2000.

25. **BP Entities**

a. BP P.L.C. is a multi-national, vertically integrated energy and petrochemical public limited company, registered in England and Wales with its principal place of business in London, England. BP P.L.C. consists of three main operating segments: (1) exploration

and production, (2) refining and marketing, and (3) gas power and renewables.

b. BP P.L.C. is the ultimate parent company for numerous subsidiaries that find and produce oil and gas worldwide, that refine oil into fossil fuel products such as gasoline, and that market and sell oil, refined petroleum products, and natural gas worldwide. BP P.L.C.'s subsidiaries explore for oil and natural gas under a wide range of licensing, joint arrangement, and other contractual agreements.

c. BP P.L.C. controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. BP P.L.C. is the ultimate decisionmaker on fundamental decisions about the company's core business, i.e., the level of companywide fossil fuels to produce, including production among BP P.L.C.'s subsidiaries. For instance, BP P.L.C. reported that in 2016–2017 it brought online thirteen major exploration and production projects, which contributed to a 12% increase in the BP group's overall fossil fuel product production. These projects were carried out by BP P.L.C.'s subsidiaries. Based on these projects, BP P.L.C. expects the company to deliver to customers 900,000 barrels of new product per day by 2021. BP P.L.C. further reported that in 2017 it sanctioned three new exploration projects in Trinidad, India, and the Gulf of Mexico and added 143% reserves replacement for the group of entities over which it is the ultimate parent company.

d. BP P.L.C. makes fossil fuel production decisions for the entire BP group based on a number of factors, including climate change. BP P.L.C.'s Board, an individual/subset of the Board, or a committee appointed by the Board, is the highest level within the company with direct responsibility for climate change policy. BP P.L.C.'s chief executive is responsible for maintaining the BP group's system of internal control that governs the BP group's business conduct. BP P.L.C. reviews climate change risks facing the BP group through two executive committees chaired by the group chief executive and one working group chaired by the executive vice president and group chief of staff, as part of BP group's established management structure.

e. BP P.L.C. does substantial fossil-fuel related business in the United States, by marketing through licensure; franchising its petroleum products in the U.S. under the BP,

ARCO and ARAL brands; and by operating oil and gas extraction and refining projects in the Gulf of Mexico, Alaska, Arkansas, Colorado, New Mexico, Oklahoma, Texas, and Wyoming.

f. BP America, Inc., is a wholly-owned subsidiary of BP P.L.C. that acts on BP P.L.C.'s behalf and subject to BP P.L.C.'s control. BP America Inc. is a vertically integrated energy and petrochemical company incorporated in the State of Delaware with its headquarters and principal place of business in Houston, Texas. BP America, Inc., consists of numerous divisions and affiliates in all aspects of the fossil fuel industry, including exploration for and production of crude oil and natural gas; manufacture of petroleum products; and transportation, marketing, and sale of crude oil, natural gas, and petroleum products. BP America Inc. was formerly known as, did or does business as, and/or is the successor in liability to BP Products North America Inc., Atlantic Richfield Company, BP Amoco Corporation, Amoco Corporation, Amoco Oil Company, The American Oil Company, BP Exploration & Oil Inc., Sohio Oil Company, Standard Oil of Ohio (SOHIO), Standard Oil (Indiana), BP Amoco Plc, BP Oil Inc., BP Oil Company, Atlantic Richfield Delaware Corporation, Atlantic Richfield Company (a Pennsylvania corporation), ARCO Products Company, and Arco Chemical Company, a division of Atlantic Richfield Company. BP is also a major manufacturer and marketer of commodity petrochemical products. BP America Inc. is registered to do business in the State of California and has a registered agent for service of process with the California Secretary of State.

g. Defendants BP P.L.C. and BP America, Inc. are collectively referred to herein as "BP."

h. BP does substantial fossil fuel product-related business in California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. Among other operations, BP operates 275 ARCO-licensed and branded gas stations in California and more than 70 compressed natural gas and liquefied natural gas fueling stations, provides natural gas used to power more than 6.9 million California households, and distributes and markets petroleum-based lubricants marketed under the "Castrol" brand name throughout the state. From 2000 to 2013, BP also owned and operated an oil refinery in Carson, Los Angeles County, California. BP's marketing and trading business maintains an

office in Irvine, Orange County, California. BP maintains an energy research center in San Diego, San Diego County, California.

26. **Shell Entities**

a. Royal Dutch Shell PLC is a vertically integrated, multinational energy and petrochemical company. Royal Dutch Shell is incorporated in England and Wales, with its headquarters and principal place of business in the Hague, Netherlands. Royal Dutch Shell PLC consists of numerous divisions, subsidiaries and affiliates engaged in all aspects of the fossil fuel industry, including exploration, development, extraction, manufacturing and energy production, transport, trading, marketing and sales.

b. Royal Dutch Shell PLC controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. Royal Dutch Shell PLC's Board of Directors in the Hague determines whether and to what extent Shell subsidiary holdings around the globe produce Shell-branded fossil fuel products. For instance, Royal Dutch Shell PLC's Board of Directors makes individual decisions on whether and when to initiate drilling in particular oil reserves.

c. Royal Dutch Shell PLC controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. Overall accountability for climate change within the Shell group of companies lies with Royal Dutch Shell PLC's Chief Executive Officer and Executive Committee. Additionally, Royal Dutch Shell PLC has directed its subsidiaries to reduce the carbon footprint of all fossil fuel products produced under the Shell brand, including those of its subsidiaries, and across all upstream and downstream segments of its operations.

d. Shell Oil Products Company LLC is a wholly-owned subsidiary of Royal Dutch Shell PLC. Shell Oil Products Company LLC is incorporated in the State of Delaware and maintains its principal place of business in Houston, Texas. Shell Oil Products Company LLC is registered to do business in the State of California and has a registered agent for service of process in California. Shell Oil Products Company LLC is an energy and petrochemical company involved in refining, transportation, distribution and marketing of Shell fossil fuel products.

e. Defendants Royal Dutch Shell PLC and Shell Oil Products Company LLC are collectively referred to as "Shell."

f. Shell does substantial fossil fuel product-related business in California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed and/or sold in California. Among other endeavors, Shell operates a petroleum refinery in Martinez, Contra Costa County, California; operates a distribution center in Carson, California; and produces heavy oil and natural gas within the state. Shell also owned and operated a refinery in Wilmington (Los Angeles), Los Angeles County, California, from 1998 to 2007, and a refinery in Bakersfield, Kern County, California, from 2001 to 2005. Shell also operates hundreds of Shell-branded gas stations in California.

27. **Citgo Petroleum Corporation ("Citgo")**

a. Citgo is a direct, wholly owned subsidiary of PDV America, Incorporated, which is a wholly owned subsidiary of PDV Holding, Incorporated. These organizations' ultimate parent is Petróleos de Venezuela, S.A. ("PDVSA"), an entity wholly owned by the Republic of Venezuela that plans, coordinates, supervises and controls activities carried out by its subsidiaries. Citgo is incorporated in the State of Delaware and maintains its headquarters in Houston, Texas.

b. Citgo controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Citgo controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Citgo and its subsidiaries are engaged in the refining, marketing, and transportation of petroleum products including gasoline, diesel fuel, jet fuel, petrochemicals, lubricants, asphalt, and refined waxes.

e. Citgo is registered to do business in the State of California and has designated an agent for service of process in California. Citgo further does substantial fossil fuel product-related business in California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. For

instance, Citgo sells significant volumes of fossil-fuel derived consumer motor oils and automobile lubricants through retail and wholesale distributers. Citgo further sells a wide variety of greases and oils for use in construction, mining, agricultural, and metalworking machinery and vehicles, and in many other industrial and commercial settings, through licensed distributors in California.

28. **ConocoPhillips Entities**

a. ConocoPhillips is a multinational energy company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. ConocoPhillips consists of numerous divisions, subsidiaries, and affiliates engaged in all aspects of the fossil fuel industry, including exploration, extraction, production, manufacture, transport, and marketing.

b. ConocoPhillips controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. ConocoPhillips' most recent annual report subsumes the operations of the entire ConocoPhillips group of subsidiaries under its name. Therein, ConocoPhillips represents that its value—for which ConocoPhillips maintains ultimate responsibility—is a function of its decisions to direct subsidiaries to explore for and produce fossil fuels: "Unless we successfully add to our existing proved reserves, our future crude oil, bitumen, natural gas and natural gas liquids production will decline, resulting in an adverse impact to our business." ConocoPhillips optimizes the ConocoPhillips group's oil and gas portfolio to fit ConocoPhillips' strategic plan. For example, in November 2016, ConocoPhillips announced a plan to generate $5 billion to $8 billion over two years by optimizing its business portfolio, including its fossil fuel product business, to focus on low cost-of-supply fossil fuel production projects that strategically fit its development plans.

c. ConocoPhillips controls and has controlled companywide decisions related to global warming and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. For instance, ConocoPhillips' Board has the highest level of direct responsibility for climate change policy within the company. ConocoPhillips has developed and implements a corporate Climate Change Action Plan to govern climate change decision-making across all entities in the ConocoPhillips group.

d. ConocoPhillips Company is a wholly owned subsidiary of ConocoPhilliips that acts on ConocoPhillips' behalf and subject to ConocoPhillips' control. ConocoPhillips Company is incorporated in Delaware and has its principal office in Bartlesville, Oklahoma. ConocoPhillips Company is registered to do business in California and has a registered agent for service of process in California.

e. Phillips 66 is a multinational energy and petrochemical company incorporated in Delaware and with its principal place of business in Houston, Texas. It encompasses downstream fossil fuel processing, refining, transport, and marketing segments that were formerly owned and/or controlled by ConocoPhillips. Phillips 66 is registered to do business in the State of California and has a registered agent for service of process in California.

f. Defendants ConocoPhillips, ConocoPhillips Company, and Phillips 66, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to herein as "ConocoPhillips."

g. ConocoPhillips does substantial fossil fuel product-related business in California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. For instance, ConocoPhillips owns and operates oil and natural gas terminals in California, owns and operates refineries in Arroyo Grande (San Luis Obispo County), Colton (San Bernardino County), and Wilmington (Los Angeles County), California, and distributes its products throughout California. Phillips 66 also owns and operates oil refineries in Rodeo (Contra Costa County), Santa Maria (Santa Barbara County), and Wilmington (Los Angeles County), California, each of which was owned and operated by ConocoPhillips and its predecessors in interest from 1997 to 2012.

29. **Total Entities**

a. Total E&P USA Inc. is a wholly owned subsidiary of Total S.A.—a French energy conglomerate—engaged in the North American segment of Total SA's fossil fuel products-related business. Total E&P USA Inc. and its subsidiaries are involved in the exploration for and extraction, transportation, research, and marketing of Total S.A.'s fossil fuel products. Total E&P

USA Inc. is registered to do business in the State of California and has designated an agent for service of process in California.

b. Total E&P USA Inc. controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Total E&P USA Inc. controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Total Specialties USA Inc., is a wholly owned subsidiary of Total S.A., involved in the marketing and distribution of Total S.A.'s fossil fuel products. Total Specialties USA Inc. is incorporated in the State of Delaware and headquartered in Houston, Texas. Total Specialties USA Inc. is registered to do business in the State of California and has designated an agent for service of process in California. Total Specialties USA Inc. does substantial fossil fuel product-related business in California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. For instance, Total Specialties USA Inc. maintains regular distributorship relationships with several California distributors of Total fossil fuel products, including engine oils, lubricants, greases, and industrial petroleum products.

30. **Eni Entities**

a. Eni S.p.A. ("Eni") is a vertically integrated, multinational energy company focusing on petroleum and natural gas. Eni is incorporated in the Republic of Italy, with its principal place of business in Rome, Italy. With its consolidated subsidiaries, Eni engages in the exploration, development, and production of hydrocarbons; in the supply and marketing of gas, liquid natural gas, and power; in the refining and marketing of petroleum products; in the production and marketing of basic petrochemicals, plastics and elastomers; in commodity trading; and in electricity marketing and generation.

b. Eni controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Eni controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Eni Oil & Gas Inc. is incorporated in Texas, with its principal place of business in Houston, Texas. Eni Oil & Gas Inc. is a wholly owned subsidiary of Eni America Ltd., a Delaware corporation doing business in the United States. Eni America, Ltd. is a wholly owned subsidiary of Eni UHL Ltd., a British corporation with its registered office in London, United Kingdom. Eni UHL Ltd. is a wholly owned subsidiary of Eni ULT, Ltd., a British corporation with its registered office on London, United Kingdom. Eni ULT, Ltd. is a wholly owned subsidiary of Eni Lasmo Plc, a British corporation with its registered office on London, United Kingdom. Eni Investments Plc, a British corporation with its registered office in London, United Kingdom, holds a 99.99% ownership interest in Eni Lasmo Plc (the other 0.01% ownership interest is held by another Eni entity, Eni UK Ltd, a British corporation with its registered office in London, United Kingdom). Eni S.p.A owns a 99.99% interest in Eni Investments Plc. Eni UK Ltd. holds the remainder interest in Eni Investments Plc. Collectively, these entities are referred to as "Eni."

e. Eni Oil & Gas Inc. is a successor-in-interest to Golden Eagle Refining Company, Inc. ("Golden Eagle"). At times relevant to this complaint, Golden Eagle did substantial fossil fuel-related business in California. Specifically, Golden Eagle owned and/or operated oil refineries in Carson (Los Angeles County) and Martinez (Contra Costa County), California, and owned and/or operated oil pipelines in or near Long Beach (Los Angeles County), California.

31. **Anadarko Petroleum Corp.**

a. Anadarko Petroleum Corporation ("Anadarko") is incorporated in the State of Delaware and maintains its principal place of business in The Woodlands, Texas. Anadarko is a multinational, vertically integrated energy company comprised of multiple upstream and downstream segments. These include exploration, production, gathering, processing, treating, transporting, marketing, and selling fossil fuel products derived primarily from petroleum and natural gas. In the United States, Anadarko entities operate fossil fuel product exploration and production concerns in Texas, the Gulf of Mexico, Alaska, the Powder River Basin, Utah,

Colorado, and the Marcellus Shale Formation. Anadarko operates fossil fuel product production and exploration activities internationally in Algeria, Ghana, Mozambique, and Columbia, among others. Anadarko Petroleum Corporation is registered to do business in California and has designated an agent for service of process in California.

b. Anadarko Petroleum Corporation is a successor-in-interest to HS Resources Inc. ("HS"). HS was an energy company headquartered in San Francisco, California. It owned natural gas reserves in Colorado, North Dakota, South Dakota, Montana, and along the coasts of Texas and Louisiana, which it extracted and imported to California. HS was acquired by Kerr-McGee Corporation in 2001. Kerr-McGee was an energy exploration and production company owning oil and natural gas rights in the Gulf of Mexico, Colorado, and Utah, with its corporate headquarters in Oklahoma. Anadarko Petroleum Corporation acquired Kerr-McGee Corporation in 2006.

32. **Occidental Entities**

a. Occidental Petroleum Corporation is a multinational, vertically integrated energy and chemical company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. Occidental's operations consist of three segments: Occidental's operations consist of three segments: (1) the exploration for, extraction of, and production of oil and natural gas products; (2) the manufacture and marketing of chemicals and vinyls; and (3) processing, transport, storage, purchase, and marketing of oil, natural gas, and power. Occidental Petroleum Corporation is registered to do business in the State of California and has designated an agent for service of process in the State of California.

b. Occidental Petroleum Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Occidental Petroleum Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Occidental Chemical Corporation, a manufacturer and marketer of petrochemicals, such as polyvinyl chloride resins, is a wholly owned subsidiary of Occidental Petroleum Corporation. Occidental Chemical Corporation is registered to do business in the State of California and has designated an agent for service of process in the State of California.

e. Defendants Occidental Petroleum Corporation and Occidental Chemical Corporation are collectively referred to as "Occidental."

f. Occidental does substantial fossil fuel product-related business in the State of California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. For instance, Occidental has extracted and transported its fossil fuel products from approximately 30,900 drilling locations within the San Joaquin, Los Angeles, Ventura, and Sacramento Basins in California.

33. **Repsol S.A.**

a. Repsol S.A. ("Repsol") is a vertically integrated, multinational global energy company, incorporated in the Kingdom of Spain, with its principal place of business in Madrid, Spain. Repsol is involved in multiple aspects of the fossil fuel industry, including exploration, production, marketing, and trading. Repsol engages in significant fossil fuel exploration and production activities in the United States, including in the Gulf of Mexico, the Marcellus Shale in Pennsylvania, the Eagle Ford Shale in South Texas, the Mississippi Lime in Oklahoma and Kansas, the North Slope in Alaska, and the Trenton-Black River in New York.

b. Repsol controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Repsol controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Repsol does substantial fossil fuel product-related business in the State of California, and a substantial portion of its fossil fuel products are extracted, refined, transported, traded, distributed, marketed, and/or sold in California. For instance, Repsol subsidiary Repsol Energy North America Corporation, incorporated in the State of Texas and with its principal place

of business in The Woodlands, Texas, is listed as a natural gas procurement, storage, transportation, scheduling, and risk management provider by Pacific Gas and Electric Co. ("PG&E"), a California utility. Repsol Energy North America Corporation is registered to do business in California and has designated an agent for service of process in California. Repsol subsidiary Repsol Trading USA Corporation, incorporated in the State of Texas and with its principal place of business in The Woodlands, Texas, is also registered do business in California and has designated an agent for service of process in California. Additionally, Repsol represents on its website that it is engaging in strategic opportunities involving its fossil fuel products in California, which may consist of crude oil, gasoline, diesel, and/or jet fuel.

34. **Marathon Entities**

a. Marathon Oil Company is an energy company incorporated in the State of Ohio and with its principal place of business in Houston, Texas. Marathon Oil Company is registered to do business in California and has designated an agent for service of process in California. Marathon Oil Company is a corporate ancestor of Marathon Oil Corporation and Marathon Petroleum Company.

b. Marathon Oil Company is a successor-in-interest to Husky Oil Ltd. ("Husky"), which it acquired in 1984. During times relevant to this Complaint, Husky operated oil production facilities near Santa Maria (Santa Barbara County), California, where it produced nearly 1,100 barrels per day. During the period relevant to this litigation, Husky did substantial fossil fuel product-related business in California.

c. Marathon Oil Corporation is a multinational energy company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. Marathon Oil Corporation consists of multiple subsidiaries and affiliates involved in the exploration for, extraction, production, and marketing of fossil fuel products.

d. Marathon Petroleum Corporation is a multinational energy company incorporated in Delaware and with its principal place of business in Findlay, Ohio. Marathon Petroleum Corporation was spun off from Marathon Oil Corporation operations in 2011. It consists of multiple subsidiaries and affiliates involved in fossil fuel product refining, marketing, retail,

and transport, including both petroleum and natural gas products.

e. Marathon Oil Corporation and Marathon Petroleum Corporation control and have controlled their companywide decisions about the quantity and extent of fossil fuel production and sales, including those of their subsidiaries.

f. Marathon Oil Corporation and Marathon Petroleum Corporation control and have controlled their companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

g. Defendants Marathon Oil Company, Marathon Oil Corporation, and Marathon Petroleum Corporation are collectively referred to as "Marathon."

35. **Hess Corporation**

a. Hess Corporation ("Hess") is a global, vertically integrated petroleum exploration and extraction company incorporated in the State of Delaware with its headquarters and principal place of business in New York, New York. Hess is registered to do business in California and has designated an agent for service of process in California.

b. Hess controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Hess controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Hess is engaged in the exploration, development, production, transportation, purchase, marketing, and sale of crude oil and natural gas. Its oil and gas production operations are located primarily in the United States, Denmark, Equatorial Guinea, Malaysia, Thailand, and Norway. Prior to 2014, Hess also conducted extensive retail operations in its own name and through subsidiaries. Hess owned and operated more than 1,000 gas stations throughout the United States, including in California, during times relevant to this complaint. Prior to 2013, Hess also operated oil refineries in the continental United States and U.S. Virgin Islands.

36. **Devon Energy Entities**

a. Devon Energy Corporation is an independent energy company engaged in

the exploration, development, and production of oil, and natural gas. It is incorporated in the State of Delaware and maintains its principal place of business in Oklahoma City, Oklahoma. Devon is engaged in multiple aspects of the fossil fuel industry, including exploration, development, production, and marketing of its fossil fuel products.

b. Devon Energy Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Devon Energy Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Devon Energy Production Company, L.P., is a Devon subsidiary registered to do business in the State of California and with a designated agent for service of process in California. Devon Energy Production Company, L.P., does substantial fossil fuel product-related business in California.

e. Devon Energy Corporation is a successor-in-interest to the Pauley Petroleum Company ("Pauley"). At times relevant to this complaint, Pauley did substantial fossil-fuel related business in California. Specifically, this included owning and operating a petroleum refinery in Newhall (Los Angeles County), California, from 1959 to 1989, and a refinery in Wilmington (Los Angeles County), California, from 1988 to 1992. Pauley merged with Hondo Oil and Gas Co. ("Hondo") in 1987. Subsequently, Devon Energy Corp. acquired Hondo in 1992.

f. Defendants Devon Energy Corporation and Devon Energy Production Company, L.P., are collectively referred to as "Devon."

37. **Encana Corporation**

a. Encana Corporation ("Encana") is a Canadian corporation with its principal place of business in Calgary, Alberta, Canada. Encana is an extractor and marketer of oil and natural gas and has facilities including gas plants and gas wells in Colorado, Texas, Wyoming, Louisiana, and New Mexico. By approximately 2005, Encana was the largest independent owner and operator of natural gas storage facilities in North America.

b. Encana has done and continues to do substantial fossil fuel product-related business in California. Between 1997 and 2006, Encana owned and operated the Wild Goose Storage underground natural gas storage facility in Butte County, California. In 2003, Encana began transporting natural gas through a 25-mile pipeline from the Wild Goose Station to a PG&E compressor station in Colusa County, California, where gas entered the main PG&E pipeline. Encana invested in a 100 billion cubic foot expansion of the facility in 2004, bringing gas storage capacity at Wild Goose to 24 billion cubic feet.

38. **Apache Corporation**

a. Apache Corporation is a publicly traded Delaware corporation with its principal place of business in Houston, Texas. Apache is an oil and gas exploration and production company, with crude oil and natural gas exploration and extraction operations in the United States, Canada, Egypt, and in the North Sea.

b. During the time at issue, Apache extracted natural gas from wells developed on approximately seven million acres of land held in the Canadian provinces of British Columbia, Alberta, and Saskatchewan, and Apache did substantial fossil fuel product-related business in California. Apache transported a substantial volume of the natural gas extracted from its Canadian holdings to California, where it sold that gas to electric utilities, end-users, other fossil fuel companies, supply aggregators, and other fossil fuel marketers. Apache directed sales of its natural gas to California in addition to markets in Washington state, Chicago, and western Canada, to intentionally retain a diverse customer base and maximize profits from the differential price rates and demand levels in those respective markets.

39. **Doe Defendants**

a. The true names and capacities, whether individual, corporate, associate, or otherwise of Defendants Does 1 through 100, inclusive, are unknown to Plaintiff, who therefore sues said Defendants by such fictitious names pursuant to California Code of Civil Procedure Section 474. Plaintiff is informed and believes, and on that basis alleges, that each of the

fictitiously named Defendants is responsible in some manner for the acts and occurrences herein alleged, and that Plaintiff's injuries and damages were caused by such Defendants.

C. Relevant Non-Parties: Fossil Fuel Industry Associations

40. As set forth in greater detail below, each Defendant had actual knowledge that its fossil fuel products were hazardous. Defendants obtained knowledge of the hazards of their products independently and through their membership and involvement in trade associations.

41. Each Defendant's fossil fuel promotion and marketing efforts were assisted by the trade associations described below. Acting on behalf of the Defendants, the industry associations engaged in a long-term course of conduct to misrepresent, omit, and conceal the dangers of Defendants' fossil fuel products.

a. **The American Petroleum Institute (API)**: API is a national trade association representing the oil and gas industry, formed in 1919. At least the following Defendants and/or their predecessors in interest are and/or have been API members at times relevant to this litigation: Chevron, Exxon, BP, Shell, ConocoPhillips, Hess, Anadarko, Occidental, Repsol, Marathon, Devon, Encana, and Apache.[10]

b. **The Western States Petroleum Association (WSPA)**: WSPA is a trade association representing oil producers in Arizona, California, Nevada, Oregon, and Washington.[11] Its members include, and at times relevant to this Complaint, have included, at least Defendants Chevron, BP, ConocoPhillips, Shell, and Exxon.[12]

c. **The American Fuel and Petrochemical Manufacturers (AFPM)** is a national association of petroleum and petrochemical companies. At relevant times, its members included, but were not limited to, at least BP Petrochemicals, BP Products North America, Chevron U.S.A. Inc., CITGO Petroleum Corporation, Exxon Mobil Corporation, Occidental

[10] American Petroleum Institute (API), *Members*, http://www.api.org/membership/members (accessed Nov. 5, 2018).
[11] WSPA, *About*, https://www.wspa.org/about (accessed Nov. 5, 2018).
[12] *Id.*

Chemical Corporation, Phillips 66, Shell Chemical Company, and Total Petrochemicals & Refining USA, Inc.[13]

d. **The Information Council for the Environment (ICE)**: ICE was formed by coal companies and their allies, including Western Fuels Association and the National Coal Association. Associated companies included at least Pittsburg and Midway Coal Mining (Chevron),[14] and Island Creek Coal Company (Occidental).

e. **The Global Climate Coalition (GCC)**: GCC was an industry group formed to oppose greenhouse gas emission reduction policies and the Kyoto Protocol. It was founded in 1989 shortly after the first Intergovernmental Panel on Climate Change meeting was held, and disbanded in 2001. Founding members included the National Association of Manufacturers, the Edison Electric Institute, and the United States Chamber of Commerce. The GCC's early individual corporate members included Amoco (BP), API, Chevron, Exxon, Shell Oil, Texaco (Chevron) and Phillips Petroleum (ConocoPhillips). During its existence, other members and funders included ARCO (BP), the National Mining Association, and the Western Fuels Association. The coalition also operated for several years out of the National Association of Manufacturers' offices.

III. AGENCY

42. At all times herein mentioned, each of the Defendants was the agent, servant, partner, aider and abettor, co-conspirator, and/or joint venturer of each of the remaining Defendants herein and was at all times operating and acting within the purpose and scope of said agency, service, employment, partnership, conspiracy, and joint venture and rendered substantial assistance and encouragement to the other Defendants, knowing that their conduct was wrongful and/or constituted a breach of duty.

IV. JURISDICTION AND VENUE

43. This court's personal jurisdiction over Defendants named herein is proper because each Defendant maintains substantial contacts with California by and through its fossil fuel

[13] AFPM, *Membership Directory*, https://www.afpm.org/membership-directory (accessed Nov. 5, 2018).

[14] Hereinafter, parenthetical references to Defendants indicate corporate ancestry and/or affiliation.

business operations in this state, as described above, and because Plaintiff's injuries described herein arose out of and relate to those operations and occurred in California.

44. The Superior Court of California for San Francisco County is a court of general jurisdiction and therefore has subject matter jurisdiction over this action.

45. Venue is proper in San Francisco County pursuant to Code of Civil Procedure section 395.5 because Defendants are corporations and/or associations, and because a substantial portion of the injuries giving rise to Defendants' liability occurred in San Francisco County.

V. FACTUAL BACKGROUND

A. Global Land and Ocean Warming—Observed Effects and Known Cause

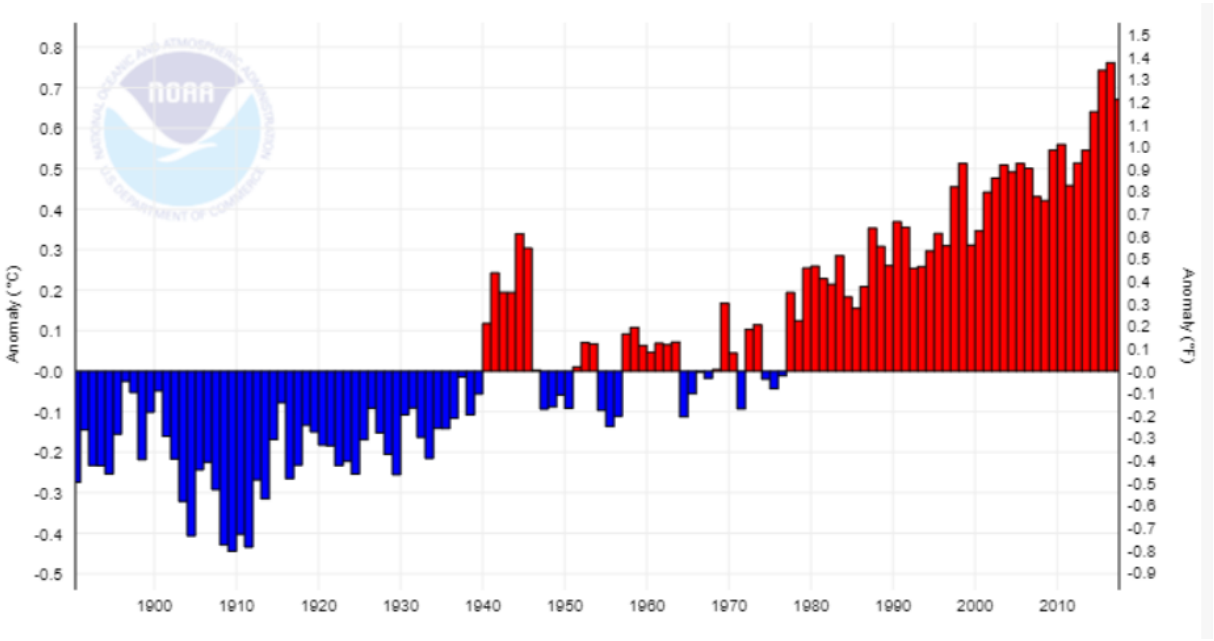
46. Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes to the climate system are unprecedented over decades to millennia.

47. The average ocean temperature in 2016 was approximately 1.7° F warmer than the 20th-century baseline, which is the greatest positive anomaly observed since at least 1880.[15] The increase in hotter temperatures and more frequent positive anomalies during the Great Acceleration is occurring both globally and locally. The graph below shows the increase in global land and ocean temperature anomalies since 1880, as measured against the 1910–2000 global average temperature.[16]

[15] NOAA, National Centers for Environmental Information, *Climate at a Glance (Global Time Series)* (June 2017) https://www.ncdc.noaa.gov/cag/time-series/global/globe/land_ocean/ytd/12/1880-2016.

[16] *Id.*

Figure 1: Global Ocean Temperature Anomalies, January - December



48. The mechanism by which human activity causes the oceans to warm is well established: ocean warming, like atmospheric warming, is overwhelmingly caused by anthropogenic greenhouse gas emissions.[17]

49. When emitted, greenhouse gases trap heat within Earth's atmosphere that would otherwise radiate into space.

50. Greenhouse gases are largely byproducts of humans burning fossil fuels to produce energy, and using fossil fuels to create petrochemical products.

51. Human activity, particularly greenhouse gas emissions, is the primary cause of global ambient air and ocean warming, and associated effects on Earth's climate.

52. Prior to World War II, most anthropogenic CO_2 emissions were caused by land-use practices, such as forestry and agriculture, which altered the ability of the land and global biosphere to absorb CO_2 from the atmosphere; the impacts of such activities on Earth's climate were relatively minor. Since the beginning of the Great Acceleration, however, both the annual rate and total volume of human CO_2 emissions have increased enormously following the advent of major

[17] IPCC 2014 Synthesis Report, *supra* note 2, at 4.

uses of oil, gas, and coal. The graph below shows that while CO_2 emissions attributable to forestry and other land-use change have remained relatively constant, total emissions attributable to fossil fuels have increased dramatically since the 1950s.[18]

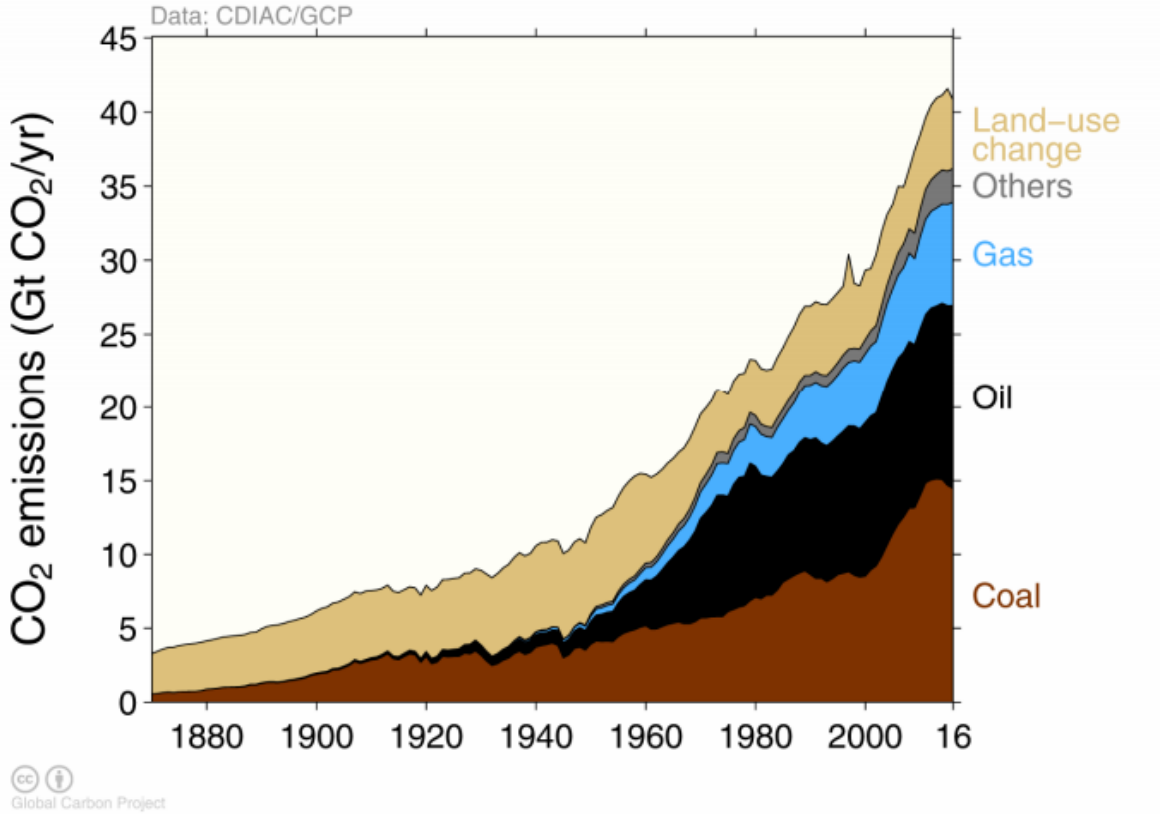


Figure 2: Total Annual Carbon Dioxide Emissions by Source, 1860–2016:

53. As human reliance on fossil fuels for industrial and mechanical processes has increased, so too have greenhouse gas emissions, especially of CO_2. The Great Acceleration is marked by a massive increase in the annual rate of fossil fuel emissions: more than half of all cumulative CO_2 emissions have occurred since 1988.[19] The rate of CO_2 emissions from fossil fuels and industry, moreover, has increased threefold since the 1960s, and by more than 60% since

[18] Global Carbon Project, Global Carbon Budget 2017 (Nov. 13, 2017), http://www.globalcarbonproject.org/carbonbudget/17/files/GCP_CarbonBudget_2017.pdf (*citing* CDIAC; R.A. Houghton & Alexander A. Nassikas, *Global and Regional Fluxes of Carbon from Land Use and Land Cover Change 1850–2015*, 31 GLOBAL BIOCHEMICAL CYCLES 3, 456 (Feb. 2017)).

[19] R.J. Andres et al., *A synthesis of carbon dioxide emissions from fossil-fuel combustion*, BIOGEOSCIENCES, 9, 1851 (2012), http://www.biogeosciences.net/9/1845/2012.

1990.[20] The graph below illustrates the increasing rate of global CO_2 emissions since the industrial era began.[21]

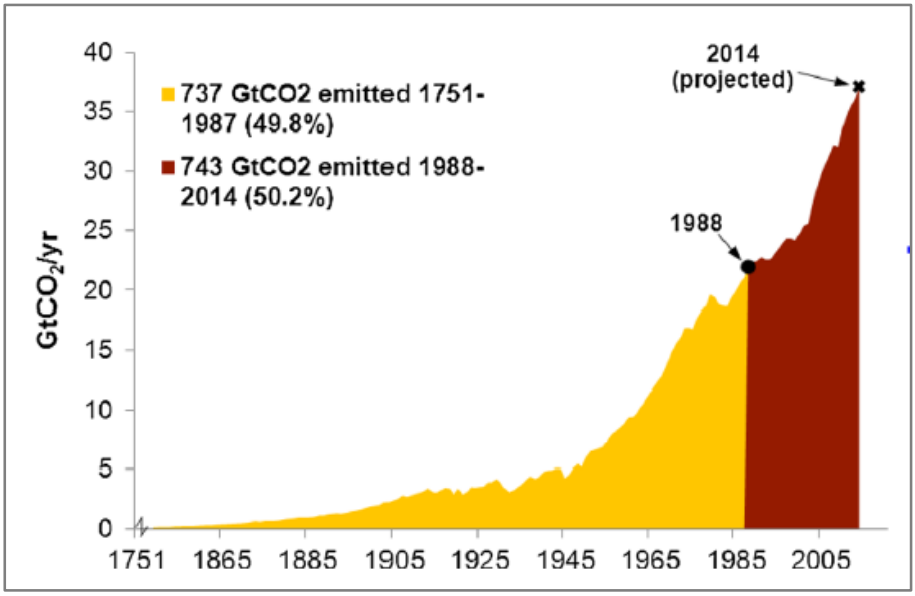


Figure 3: Cumulative Annual Anthropogenic Carbon Dioxide Emissions, 1751–2014:

54. Because of the increased use of fossil fuel products, concentrations of greenhouse gases in the atmosphere are now at a level unprecedented in at least 800,000 years.[22] The graph below illustrates the nearly 30% increase in atmospheric CO_2 concentration above pre-Industrial levels since 1960.[23]

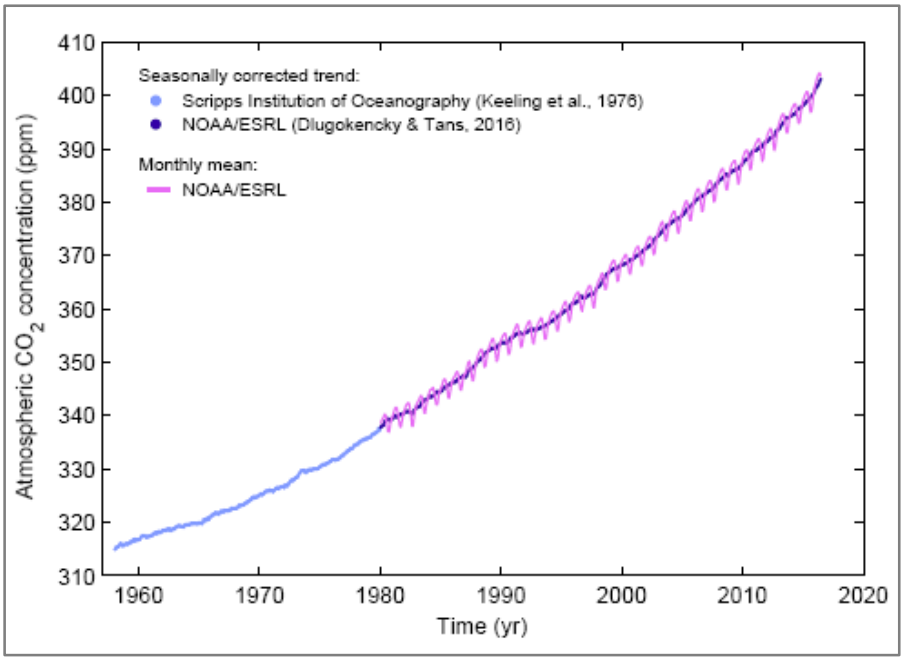
[20] *Global Carbon Budget 2016*, *supra* note 4, at 630 ("Global CO_2 emissions from fossil fuels and industry have increased every decade from an average of 3.1±0.2 GtC/yr in the 1960s to an average of 9.3±0.5 GtC/yr during 2006–2015.").

[21] Peter Frumhoff et al., *The Climate Responsibilities of Industrial Carbon Producers*, 132 CLIMATIC CHANGE 157, 164 (2015).

[22] IPCC 2014 Synthesis Report, *supra* note 2, at 4.

[23] *Global Carbon Budget 2016*, *supra* note 4, at 608.

Figure 4: Atmospheric Carbon Dioxide Concentration in Parts Per Million, 1960–2015:



55. Of the increase in energy that has accumulated in Earth's atmosphere between 1971 and 2010, more than 90% is stored in the oceans.[24]

56. In addition to the positive (increasing) trend in ocean surface temperature, marine heatwaves—prolonged, discrete, anomalously warm water events that can be described by their duration, intensity, rate of evolution, and spatial extent[25]—have become more frequent under continued anthropogenic warming.[26] This trend will continue and worsen in the future.

B. Domoic Acid Outbreaks

57. Domoic acid is a neurotoxin produced by species of marine algae, including the diatom *Pseudo-nitzschia australis*, that when ingested by humans causes "amnesic shellfish

[24] IPCC 2014 Synthesis Report, *supra* note 2, at 4.

[25] Alistair J. Hobday et al., *A hierarchical approach to defining marine heatwaves*, PROGRESS IN OCEANOGRAPHY 141, 227–38 (Feb. 2016).

[26] *See, e.g.*, Evan Weller et al., *Human Contribution to the 2014 Record High Sea Surface Temperatures Over the Western Tropical and Northeast Pacific*, BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY, Vol. 96, No. 12, S103 (Dec. 2015).

poisoning," which induces symptoms including vomiting, diarrhea, cramps, and other gastrointestinal upset, permanent short-term memory loss, and, in severe cases, death.

58. The U.S. Food and Drug Administration ("FDA") has established a domoic acid action level in Dungeness crab viscera of 30 parts per million ("ppm"). Above that action level, crab is considered "adulterated" and illegal to sell. California and Oregon both adhere to that action level and impose precautionary measures when crabs in those states contain domoic acid at levels exceeding the action level.

59. Members of the algal genus *Pseudo-nitzschia* thrive in warming oceans.[27] In particular, *Pseudo-nitzschia australis* increases its growth rate, photosynthesis, and toxigenicity in warmer water temperatures.[28]

60. In late 2013, a sea surface temperature anomaly developed in the Northeastern Pacific Ocean, including along the California coast. Eventually dubbed "the Blob" by scientists,[29] this mass of warm water would persist through 2016,[30] extend from Alaska to Mexico,[31] and feature positive temperature anomalies of greater than 4.5º F—more than three standard deviations above the expected sea surface temperature in the area.[32]

61. Conditions within the Blob were characterized by unusually warm waters, particularly before the initiation of the upwelling season.[33]

62. The conditions brought by the Blob favored *Pseudo-nitzschia* and allowed small seed populations to become established, specifically in those temperature ranges present along the California coast.[34]

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[27] Zhi Zhu et al., *Understanding the blob bloom: Warming increases toxicity and abundance of the harmful bloom diatom Pseudo-Nitzschia in California Coastal Waters*, 67 HARMFUL ALGAE 36, 36 (2017).

[28] *Id.*

[29] *See* Nicholas A. Bond et al., *Causes and impacts of the 2014 warm anomaly in the NE Pacific*, GEOPHYSICAL RESEARCH LETTERS 42, 3414 (May 5, 2015).

[30] *See* Dr. Raphael Kudela, California Joint Committee on Fisheries and Aquaculture Hearing Testimony (Oct. 4, 2016) (Blob persisted into July 2016, causing late *Pseudo-nitzschia* bloom).

[31] Di Lorenzo & Mantua, *supra* note 3, at 1.

[32] *See* Bond et al., *supra* note 29, at 3414.

[33] "Upwelling" is the phenomenon by which the Northwest winds blowing out of the Gulf of Alaska displace surface water and bring cooler, nutrient-rich water from depth. This annual phenomenon is the principal reason that the California Current ecosystem is among the most productive, diverse marine ecosystems on the planet.

[34] *Id.*

63. With the onset of upwelling came a deluge of nutrients that caused *Pseudo-nitzschia* seed populations to explode in abundance, resulting in a harmful algal bloom unprecedented in its extent and persistence.[35] The sheer biomass and extent of *Pseudo-nitzschia* produced similarly unprecedented concentrations of domoic acid.[36] The toxin entered the marine trophic chain, where it accumulated in crabs feeding on other contaminated organisms. Domoic acid contamination persists in ocean sediments and therefore continues to impact organisms living and feeding on the bottom of the ocean floor ("benthic organisms") long after the toxin-producing algal species have dissipated.[37]

64. In response to testing showing that crabs off the west coast contained domoic acid concentrations greater than FDA's 30-ppm action level, CDFW and ODFW have closed large swaths of those states' coasts to commercial crabbing. ODFW also has imposed additional precautionary measures, such as requiring crabs harvested from areas that had been under a domoic acid-induced closure to be eviscerated (thereby removing the viscera, or guts, which typically contain the highest concentration of domoic acid) before proceeding to the retail market.

65. As the sea surface temperature warming trend continues, domoic acid outbreaks will become a recurring facet of the California Current ecosystem, [38] and will continue to impact commercial fisheries. Indeed, testing in California and Oregon ahead of the 2018–19 commercial Dungeness crab season has shown crabs that exceed the 30-ppm action level. In response, CDFW has already announced the closure of a large section of the California coast from Bodega Head to the Sonoma/Mendocino County line to commercial crabbing at the outset of the 2018–19 season. Continued ocean warming through the 21st century will promote the intensification and

[35] Ryan M. McCabe et al., *The unprecedented coastwide toxic algal bloom linked to anomalous ocean conditions*, GEOPHYSICAL RESEARCH LETTERS 43, 10,369 (2016); *see also* S. Morgaine McKibben, *Climatic regulation of the neurotoxin domoic acid*, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES 114, 240 (Jan. 10, 2017).

[36] McCabe et al., *supra* note 35, at 10,372.

[37] *Id.* at 10,371 (citing R.A. Horner et al., *Retention of domoic acid by Pacific Razor Clams, Siliqua patula, Preliminary Study*, 12 JOURNAL OF SHELLFISH RESEARCH 451, 451–56 (1993)).

[38] *Id.* at 10,373; Zhu, *supra* note 27, at 40 (noting that anticipated summertime sea surface temperature increases will correspond with the temperatures observed in the Blob).

redistribution of harmful algal blooms around the world,[39] including *Pseudo-nitzschia* blooms on the west coast.

C. Attribution

66. "Carbon factors" analysis, devised by the International Panel on Climate Change (IPCC), the United Nations International Energy Agency, and the U.S. Environmental Protection Agency, quantifies the amount of CO_2 emissions attributable to a unit of raw fossil fuel extracted from the ground.[40] Emissions factors for oil, coal, liquid natural gas, and natural gas are different for each material but are nevertheless known and quantifiable for each.[41] This analysis accounts for the use of Defendants' fossil fuel products, including non-combustion purposes that sequester CO_2 rather than emit it (e.g., production of asphalt).

67. Defendants' historical and current fossil fuel extraction and production records are publicly available in various fora. These include university and public library collections, company websites, company reports filed with the U.S. Securities and Exchange Commission, company histories, and other sources. The cumulative CO_2 and methane emissions attributable to Defendants' fossil fuel products were calculated by reference to such publicly available documents.

68. While it is possible to distinguish CO_2 derived from fossil fuels from other sources, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere. However, cumulative carbon analysis allows an accurate calculation of net annual CO_2 and methane emissions attributable to each Defendant by quantifying the amount and type of fossil fuels products each Defendant extracted and placed into the stream of commerce, and multiplying those quantities by each fossil fuel product's carbon factor.

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[39] *See* Cristopher J. Gobler, et al., *Ocean warming since 1982 has expanded the niche of toxic algal blooms in the North Atlantic and North Pacific oceans*, Proceedings of the National Academy of Sciences (March 23, 2017).

[40] *See* Richard Heede, *Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers, 1854–2010*, CLIMATIC CHANGE 122, 232–33 (2014).

[41] *See, e.g., id.*

69. Defendants, through their extraction, promotion, marketing, and sale of their fossil fuel products, caused more than 15% of global fossil fuel product-related CO_2 between 1965 and 2015, with contributions currently continuing unabated. This constitutes a substantial portion of all such emissions in history, and the attendant increase in mean sea surface temperature; increase in frequency and intensity of marine heatwaves, including the Blob; increase in the expanse, persistence, and severity of harmful algal blooms; increase in *Pseudo-nitzschia* toxigenicity; and the associated domoic acid-related injuries.

70. By quantifying CO_2 and methane pollution attributable to Defendants by and through their fossil fuel products, ocean temperature responses to those emissions are also calculable, and can be attributed to Defendants on an individual and aggregate basis. Individually and collectively, Defendants' extraction, sale, and promotion of their fossil fuel products at the extraction, wholesale and retail levels are responsible for substantial increases in ocean temperature, harmful algal blooms, anomalous weather conditions and events, and specifically the domoic acid outbreaks and related injuries endured by Plaintiff, as described herein.

71. Marine outbreaks of domoic acid are climatically regulated.[42] The warmer the ocean conditions, the more likely domoic acid concentrations are to surpass alert thresholds during upwelling season, and the more toxic and/or widespread a domoic acid event has the potential to become.[43]

72. A marine heatwave as massive and warm as the Blob is "extremely rare" without the influence of anthropogenic climate forcing on the atmosphere.[44] Anthropogenic climate forcing has already increased the risk for extreme sea surface temperature events like the Blob by at least a factor of five.[45] Despite the known influence of normal sea surface temperature variability observed in Northeast Pacific on semi-decadal, decadal, and other relatively short timeframes, the Blob was still "significantly attributable to anthropogenic forcing."[46]

[42] McKibben, *supra* note 35, at 239–44.
[43] *Id.* at 243.
[44] Weller et al., *supra* note 26, at S103.
[45] Di Lorenzo & Mantua, *supra* note 3, at 6.
[46] Weller et al., *supra* note 27.

73. But for the Blob, caused by Defendants' actions, the California and Oregon commercial Dungeness crab fisheries would not have been closed as described herein. As ocean warming and circulation anomalies continue and domoic acid outbreaks increase in frequency and severity, such closures will continue to occur and continue to injure Plaintiff and the west coast crab industry.

74. Defendants, through their extraction, promotion, marketing, and sale of their fossil fuel products, caused a substantial portion of both those emissions and the attendant domoic acid outbreaks that forced California and Oregon to close their commercial crab fisheries during each of the last three seasons and will compel them to close the fisheries during future seasons.

75. As explained above, this analysis considers only the volume of raw material actually extracted from the earth by these Defendants. Many of these Defendants actually are responsible for far greater volumes of emissions because they also refine, manufacture, produce, market, promote, and sell more fossil fuel derivatives than they extract themselves by purchasing fossil fuel products extracted by independent third parties.

76. In addition, considering the Defendants' lead role in promoting, marketing, and selling their fossil fuels products between 1965 and 2015; their efforts to conceal the hazards of those products from consumers; their promotion of their fossil fuel products despite knowing the dangers associated with those products; their dogged campaign against regulation of those products based on falsehoods, omissions, and deceptions; and their failure to pursue less hazardous alternatives available to them, Defendants, individually and together, have substantially and measurably contributed to Plaintiff's domoic acid-related injuries.

D. Defendants Went to Great Lengths to Understand the Hazards Associated With and Knew or Should Have Known of the Dangers Associated with the Extraction, Promotion, and Sale of Their Fossil Fuel Products.

77. By 1965, concern about the risks of anthropogenic greenhouse gas emissions reached the highest level of the United States' scientific community. In that year, President Lyndon B. Johnson's Science Advisory Committee Panel on Environmental Pollution reported that by the year 2000, anthropogenic CO_2 emissions would "modify the heat balance of the atmosphere to such an extent that marked changes in climate . . . could occur," and that atmospheric warming

would create an equivalent sea temperature increase that could impact fisheries.[47] President Johnson announced in a special message to Congress that "[t]his generation has altered the composition of the atmosphere on a global scale through . . . a steady increase in carbon dioxide from the burning of fossil fuels."[48]

78. These statements from the Johnson Administration, at a minimum, put Defendants on notice of the potentially substantial dangers to people, communities, and the planet associated with unabated use of their fossil fuel products. Moreover, Defendants had amassed a considerable body of knowledge on the subject through their own independent efforts.

79. A 1963 Conservation Foundation report on a conference of scientists referenced in the 1966 World Book Encyclopedia, as well as in presidential panel reports and other sources around that time, described many specific consequences of rising greenhouse gas pollution in the atmosphere. It warned that

> a continuing rise in the amount of atmospheric carbon dioxide is likely to be accompanied by a significant warming of the surface of the earth which by melting the polar ice caps would raise sea level and by warming the oceans would change considerably the distributions of marine species including commercial fisheries.

It warned of the possibility of "wiping out the world's present commercial fisheries." The report, in fact, noted that "the changes in marine life in the North Atlantic which accompanied the temperature change have been very noticeable."[49]

80. In 1968, a Stanford Research Institute (SRI) report commissioned by the American Petroleum Institute ("API") and made available to all of its members, concluded, among other things:

[47] President's Science Advisory Committee, *Restoring the Quality of Our Environment: Report of the Environmental Pollution Panel*, at 9, 123–24 (Nov. 1965), https://hdl.handle.net/2027/uc1.b4315678.

[48] President Lyndon B. Johnson, *Special Message to Congress on Conservation and Restoration of Natural Beauty* (Feb. 8, 1965), http://acsc.lib.udel.edu/items/show/292.

[49] The Conservation Foundation, *Implications of Rising Carbon Dioxide Content of the Atmosphere: A statement of trends and implications of carbon dioxide research reviewed at a conference of scientists* (Mar. 1963), https://babel.hathitrust.org/cgi/pt?id=mdp.39015004619030;view=1up;seq=5.

> If the Earth's temperature increases significantly, a number of events might be expected to occur including the melting of the Antarctic ice cap, a rise in sea levels, warming of the oceans and an increase in photosynthesis. . . .
>
> It is clear that we are unsure as to what our long-lived pollutants are doing to our environment; however, there seems to be no doubt that the potential damage to our environment could be severe. . . .[T]he prospect for the future must be of serious concern.[50]

81. In a supplement to the 1968 report prepared for API in 1969, authors Robinson and Robbins projected that based on current fuel usage, atmospheric CO_2 concentrations would reach 370 ppm by 2000—almost exactly what it turned out to be (369.34 ppm, according to data from NASA).[51] The report also drew the connection between rising atmospheric CO_2 concentrations and the use of fossil fuels, stating that "balance between environmental sources and sinks has been disturbed by the emission to the atmosphere of additional CO_2 from the increased combustion of carbonaceous fuels" and that it seemed "unlikely that the observed rise in atmospheric CO_2 has been due to changes in the biosphere." The authors warn repeatedly of the temptations and consequences of ignoring CO_2 as a problem and pollutant:

> CO_2 is so common and such an integral part of all our activities that air pollution regulations typically state that CO_2 emissions are not to be considered as pollutants. This is perhaps fortunate for our present mode of living, centered as it is around carbon combustion. However, this seeming necessity, the CO_2 emission, is the only air pollutant, as we shall see, that has been shown to be of global importance as a factor that could change man's environment on the basis of a long period of scientific investigation.[52]

82. In 1969, Shell memorialized an ongoing, 18-month project to collect ocean data from oil platforms to develop and calibrate environmental forecasting theories related to predicting wave, wind, storm, sea level, and current changes and trends.[53] Several Defendants and/or their predecessors participated in the project, including Esso Production Research Company (Exxon), Mobil Research and Development Company (Exxon), Pan American Petroleum Corporation (BP),

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[50] Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants*, Stanford Research Institute (Feb. 1968), https://www.smokeandfumes.org/documents/document16.

[51] "Global Mean CO_2 Mixing Ratios (ppm): Observations," NASA Goddard Institute for Space Studies, https://data.giss.nasa.gov/modelforce/ghgases/Fig1A.ext.txt (webpage) (accessed June 16, 2018).

[52] Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants Supplement*, Stanford Research Institute (June 1969).

[53] M.M. Patterson, *An Ocean Data Gathering Program for the Gulf of Mexico*, Society of Petroleum Engineers (1969), https://www.onepetro.org/conference-paper/SPE-2638-MS.

Gulf Oil Corporation (Chevron), Texaco Inc. (Chevron), and the Chevron Oil Field Research Company.

83. In a 1970 report by H.R. Holland from the Engineering Division of Imperial Oil (Exxon), he stated: "Since pollution means disaster to the affected species, the only satisfactory course of action is to prevent it—to maintain the addition of foreign matter at such levels that it can be diluted, assimilated or destroyed by natural processes—to protect man's environment from man." He also noted that "a problem of such size, complexity and importance cannot be dealt with on a voluntary basis." CO_2 was listed as an air pollutant in the document.[54]

84. In 1972, API members, including Defendants, received a status report on all environmental research projects funded by API. The report summarized the 1968 SRI report describing the impact of Defendants' fossil fuel products on the environment, including global surface and ocean warming. Industry participants who received this report include: American Standard of Indiana (BP), Asiatic (Shell), Ashland (Marathon), Atlantic Richfield (BP), British Petroleum (BP), Chevron Standard of California (Chevron), Cities Service (Citgo), Continental (ConocoPhillips), Dupont (former owner of Conoco), Esso Research (Exxon), Ethyl (formerly affiliated with Esso, which was subsumed by Exxon Mobil), Getty (Exxon), Gulf (Chevron, among others), Humble Standard of New Jersey (Exxon/Chevron/BP), Marathon, Mobil (Exxon), Pan American (BP), Phillips (ConocoPhillips), Shell, Standard of Ohio (BP), Texaco (Chevron), Union (Chevron), Edison Electric Institute (representing electric utilities), Bituminous Coal Research (coal industry research group), Mid-Continent Oil & Gas Association (presently the U.S. Oil & Gas Association, a national trade association), Western Oil & Gas Association, National Petroleum Refiners Association (presently the American Fuel and Petrochemical Manufacturers Association, a national trade association), Champlin (Anadarko), Skelly (Exxon), Colonial Pipeline (ownership has included BP, Citgo, Exxon, ConocoPhillips, Chevron entities, among others) and Caltex (Chevron), among others.[55]

[54] H.R. Holland, "Pollution is Everybody's Business," Imperial Oil (1970), https://www.desmogblog.com/sites/beta.desmogblog.com/files/DeSmogBlog-Imperial%20Oil%20Archive-Pollution-Everyone-Business-1970.pdf.

[55] American Petroleum Institute, *Environmental Research, A Status Report*, Committee for Air and Water Conservation (Jan. 1972), *available at* http://files.eric.ed.gov/fulltext/ED066339.pdf.

85. In a 1977 presentation and again in a 1978 briefing, Exxon scientists warned the Exxon Corporation Management Committee that CO_2 concentrations were building in Earth's atmosphere at an increasing rate, that CO_2 emissions attributable to fossil fuels were retained in the atmosphere, and that CO_2 was contributing to global warming.[56] The report stated:

> There is general scientific agreement that the most likely manner in which mankind is influencing the global climate is through carbon dioxide release from the burning of fossil fuels . . . [and that] Man has a time window of five to ten years before the need for hard decisions regarding changes in energy strategies might become critical.[57]

The report concluded that "doubling in CO_2 could increase average global temperature 1°C to 3°C by 2050 A.D. (10°C predicted at poles)."[58]

86. Thereafter, Exxon engaged in a research program to study the environmental fate of fossil fuel-derived greenhouse gases and their impacts, which included publication of peer-reviewed research by Exxon staff scientists and the conversion of a supertanker into a research vessel to study the greenhouse effect and the role of the oceans in absorbing anthropogenic CO_2. Much of this research was communicated in a variety of industry fora, symposia, and papers shared through trade associations and directly with other Defendants.

87. Exxon scientists made the case internally for using company resources to build corporate knowledge about the impacts of the promotion, marketing, and consumption of Defendants' fossil fuel products. Exxon climate researcher Henry Shaw wrote in 1978: "The rationale for Exxon's involvement and commitment of funds and personnel is based on our need to assess the possible impact of the greenhouse effect on Exxon business. Exxon must develop a credible scientific team that can critically evaluate the information generated on the subject and be able to carry bad news, if any, to the corporation."[59] Moreover, Shaw emphasized the need to

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[56] Memo from J.F. Black to F.G. Turpin, *The Greenhouse Effect*, Exxon Research and Engineering Co. (June 6, 1978), http://www.climatefiles.com/exxonmobil/1978-exxon-memo-on-greenhouse-effect-for-exxon-corporation-management-committee.

[57] *Id.*

[58] *Id.*

[59] Memo from Henry Shaw to Edward David Jr., *The "Greenhouse Effect,"* Exxon Research and Engineering Company (Dec. 7, 1978), http://insideclimatenews.org/sites/default/files/documents/Credible%20Scientific%20Team%201978%20Letter.pdf.

collaborate with universities and government to more completely understand what he called the "CO_2 problem."[60]

88. In 1979, API and its members, including Defendants, convened a Task Force to monitor and share cutting edge climate research among the oil industry. The group was initially called the CO_2 and Climate Task Force, but changed its name to the Climate and Energy Task Force in 1980 (hereinafter referred to as "API CO_2 Task Force"). Membership included senior scientists and engineers from nearly every major U.S. and multinational oil and gas company, including Exxon, Mobil (Exxon), Amoco (BP), Phillips (ConocoPhillips), Texaco (Chevron), Shell, Sunoco, Sohio (BP) as well as Standard Oil of California (BP) and Gulf Oil (Chevron, among others). The Task Force was charged with assessing the implications of emerging science on the petroleum and gas industries and identifying where reductions in greenhouse gas emissions from Defendants' fossil fuel products could be made.[61]

89. In 1979, API sent its members a background memo related to the API CO_2 and Climate Task Force's efforts, stating that CO_2 concentrations were rising steadily in the atmosphere, and predicting when the first clear effects of climate change might be felt.[62]

90. Also in 1979, Exxon scientists advocated internally for additional fossil fuel industry-generated research in light of the growing consensus that consumption of fossil fuel products was changing the planet's climate:

> "We should determine how Exxon can best participate in all these [atmospheric science research] areas and influence possible legislation on environmental controls. It is important to begin to anticipate the strong intervention of environmental groups and be prepared to respond with reliable and credible data. It behooves [Exxon] to start a very aggressive defensive program in the indicated areas of atmospheric science and climate because there is a good probability that legislation affecting our business will be passed. Clearly, it is in our interest for such legislation to be based on hard scientific data. The data obtained from research

[60] *Id.*

[61] American Petroleum Institute, *AQ-9 Task Force Meeting Minutes* (Mar. 18, 1980), http://insideclimatenews.org/sites/default/files/documents/AQ-9%20Task%20Force%20Meeting%20%281980%29.pdf (AQ-9 refers to the "CO_2 and Climate" Task Force).

[62] Neela Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, INSIDE CLIMATE NEWS (Dec. 22, 2015), https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco.

> on the global damage from pollution, e.g., from coal combustion, will give us the needed focus for further research to avoid or control such pollutants."[63]

91. That same year, Exxon Research and Engineering reported that: "The most widely held theory [about increasing CO_2 concentration] is that the increase is due to fossil fuel combustion, increasing CO_2 concentration will cause a warming of the earth's surface, and the present trend of fossil fuel consumption will cause dramatic environmental effects before the year 2050."[64] According to the report, "ecological consequences of increased CO_2" to 500 ppm (1.7 times 1850 levels) could mean that "marine life would be markedly changed;" and, by way of example, that "maintaining runs of salmon and steelhead and other subarctic species in the Columbia River system would become increasingly difficult."[65] With a doubling of the 1860 CO_2 concentration, "ocean levels would rise four feet" and "the Arctic Ocean would be ice free for at least six months each year, causing major shifts in weather patterns in the northern hemisphere."[66]

92. Further, the report stated that unless fossil fuel use was constrained, there would be "noticeable temperature changes" associated with an increase in atmospheric CO_2 from about 280 parts per million before the Industrial Revolution to 400 parts per million by the year 2010.[67] Those projections proved remarkably accurate—atmospheric CO_2 concentrations surpassed 400 parts per million in May 2013, for the first time in millions of years.[68] In 2015, the annual average CO_2 concentration rose above 400 parts per million, and in 2016 the annual low surpassed 400 parts per million, meaning atmospheric CO_2 concentration remained above that threshold all year.[69]

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[63] Henry Shaw, *Exxon Memo to H.N. Weinberg about "Research in Atmospheric Science"*, Exxon Inter-Office Correspondence (Nov. 19, 1979), https://insideclimatenews.org/sites/default/files/documents/Probable%20Legislation%20Memo%20(1979).pdf.

[64] W.L. Ferrall, *Exxon Memo to R.L. Hirsch about "Controlling Atmospheric CO_2"*, Exxon Research and Engineering Co. (Oct. 16, 1979), http://insideclimatenews.org/sites/default/files/documents/CO2%20and%20Fuel%20Use%20Projections.pdf.

[65] *Id.*

[66] *Id.*

[67] *Id.*

[68] Nicola Jones, *How the World Passed a Carbon Threshold and Why it Matters*, YALE ENVIRONMENT 360 (Jan. 26, 2017), http://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters.

[69] *Id.*

93. In 1980, API's CO_2 Task Force members discussed the oil industry's responsibility to reduce CO_2 emissions by changing refining processes and developing fuels that emit less CO_2. The minutes from the Task Force's February 29, 1980, meeting included a summary of a presentation on "The CO_2 Problem" given by Dr. John Laurmann, which identified the "scientific consensus on the potential for large future climatic response to increased CO2 levels" as a reason for API members to have concern with the "CO_2 problem" and informed attendees that there was "strong empirical evidence that rise [in CO_2 concentration was] caused by anthropogenic release of CO_2, mainly from fossil fuel combustion."[70] Moreover, Dr. Laurmann warned that the amount of CO_2 in the atmosphere could double by 2038, which he said would likely lead to a 2.5° C (4.5º F) rise in global average temperatures with "major economic consequences." He then told the Task Force that models showed a 5°C (9º F) rise by 2067, with "globally catastrophic effects."[71] A taskforce member and representative of Texaco leadership present at the meeting posited that the API CO_2 Task Force should develop ground rules for energy release of fuels and the cleanup of fuels as they relate to CO_2 creation.

94. In 1980, the API CO_2 Task Force also discussed a potential area for investigation: alternative energy sources as a means of mitigating CO_2 emissions from Defendants' fossil fuel products. These efforts called for research and development to "Investigate the Market Penetration Requirements of Introducing a New Energy Source into World Wide Use." Such investigation was to include the technical implications of energy source changeover, research timing, and requirements.[72]

95. By 1980, Exxon's senior leadership had become intimately familiar with the greenhouse effect and the role of CO_2 in the atmosphere. In that year, Exxon Senior Vice President and Board member George Piercy questioned Exxon researchers on the minutiae of the ocean's role in absorbing atmospheric CO_2, including whether there was a net CO_2 flux out of the ocean

[70] American Petroleum Institute, *AQ-9 Task Force Meeting Minutes*, *supra* note 59 (AQ-9 refers to the "CO_2 and Climate" Task Force).

[71] *Id.*

[72] *Id.*

into the atmosphere in certain zones where upwelling of cold water to the surface occurs, because Piercy evidently believed that the oceans could absorb and retain higher concentrations of CO_2 than the atmosphere.[73] This inquiry aligns with Exxon supertanker research into whether the ocean would act as a significant CO_2 sink that would sequester atmospheric CO_2 long enough to allow unabated emissions without triggering dire climatic consequences. As described below, Exxon eventually scrapped this research before it produced sufficient data to derive a conclusion.[74]

96. Also in 1980, Imperial Oil (Exxon) reported to Esso and Exxon managers and environmental staff that increases in fossil fuel usage aggravates CO_2 in the atmosphere. Noting that the United Nations was encouraging research into the carbon cycle, Imperial reported that "[t]echnology exists to remove CO_2 from [fossil fuel power plant] stack gases but removal of only 50% of the CO_2 would double the cost of power generation."

97. Exxon scientist Roger Cohen warned his colleagues in a 1981 internal memorandum that "future developments in global data gathering and analysis, along with advances in climate modeling, may provide strong evidence for a delayed CO_2 effect of a truly substantial magnitude," and that under certain circumstances it would be "very likely that we will unambiguously recognize the threat by the year 2000."[75] Cohen had expressed concern that the memorandum mischaracterized potential effects of unabated CO_2 emissions from Defendants' fossil fuel products: "[I]t is distinctly possible that the . . . [Exxon Planning Division's] scenario will produce effects which will indeed be catastrophic (at least for a substantial fraction of the world's population)."[76]

[73] Neela Banerjee, *More Exxon Documents Show How Much It Knew About Climate 35 Years Ago*, INSIDE CLIMATE NEWS (Dec. 1, 2015), https://insideclimatenews.org/news/01122015/documents-exxons-early-co2-position-senior-executives-engage-and-warming-forecast.

[74] Neela Banerjee et al., *Exxon Believed Deep Dive Into Climate Research Would Protect Its Business*, INSIDE CLIMATE NEWS (Sept. 17, 2015), https://insideclimatenews.org/news/16092015/exxon-believed-deep-dive-into-climate-research-would-protect-its-business.

[75] Roger W. Cohen, *Exxon Memo to W. Glass about possible "catastrophic" effect of CO_2*, Exxon Inter-Office Correspondence (Aug. 18, 1981), http://www.climatefiles.com/exxonmobil/1981-exxon-memo-on-possible-emission-consequences-of-fossil-fuel-consumption.

[76] *Id.*

98. In 1981, Exxon's Henry Shaw, the company's lead climate researcher at the time, prepared a summary of Exxon's current position on the greenhouse effect for Edward David Jr., president of Exxon Research and Engineering, stating in relevant part:

- "Atmospheric CO_2 will double in 100 years if fossil fuels grow at 1.4%/ a^2.
- 3ºC global average temperature rise and 10ºC at poles if CO_2 doubles.
  - Major shifts in rainfall/agriculture
  - Polar ice may melt"[77]

99. In 1982, another report prepared for API by scientists at the Lamont-Doherty Geological Observatory at Columbia University recognized that atmospheric CO_2 concentration had risen significantly compared to the beginning of the industrial revolution from about 290 parts per million to about 340 parts per million in 1981 and acknowledged that despite differences in climate modelers' predictions, all models indicated a temperature increase caused by anthropogenic CO_2 within a global mean range of 4º C (7.2° F). The report advised that there was scientific consensus that "a doubling of atmospheric CO_2 from [] pre-industrial revolution value would result in an average global temperature rise of (3.0 ± 1.5)°C [5.4 ± 2.7° F]." It went further, warning that "[s]uch a warming can have serious consequences for man's comfort and survival since patterns of aridity and rainfall can change, the height of the sea level can increase considerably and the world food supply can be affected."[78] Exxon's own modeling research confirmed this, and the company's results were later published in at least three peer-reviewed scientific papers.[79]

100. Also in 1982, Exxon's Environmental Affairs Manager distributed a primer on climate change to a "wide circulation [of] Exxon management . . . intended to familiarize Exxon

[77] Henry Shaw, *Exxon Memo to E. E. David, Jr. about "CO_2Position Statement"*, Exxon Inter-Office Correspondence (May 15, 1981), https://insideclimatenews.org/sites/default/files/documents/Exxon%20Position%20on%20CO2%20%281981%29.pdf.

[78] American Petroleum Institute, *Climate Models and CO_2 Warming: A Selective Review and Summary*, Lamont-Doherty Geological Observatory (Columbia University) (Mar. 1982), https://assets.documentcloud.org/documents/2805626/1982-API-Climate-Models-and-CO2-Warming-a.pdf.

[79] *See* Roger W. Cohen, *Exxon Memo summarizing findings of research in climate modeling*, Exxon Research and Engineering Co. (Sept. 2, 1982), https://insideclimatenews.org/sites/default/files/documents/%2522Consensus%2522%20on%20CO2%20Impacts%20(1982).pdf (discussing research articles).

personnel with the subject."[80] The primer also was "restricted to Exxon personnel and not to be distributed externally."[81] The primer compiled science on climate change available at the time, and confirmed fossil fuel combustion as a primary anthropogenic contributor to global warming. The report estimated a CO_2 doubling around 2090 based on Exxon's long-range modeled outlook. The author warned that "there are some potentially catastrophic events that must be considered," including increased sea surface temperatures, and the loss of Antarctic ice sheets.[82] It noted that some scientific groups were concerned "that once the effects are measurable, they might not be reversible."[83]

101. In a summary of Exxon's climate modeling research from 1982, Director of Exxon's Theoretical and Mathematical Sciences Laboratory Roger Cohen wrote that "the time required for doubling of atmospheric CO_2 depends on future world consumption of fossil fuels." Cohen concluded that Exxon's own results were "consistent with the published predictions of more complex climate models" and "in accord with the scientific consensus on the effect of increased atmospheric CO_2 on climate."[84]

102. At the fourth biennial Maurice Ewing Symposium at the Lamont-Doherty Geophysical Observatory in October 1982, attended by members of API, Exxon Research and Engineering Company president E.E. David delivered a speech titled: "Inventing the Future: Energy and the CO_2 'Greenhouse Effect.'"[85] His remarks included the following statement: "[F]ew people doubt that the world has entered an energy transition away from dependence upon fossil fuels and toward some mix of renewable resources that will not pose problems of CO_2 accumulation." He went on, discussing the human opportunity to address anthropogenic climate change before the point of no return:

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[80] M. B. Glaser, *Exxon Memo to Management about "CO_2 'Greenhouse' Effect"*, Exxon Research and Engineering Co. (Nov. 12, 1982), http://insideclimatenews.org/sites/default/files/documents/1982%20Exxon%20Primer%20on%20CO2%20Greenhouse%20Effect.pdf.

[81] *Id.*

[82] *Id.*

[83] *Id.*

[84] Cohen, *Exxon Memo summarizing findings of research in climate modeling*, *supra* note 77.

[85] E. E. David, Jr., *Inventing the Future: Energy and the CO_2 Greenhouse Effect: Remarks at the Fourth Annual Ewing Symposium, Tenafly, NJ* (1982), *available at* http://sites.agu.org/publications/files/2015/09/ch1.pdf.

> It is ironic that the biggest uncertainties about the CO_2 buildup are not in predicting what the climate will do, but in predicting what people will do. . . .[It] appears we still have time to generate the wealth and knowledge we will need to invent the transition to a stable energy system.

103. Throughout the early 1980s, at Exxon's direction, Exxon climate scientist Henry Shaw forecasted emissions of CO_2 from fossil fuel use. Those estimates were incorporated into Exxon's 21st century energy projections and were distributed among Exxon's various divisions. Shaw's conclusions included an expectation that atmospheric CO_2 concentrations would double in 2090 per the Exxon model, with an attendant 2.3–5.6º F average global temperature increase. Shaw compared his model results to those of the U.S. EPA, the National Academy of Sciences, and the Massachusetts Institute of Technology, indicating that the Exxon model predicted a longer delay than any of the other models, although its temperature increase prediction was in the mid-range of the four projections.[86]

104. During the 1980s, many Defendants formed their own research units focused on climate modeling. The API, including the API CO_2 Task Force, provided a forum for Defendants to share their research efforts and corroborate their findings related to anthropogenic greenhouse gas emissions.[87]

105. During this time, Defendants' statements express an understanding of their obligation to consider and mitigate the externalities of unabated promotion, marketing, and sale of their fossil fuel products. For example, in 1988, Richard Tucker, the president of Mobil Oil, presented at the American Institute of Chemical Engineers National Meeting, the premier educational forum for chemical engineers, where he stated:

> [H]umanity, which has created the industrial system that has transformed civilities, is also responsible for the environment, which sometimes is at risk because of unintended consequences of industrialization. . . . Maintaining the health of this life-support system is emerging as one of the highest priorities. . . .[W]e must all be environmentalists.
>
> The environmental covenant requires action on many fronts…the low-atmosphere ozone problem, the upper-atmosphere ozone problem and the greenhouse effect, to

[86] Banerjee, More Exxon Documents Show How Much It Knew About Climate 35 Years Ago, *supra* note 77.

[87] Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, *supra* note 620.

> name a few. . . .Our strategy must be to reduce pollution before it is ever generated – to prevent problems at the source.
>
> Prevention means engineering a new generation of fuels, lubricants and chemical products…. Prevention means designing catalysts and processes that minimize or eliminate the production of unwanted byproducts. . . .Prevention on a global scale may even require a dramatic reduction in our dependence on fossil fuels—and a shift towards solar, hydrogen, and safe nuclear power. It may be possible that—just possible—that the energy industry will transform itself so completely that observers will declare it a new industry. . . .Brute force, low-tech responses and money alone won't meet the challenges we face in the energy industry.[88]

106. Also in 1988, the Shell Greenhouse Effect Working Group issued a confidential internal report, "The Greenhouse Effect," which acknowledged global warming's anthropogenic nature: "Man-made carbon dioxide released into and accumulated in the atmosphere is believed to warm the earth through the so-called greenhouse effect." The authors also noted the burning of fossil fuel as a primary driver of CO_2 buildup and warned that ocean warming would impact marine species populations and that "shifts in ranges and migration patterns could result in local losses of food source revenues, and could require [fishing] operations in other (more distant) grounds."[89]

107. Similar to early warnings by Exxon scientists, the Shell report notes that "by the time the global warming becomes detectable it could be too late to take effective countermeasures to reduce the effects or even to stabilize the situation." The authors mention the need to consider policy changes on multiple occasions, noting that "the potential implications for the world are…so large that policy options need to be considered much earlier" and that research should be "directed more to the analysis of policy and energy options than to studies of what we will be facing exactly."[90]

108. In 1991, Shell produced a film called "Climate of Concern." The film advises that while "no two [climate change projection] scenarios fully agree…[they] have each prompted the same serious warning. A warning endorsed by a uniquely broad consensus of scientists in their

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[88] Richard E. Tucker, *High Tech Frontiers in the Energy Industry: The Challenge Ahead*, AIChE National Meeting (Nov. 30, 1988), *available at* https://hdl.handle.net/2027/pur1.32754074119482?urlappend=%3Bseq=522.

[89] Shell Internationale Petroleum Greenhouse Effect Working Group, *The Greenhouse Effect* (May 30, 1988), https://www.documentcloud.org/documents/4411090-Document3.html#document/p9/a411239.

[90] *Id.*

report to the UN at the end of 1990." The video concludes with a stark admonition: "Global warming is not yet certain, but many think that the wait for final proof would be irresponsible. Action now is seen as the only safe insurance."[91]

109. The fossil fuel industry, including Defendants, was at the forefront of carbon dioxide research for much of the latter half of the 20th century. They developed cutting edge and innovative technology and worked with many of the field's top researchers to produce exceptionally sophisticated studies and models. For instance, in the mid-nineties Shell began using scenarios to plan how the company could respond to various global forces in the future. In one scenario published in a 1998 internal report, Shell paints an eerily prescient scene:

> In 2010, a series of violent storms causes extensive damage to the eastern coast of the U.S. Although it is not clear whether the storms are caused by climate change, people are not willing to take further chances. The insurance industry refuses to accept liability, setting off a fierce debate over who is liable: the insurance industry or the government. After all, two successive IPCC reports since 1995 have reinforced the human connection to climate change….Following the storms, a coalition of environmental NGOs brings a class-action suit against the US government and fossil-fuel companies on the grounds of neglecting what scientists (including their own) have been saying for years: that something must be done. A social reaction to the use of fossil fuels grows, and individuals become 'vigilante environmentalists' in the same way, a generation earlier, they had become fiercely anti-tobacco. Direct-action campaigns against companies escalate. Young consumers, especially, demand action.[92]

110. Climate change research conducted by Defendants and their industry associations frequently acknowledged uncertainties in their climate modeling—those uncertainties, however, were merely with respect to the magnitude and timing of climate impacts resulting from fossil fuel consumption, not that significant changes would eventually occur. The Defendants' researchers and the researchers at their industry associations harbored little doubt that climate change was occurring and that fossil fuel products were, and are, the primary cause.

111. Despite the overwhelming information about the threats to people and the planet posed by continued unabated use of their fossil fuel products, Defendants failed to act as they

[91] Jelmer Mommers, *Shell made a film about climate change in 1991 (then neglected to heed its own warning)*, DE CORRESPONDENT (Feb. 27, 2017), https://thecorrespondent.com/6285/shell-made-a-film-about-climate-change-in-1991-then-neglected-to-heed-its-own-warning/692663565-875331f6.

[92] Royal Dutch/Shell Group, *Group Scenarios 1998–2020*, 115 (1998), http://www.documentcloud.org/documents/4430277-27-1-Compiled.html.

reasonably should have to mitigate or avoid those dire adverse impacts. Defendants instead adopted the position, as described below, that the absence of meaningful regulations on the consumption of their fossil fuel products was the equivalent of a social license to continue the unfettered pursuit of profits from those products. This position was an abdication of Defendants' responsibility to consumers and the public, including Plaintiff, to act on their unique knowledge of the reasonably foreseeable hazards of unabated production and consumption of their fossil fuel products.

E. Defendants Did Not Disclose Known Harms Associated with the Extraction, Promotion, and Consumption of Their Fossil Fuel Products and Instead Affirmatively Acted to Obscure Those Harms and Engaged in a Concerted Campaign to Evade Regulation.

112. By 1988, Defendants had amassed a compelling body of knowledge about the role of anthropogenic greenhouse gases, and specifically those emitted from the normal use of Defendants' fossil fuel products, in causing global warming, increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and the attendant consequences for human communities and the environment. On notice that their products were causing global climate change and dire effects on the planet, Defendants were faced with the decision of whether to take steps to limit the damages their fossil fuel products were causing and would continue to cause for virtually every one of Earth's inhabitants, including Plaintiff.

113. Defendants at any time before or thereafter could and should reasonably have taken any of a number of steps to mitigate the damages caused by their fossil fuel products, and their own comments reveal an awareness of what some of these steps may have been. Defendants should have made reasonable warnings to consumers, the public, and regulators of the dangers known to them of the unabated consumption of their fossil fuel products, and they should have taken reasonable steps to limit the potential greenhouse gas emissions arising out of those products.

114. But several key events during the period 1988–1992 appear to have prompted Defendants to change their tactics from general research and internal discussion on climate change to a public campaign aimed at evading regulation of their fossil fuel products and/or emissions therefrom. These include:

a. In 1988, National Aeronautics and Space Administration ("NASA") scientists confirmed that human activities were actually contributing to global warming.[93] On June 23 of that year, NASA scientist James Hansen's presentation of this information to Congress engendered significant news coverage and publicity for the announcement, including coverage on the front page of the New York Times.

b. On July 28, 1988, Senator Robert Stafford and four bipartisan co-sponsors introduced S. 2666, "The Global Environmental Protection Act," to regulate CO_2 and other greenhouse gases. Four more bipartisan bills to significantly reduce CO_2 pollution were introduced over the following ten weeks, and in August, U.S. Presidential candidate George H.W. Bush pledged that his presidency would "combat the greenhouse effect with the White House effect."[94] Political will in the United States to reduce anthropogenic greenhouse gas emissions and mitigate the harms associated with Defendants' fossil fuel products was gaining momentum.

c. In December 1988, the United Nations formed the Intergovernmental Panel on Climate Change ("IPCC"), a scientific panel dedicated to providing the world's governments with an objective, scientific analysis of climate change and its environmental, political, and economic impacts.

d. In 1990, the IPCC published its First Assessment Report on anthropogenic climate change,[95] in which it concluded that (1) "there is a natural greenhouse effect which already keeps the Earth warmer than it would otherwise be," and (2) that

> emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases carbon dioxide, methane, chlorofluorocarbons (CFCs)

[93] *See* Frumhoff et al., *The Climate Responsibilities of Industrial Carbon Producers*, *supra* note 211.

[94] N.Y. TIMES, *The White House and the Greenhouse* (May 9, 1998), http://www.nytimes.com/1989/05/09/opinion/the-white-house-and-the-greenhouse.html.

[95] *See* IPCC, *Reports*, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.

> and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface. The main greenhouse gas, water vapour, will increase in response to global warming and further enhance it.[96]

The IPCC reconfirmed these conclusions in a 1992 supplement to the First Assessment Report.[97]

e. The United Nations began preparation for the 1992 Earth Summit in Rio de Janeiro, Brazil, a major, newsworthy gathering of 172 world governments, of which 116 sent their heads of state. The Summit resulted in the United Nations Framework Convention on Climate Change ("UNFCCC"), an international environmental treaty providing protocols for future negotiations aimed at "stabiliz[ing] greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[98]

115. These world events marked a shift in public discussion of climate change, and the initiation of international efforts to curb anthropogenic greenhouse emissions—developments that had stark implications for, and would have diminished the profitability of, Defendants' fossil fuel products.

116. But rather than collaborating with the international community by acting to forestall, or at least decrease, their fossil fuel products' contributions to global warming, increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and marine toxin outbreaks, and consequent injuries to Plaintiff, Defendants embarked on a decades-long campaign designed to maximize continued dependence on their products and undermine national and international efforts to rein in greenhouse gas emissions.

[96] IPCC, *Climate Change: The IPCC Scientific Assessment*, "Policymakers Summary" (1990), http://www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_spm.pdf.

[97] IPCC, *1992 Supplement to the First Assessment Report* (1992), http://www.ipcc.ch/publications_and_data/publications_ipcc_90_92_assessments_far.shtml.

[98] United Nations, *United Nations Framework Convention on Climate Change*, Article 2 (1992), https://unfccc.int/resource/docs/convkp/conveng.pdf.

117. Defendants' campaign, which focused on concealing, discrediting, and/or misrepresenting information that tended to support restricting consumption of (and thereby decreasing demand for) Defendants' fossil fuel products, took several forms. The campaign enabled Defendants to accelerate their business practice of exploiting fossil fuel reserves, and concurrently externalize the social and environmental costs of their fossil fuel products. These activities stood in direct contradiction to Defendants' own prior recognition that the science of anthropogenic climate change was clear and that the greatest uncertainties involved responsive human behavior, not scientific understanding of the issue.

118. Defendants took affirmative steps to conceal, from Plaintiff and the general public, the foreseeable impacts of the use of their fossil fuel products on Earth's climate and associated harms to people and communities. Defendants embarked on a concerted public relations campaign to cast doubt on the science connecting global climate change to fossil fuel products and greenhouse gas emissions, in order to influence public perception of the existence of anthropogenic global warming. The effort included promoting their hazardous products through advertising campaigns and the initiation and funding of climate change denialist organizations, designed to influence consumers to continue using Defendants' fossil fuel products irrespective of those products' damage to communities and the environment.

119. For example, in 1988, Joseph Carlson, an Exxon public affairs manager, described the "Exxon Position," which included among others, two important messaging tenets: (1) "[e]mphasize the uncertainty in scientific conclusions regarding the potential enhanced Greenhouse Effect;" and (2) "[r]esist the overstatement and sensationalization [sic] of potential greenhouse effect which could lead to noneconomic development of non-fossil fuel resources."[99]

120. A 1994 Shell report entitled "The Enhanced Greenhouse Effect: A Review of the Scientific Aspects" by Royal Dutch Shell environmental advisor Peter Langcake stands in stark contrast to the company's 1988 report on the same topic. Whereas before, the authors recommended consideration of policy solutions early on, Langcake warned of the potentially

[99]Joseph M. Carlson, *Exxon Memo on "The Greenhouse Effect"* (Aug. 3, 1988), https://assets.documentcloud.org/documents/3024180/1998-Exxon-Memo-on-the-Greenhouse-Effect.pdf.

dramatic "economic effects of ill-advised policy measures." While the report recognized the IPCC conclusions as the mainstream view, Langcake still emphasized scientific uncertainty, noting, for example, that "the postulated link between any observed temperature rise and human activities has to be seen in relation to natural variability, which is still largely unpredictable." The Group position is stated clearly in the report: "Scientific uncertainty and the evolution of energy systems indicate that policies to curb greenhouse gas emissions beyond 'no regrets' measures could be premature, divert resources from more pressing needs and further distort markets."[100]

121. In 1991, for example, the Information Council for the Environment ("ICE"), whose members included affiliates, predecessors and/or subsidiaries of Defendants, including Pittsburg and Midway Coal Mining (Chevron), and Island Creek Coal Company (Occidental), launched a national climate change science denial campaign with full-page newspaper ads, radio commercials, a public relations tour schedule, "mailers," and research tools to measure campaign success. Included among the campaign strategies was to "reposition global warming as theory (not fact)." Its target audience included older less-educated males who are "predisposed to favor the ICE agenda, and likely to be even more supportive of that agenda following exposure to new information."[101]

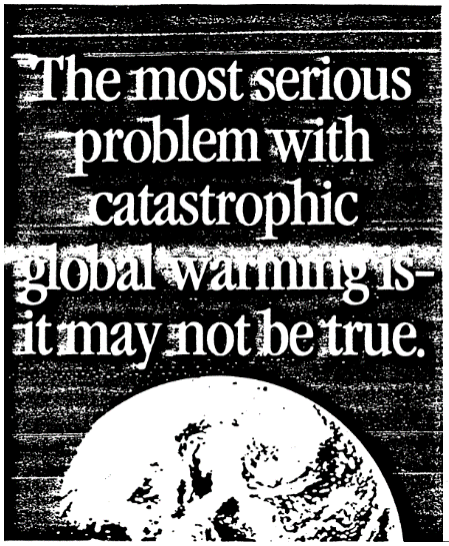
122. An implicit goal of ICE's advertising campaign was to change public opinion and avoid regulation. A memo from Richard Lawson, president of the National Coal Association asked members to contribute to the ICE campaign with the justification that "policymakers are prepared to act [on global warming]. Public opinion polls reveal that 60% of the American people already believe global warming is a serious environmental problem. Our industry cannot sit on the sidelines in this debate."[102]

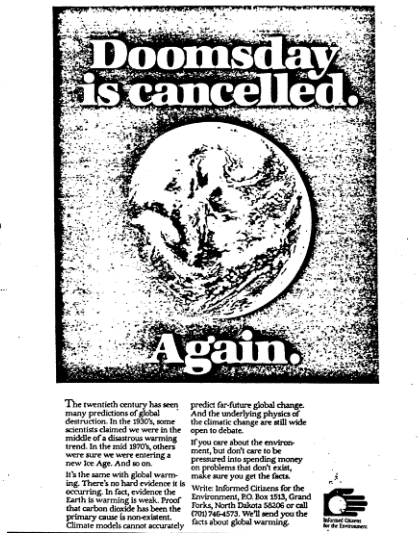
[100] P. Langcake, *The Enhanced Greenhouse Effect: A review of the Scientific Aspects*, (Dec. 1994), https://www.documentcloud.org/documents/4411099-Document11.html#document/p15/a411511.

[101] Union of Concerned Scientists, *Deception Dossier #5: Coal's "Information Council on the Environment" Sham*, (1991), http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-5_ICE.pdf.

[102] Naomi Oreskes, *My Facts Are Better Than Your Facts: Spreading Good News about Global Warming* (2010), in Peter Howlett et al., *How Well Do Facts Travel?: The Dissemination of Reliable Knowledge*, 136–66. Cambridge University Press. doi:10.1017/CBO9780511762154.008.8

123. The following images are examples of ICE-funded print advertisements challenging the validity of climate science and intended to obscure the scientific consensus on anthropogenic climate change and induce political inertia to address it.[103]





124. In 1996, Exxon released a publication called "Global Warming: Who's Right? Facts about a debate that's turned up more questions than answers." In the publication's preface, Exxon CEO Lee Raymond stated that "taking drastic action immediately is unnecessary since many scientists agree there's ample time to better understand the climate system." The subsequent article described the greenhouse effect as "unquestionably real and definitely a good thing," while ignoring the severe consequences that would result from the influence of the increased CO_2 concentration on Earth's climate. Instead, it characterized the greenhouse effect as simply "what makes the earth's atmosphere livable." Directly contradicting their own internal reports and peer-reviewed science, the article ascribed the rise in temperature since the late 19th century to "natural fluctuations that occur over long periods of time" rather than to the anthropogenic emissions that Exxon and other scientists had confirmed were responsible. The article also falsely challenged the computer models that projected the future impacts of unabated fossil fuel product consumption, including those developed by Exxon's own employees, as having been "proved to be inaccurate." The article contradicted the numerous reports circulated among Exxon's staff, and by the API, by

[103] Union of Concerned Scientists, *Deception Dossier #5*, *supra* note 98.

stating that "the indications are that a warmer world would be far more benign than many imagine . . . moderate warming would reduce mortality rates in the US, so a slightly warmer climate would be more healthful." Raymond concluded his preface by attacking advocates for limiting the use of his company's fossil fuel products as "drawing on bad science, faulty logic, or unrealistic assumptions"—despite the important role that Exxon's own scientists had played in compiling those same scientific underpinnings.[104]

125. API published an extensive report in the same year warning against concern over CO_2 buildup and any need to curb consumption or regulate the industry. The introduction states that "there is no persuasive basis for forcing Americans to dramatically change their lifestyles to use less oil." The authors discourage the further development of certain alternative energy sources, writing that "government agencies have advocated the increased use of ethanol and the electric car, without the facts to support the assertion that either is superior to existing fuels and technologies" and that "policies that mandate replacing oil with specific alternative fuel technologies freeze progress at the current level of technology, and reduce the chance that innovation will develop better solutions." The paper also denies the human connection to climate change, saying that no "scientific evidence exists that human activities are significantly affecting sea levels, rainfall, surface temperatures or the intensity and frequency of storms." The message the report repeatedly sends is clear: "Facts don't support the arguments for restraining oil use."[105]

126. In a speech presented at the World Petroleum Congress in Beijing in 1997 at which many of the Defendants were present, Exxon CEO Lee Raymond reiterated these views. This time, he presented a false dichotomy between stable energy markets and abatement of the marketing, promotion, and sale of fossil fuel products known to Defendants to be hazardous. He stated:

> Some people who argue that we should drastically curtail our use of fossil fuels for environmental reasons…my belief [is] that such proposals are neither prudent nor practical. With no readily available economic alternatives on the horizon, fossil fuels will continue to supply most of the world's and this region's energy for the foreseeable future.

[104] Exxon Corp., *Global warming: who's right?* (1996), https://www.documentcloud.org/documents/2805542-Exxon-Global-Warming-Whos-Right.html.

> Governments also need to provide a stable investment climate…They should avoid the temptation to intervene in energy markets in ways that give advantage to one competitor over another or one fuel over another.
>
> We also have to keep in mind that most of the greenhouse effects comes from natural sources.…Leaping to radically cut this tiny sliver of the greenhouse pie on the premise that it will affect climate defies common sense and lacks foundation in our current understanding of the climate system.
>
> Let's agree there's a lot we really don't know about how climate will change in the 21st century and beyond.…It is highly unlikely that the temperature in the middle of the next century will be significantly affected whether policies are enacted now or 20 years from now. It's bad public policy to impose very costly regulations and restrictions when their need has yet to be proven.[106]

127. Imperial Oil (Exxon) CEO Robert Peterson falsely denied the established connection between Defendants' fossil fuel products and anthropogenic climate change in the Summer 1998 Imperial Oil Review, "A Cleaner Canada":

> [T]his issue [referring to climate change] has absolutely nothing to do with pollution and air quality. Carbon dioxide is not a pollutant but an essential ingredient of life on this planet…. [T]he question of whether or not the trapping of 'greenhouse' gases will result in the planet's getting warmer…has no connection whatsoever with our day-to-day weather.
>
> There is absolutely no agreement among climatologists on whether or not the planet is getting warmer, or, if it is, on whether the warming is the result of man-made factors or natural variations in the climate….I feel very safe in saying that the view that burning fossil fuels will result in global climate change remains an unproved hypothesis.[107]

128. Mobil (Exxon) paid for a series of "advertorials," advertisements located in the editorial section of the New York Times and meant to look like editorials rather than paid ads. These ads discussed various aspects of the public discussion of climate change and sought to undermine the justifications for tackling greenhouse gas emissions, referring to it as unsettled

[106] Lee R. Raymond, *Energy – Key to growth and a better environment for Asia-Pacific nations*, World Petroleum Congress (Oct. 13, 1997), https://assets.documentcloud.org/documents/2840902/1997-Lee-Raymond-Speech-at-China-World-Petroleum.pdf.

[107] Robert Peterson, *A Cleaner Canada in Imperial Oil Review* (1998), http://www.documentcloud.org/documents/2827818-1998-Imperial-Oil-Robert-Peterson-A-Cleaner-Canada.html.

science. The 1997 advertorial below[108] argued that economic analysis of emissions restrictions was faulty and inconclusive and therefore a justification for delaying action on climate change.

When facts don't square with the theory, throw out the facts

That seems to characterize the administration's attitude on two of its own studies which show that international efforts to curb global warming could spark a big run-up in energy prices.

For months, the administration—playing its cards close to the vest—has promised to provide details of the emission reduction plan it will put on the table at the climate change meeting in Kyoto, Japan, later this year. It also promised to evaluate the economics of that policy and measure its impact. Those results are important because the proposals submitted by other countries thus far would be disruptive and costly to the U.S. economy.

Yet, when the results from its own economic models were finally generated, the administration started distancing itself from the findings and models that produced them. The administration's top economic advisor said that economic models can't provide a "definitive answer" on the impact of controlling emissions. The effort, she said, was "futile." At best, the models can only provide a "range of potential impacts."

Frankly, we're puzzled. The White House has promised to lay the economic facts before the public. Yet, the administration's top advisor said such an analysis won't be based on models and it will "preclude . . . detailed numbers." If you don't provide numbers and don't rely on models, what kind of rigorous economic examination can Congress and the public expect?

We're also puzzled by ambivalence over models. The administration downplays the utility of economic models to forecast cost impacts 10–15 years from now, yet its negotiators accept as gospel the 50–100-year predictions of global warming that have been generated by climate models—many of which have been criticized as seriously flawed.

The second study, conducted by Argonne National Laboratory under a contract with the Energy Department, examined what would happen if the U.S. had to commit to higher energy prices under the emission reduction plans that several nations had advanced last year. Such increases, the report concluded, would result in "significant reductions in output and employment" in six industries—aluminum, cement, chemical, paper and pulp, petroleum refining and steel.

Hit hardest, the study noted, would be the chemical industry, with estimates that up to 30 percent of U.S. chemical manufacturing capacity would move offshore to developing countries. Job losses could amount to some 200,000 in that industry, with another 100,000 in the steel sector. And despite the substantial loss of U.S. jobs and manufacturing capacity, the net emission reduction could be insignificant since developing countries will not be bound by the emission targets of a global warming treaty.

Downplaying Argonne's findings, the Energy Department noted that the study used outdated energy prices (mid-1996), didn't reflect the gains that would come from international emissions trading and failed to factor in the benefits of accelerated developments in energy efficiency and low-carbon technologies.

What it failed to mention is just what these new technologies are and when we can expect their benefits to kick in. As for emissions trading, many economists have theorized about the role they could play in reducing emissions, but few have grappled with the practicality of implementing and policing such a scheme.

We applaud the goals the U.S. wants to achieve in these upcoming negotiations—namely, that a final agreement must be "flexible, cost-effective, realistic, achievable and ultimately global in scope." But until we see the details of the administration's policy, we are concerned that plans are being developed in the absence of rigorous economic analysis. Too much is at stake to simply ignore facts that don't square with preconceived theories.

Mobil The energy to make a difference.

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[108] Mobil, *When Facts Don't Square with the Theory, Throw Out the Facts*, N.Y. TIMES, A31 (Aug. 14, 1997), https://www.documentcloud.org/documents/705550-mob-nyt-1997-aug-14-whenfactsdontsquare.html.

129. In 1998, API, on behalf of Defendants, among other fossil fuel companies and organizations supported by fossil fuel corporate grants, developed a Global Climate Science Communications Plan that stated that unless "climate change becomes a non-issue . . . there may be no moment when we can declare victory for our efforts." Rather, API proclaimed that "[v]ictory will be achieved when . . . average citizens 'understand' (recognize) uncertainties in climate science; [and when] recognition of uncertainties becomes part of the 'conventional wisdom.'"[109] The multi-million-dollar, multi-year proposed budget included public outreach and the dissemination of educational materials to schools to "begin to erect a barrier against further efforts to impose Kyoto-like measures in the future."[110]

130. Soon after, API distributed a memo to its members identifying public agreement on fossil fuel products' role in climate change as its highest priority issue.[111] The memorandum illuminates API's and Defendants' concern over the potential regulation of Defendants' fossil fuel products: "Climate is at the center of the industry's business interests. Policies limiting carbon emissions reduce petroleum product use. That is why it is API's highest priority issue and defined as 'strategic.'"[112] Further, the API memo stresses many of the strategies that Defendants individually and collectively utilized to combat the perception of their fossil fuel products as hazardous. These included:

a. Influencing the tenor of the climate change "debate" as a means to establish that efforts to reduce greenhouse gas emissions were not necessary to responsibly address climate change;

b. Maintaining strong working relationships between government regulators and communications-oriented organizations like the Global Climate Coalition, the Heartland Institute, and other groups carrying Defendants'

[109] Joe Walker, *E-mail to Global Climate Science Team, attaching the Draft Global Science Communications Plan* (Apr. 3, 1998), https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-plan.pdf.

[110] *Id.*

[111] Committee on Oversight and Government Reform, *Allegations of Political Interference with Government Climate Change Science*, page 51 (Mar. 19, 2007), https://ia601904.us.archive.org/25/items/gov.gpo.fdsys.CHRG-110hhrg37415/CHRG-110hhrg37415.pdf.

[112] *Id.*

message minimizing the hazards of the unabated use of their fossil fuel products and opposing regulation thereof;

c. Building the case for (and falsely dichotomizing) Defendants' positive contributions to a "long-term approach" (ostensibly for regulation of their products) as a reason for society to reject short term fossil fuel regulations, and engaging in climate change science uncertainty research; and

d. Presenting Defendants' positions on climate change in domestic and international forums, including by preparing rebuttals to IPCC reports.

131. Additionally, Defendants mounted a campaign against regulation of their business practices in order to continue placing their fossil fuel products into the stream of commerce, despite their own knowledge and the growing national and international scientific consensus about the hazards of doing so. These efforts came despite Defendants' recognition that "risks to nearly every facet of life on Earth . . . could be avoided only if timely steps were taken to address climate change."[113]

132. The Global Climate Coalition (GCC), on behalf of Defendants and other fossil fuel companies, funded advertising campaigns and distributed material to generate public uncertainty around the climate debate, with the specific purpose of preventing U.S. adoption of the Kyoto Protocol, despite the leading role that the U.S. had played in the Protocol negotiations.[114] Despite an internal primer stating that various "contrarian theories" [i.e., climate change skepticism] do not "offer convincing arguments against the conventional model of greenhouse gas emission-induced climate change," GCC excluded this section from the public version of the backgrounder and instead funded efforts to promote some of those same contrarian theories over subsequent years.[115]

133. A key strategy in Defendants' efforts to discredit scientific consensus on climate change and the IPCC was to bankroll scientists who, although accredited, held fringe opinions that

[113] Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, *supra* note 60.

[114] *Id.*

[115] Gregory J. Dana, *Memo to AIAM Technical Committee Re: Global Climate Coalition (GCC) – Primer on Climate Change Science – Final Draft*, Association of International Automobile Manufacturers (Jan. 18, 1996), http://www.webcitation.org/6FyqHawb9.

were even more questionable given the sources of their research funding. These scientists obtained part or all of their research budget from Defendants directly or through Defendant-funded organizations like API,[116] but they frequently failed to disclose their fossil fuel industry underwriters.[117]

134. Creating a false sense of disagreement in the scientific community (despite the consensus that its own scientists, experts, and managers had previously acknowledged) has had an evident impact on public opinion. A 2007 Yale University-Gallup poll found that while 71% of Americans personally believed global warming was happening, only 48% believed that there was a consensus among the scientific community, and 40% believed there was a lot of disagreement among scientists over whether global warming was occurring.[118]

135. 2007 was the same year the IPCC published its Fourth Assessment Report, in which it concluded that "there is *very high confidence* that the net effect of human activities since 1750 has been one of warming."[119] The IPCC defined "very high confidence" as at least a 9 out of 10 chance.[120]

136. Defendants borrowed pages out of the playbook of prior denialist campaigns. A "Global Climate Science Team" ("GCST") was created that mirrored a front group created by the tobacco industry, known as The Advancement of Sound Science Coalition, whose purpose was to sow uncertainty about the fact that cigarette smoke is carcinogenic. The GCST's membership included Steve Milloy (a key player on the tobacco industry's front group) for Exxon; an API public relations representative; and representatives from Chevron and Southern Company that drafted API's 1998 Communications Plan. There were no scientists on the "Global Climate

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[116] Willie Soon & Sallie Baliunas, *Proxy Climatic and Environmental Changes of the Past 1000 Years*, 23 CLIMATE RESEARCH 88, 105 (Jan. 31, 2003), http://www.int-res.com/articles/cr2003/23/c023p089.pdf.

[117] Newsdesk, *Smithsonian Statement: Dr. Wei-Hock (Willie) Soon*, SMITHSONIAN (Feb. 26, 2015), http://newsdesk.si.edu/releases/smithsonian-statement-dr-wei-hock-willie-soon.

[118] *American Opinions on Global Warming: A Yale/Gallup/Clearvision Poll*, Yale Program on Climate Change Communication (July 31, 2007), http://climatecommunication.yale.edu/publications/american-opinions-on-global-warming.

[119] IPCC, 2007: Summary for Policymakers, page 3 (emphasis in original), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007), https://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf.

[120] *Id.*

Science Team." GCST developed a strategy to spend millions of dollars manufacturing climate change uncertainty. Between 2000 and 2004, Exxon donated $110,000 to Milloy's efforts and another organization, the Free Enterprise Education Institute and $50,000 to the Free Enterprise Action Institute, both registered to Milloy's home address.[121]

137. Defendants by and through their trade association memberships, worked directly, and often in a deliberately obscured manner, to evade regulation of the emissions resulting from use of their fossil fuel products.

138. Defendants have funded dozens of think tanks, front groups, and dark money foundations pushing climate change denial. These include the Competitive Enterprise Institute, the Heartland Institute, Frontiers for Freedom, Committee for a Constructive Tomorrow, and Heritage Foundation. From 1998 to 2014 Exxon spent almost $31 million funding numerous organizations misrepresenting the scientific consensus that Defendants' fossil fuel products were causing climate change. Several Defendants have been linked to other groups that undermine the scientific basis linking Defendants' fossil fuel products to climate change, including the Frontiers of Freedom Institute and the George C. Marshall Institute.

139. Exxon acknowledged its own previous success in sowing uncertainty and slowing mitigation through funding of climate denial groups. In its 2007 Corporate Citizenship Report, Exxon declared: "In 2008, we will discontinue contributions to several public policy research groups whose position on climate change could divert attention from the important discussion on how the world will secure the energy required for economic growth in an environmentally responsible manner."[122] Despite this pronouncement, Exxon remained financially associated with several such groups after the report's publication.

140. Today, Defendants, including Exxon, Chevron, BP, Shell, and ConocoPhillips publicly purport to accept the consensus embodied in the most recent IPCC reports, that global warming is occurring, and that human activity has been the dominant cause of global warming and

[121] Seth Shulman et al. *Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco's Tactics to Manufacture Uncertainty on Climate Science*, Union of Concerned Scientists, 19 (Jan. 2007), http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/exxon_report.pdf.

[122] ExxonMobil, *2007 Corporate Citizenship Report* (Dec. 31, 2007), http://www.documentcloud.org/documents/2799777-ExxonMobil-2007-Corporate-Citizenship-Report.html.

related climactic changes since the beginning of the Great Acceleration. At the same time, however, Defendants continue to play up the uncertainty of future climate modeling, and the purported historic uncertainty, imprecision, and inconsistency of climate science to disguise and distract from their own knowledge and intensive research dating back to at least 1960s. While Defendants claim to accept the scientific consensus on climate change, moreover, they still continue to promote and expand their exploration, production, promotion, marketing, and sale of fossil fuels that are the dominant cause of anthropogenic global warming.

141. Defendants could have contributed to the global effort to mitigate the impacts of greenhouse gas emissions by, for example, delineating practical policy goals and regulatory structures that would have allowed them to continue their business ventures while reducing greenhouse gas emissions and supporting a transition to a lower carbon future. Instead, Defendants undertook a momentous effort to evade international and national regulation of greenhouse gas emissions to enable them to continue unabated fossil fuel production.

142. As a result of Defendants' tortious, false and misleading conduct, reasonable consumers of Defendants' fossil fuel products, members of the public, and policy-makers, have been deliberately and unnecessarily deceived about: the role of fossil fuel products in causing ocean warming and consequent harmful algal blooms and domoic outbreaks; the acceleration of global warming since the mid-20th century and the continuation thereof; and about the fact that the continued increase in fossil fuel product consumption creates severe environmental threats and significant economic costs for members of the ocean-dependent economy. Reasonable consumers and policy makers have also been deceived about the depth and breadth of the state of the scientific evidence on anthropogenic climate change, and in particular, on the strength of the scientific consensus demonstrating the role of fossil fuels in causing climate change and its potentially destructive impacts.

F. In Contrast to Their Public Statements, Defendants' Internal Actions Demonstrate Their Awareness of and Intent to Profit from the Unabated Use of Fossil Fuel Products.

143. In contrast to their public-facing efforts challenging the validity of the scientific consensus about anthropogenic climate change, Defendants' acts and omissions evidence their

internal acknowledgement of the reality of climate change and its likely consequences. These actions include, but are not limited to, making multi-billion-dollar infrastructure investments for their own operations that acknowledge the reality of coming anthropogenic climate-related change. These investments included (among others), raising offshore oil platforms to protect against sea level rise; reinforcing offshore oil platforms to withstand increased wave strength and storm severity; and developing and patenting designs for equipment intended to extract crude oil and/or natural gas in areas previously unreachable because of the presence of polar ice sheets.[123]

144. For example, in 1973 Exxon obtained a patent for a cargo ship capable of breaking through sea ice[124] and for an oil tanker[125] designed specifically for use in previously unreachable areas of the Arctic.

145. In 1974, Chevron obtained a patent for a mobile arctic drilling platform designed to withstand significant interference from lateral ice masses,[126] allowing for drilling in areas with increased ice floe movement due to elevated temperature.

146. That same year, Texaco (Chevron) worked toward obtaining a patent for a method and apparatus for reducing ice forces on a marine structure prone to being frozen in ice through natural weather conditions,[127] allowing for drilling in previously unreachable Arctic areas that would become seasonally accessible.

147. Shell obtained a patent similar to Texaco's (Chevron) in 1984.[128]

148. In 1989, Norske Shell, Royal Dutch Shell's Norwegian subsidiary, altered designs for a natural gas platform planned for construction in the North Sea to account for anticipated sea

[123] Amy Lieberman & Suzanne Rust, *Big Oil braced for global warming while it fought regulations*, L.A. TIMES (Dec. 31, 2015), http://graphics.latimes.com/oil-operations.

[124] Patents, *Icebreaking cargo vessel*, Exxon Research Engineering Co. (Apr. 17, 1973), https://www.google.com/patents/US3727571.

[125] Patents, *Tanker vessel*, Exxon Research Engineering Co. (July 17, 1973), https://www.google.com/patents/US3745960.

[126] Patents, *Arctic offshore platform*, Chevron Research & Technology Co. (Aug. 27, 1974) https://www.google.com/patents/US3831385.

[127] Patents, *Mobile, arctic drilling and production platform*, Texaco Inc. (Feb. 26, 1974) https://www.google.com/patents/US3793840.

[128] Patents, *Arctic offshore platform*, Shell Oil Co. (Jan. 24, 1984) https://www.google.com/patents/US4427320.

level rise. Those design changes were ultimately carried out by Shell's contractors, adding substantial costs to the project.[129]

a. The Troll field, off the Norwegian coast in the North Sea, was proven to contain large natural oil and gas deposits in 1979, shortly after Norske Shell was approved by Norwegian oil and gas regulators to operate a portion of the field.

b. In 1986, the Norwegian parliament granted Norske Shell authority to complete the first development phase of the Troll field gas deposits, and Norske Shell began designing the "Troll A" gas platform, with the intent to begin operation of the platform in approximately 1995. Based on the very large size of the gas deposits in the Troll field, the Troll A platform was projected to operate for approximately 70 years.

c. The platform was originally designed to stand approximately 100 feet above sea level—the amount necessary to stay above waves in a once-in-a-century strength storm.

d. In 1989, Shell engineers revised their plans to increase the above-water height of the platform by 3–6 feet, specifically to account for higher anticipated average sea levels and increased storm intensity due to global warming over the platform's 70-year operational life.[130]

e. Shell projected that the additional 3–6 feet of above-water construction would increase the cost of the Troll A platform by as much as $40 million.

G. Defendants' Actions Prevented the Development of Alternatives That Would Have Eased the Transition to a Less Fossil Fuel Dependent Economy.

149. The harms and benefits of Defendants' conduct can be balanced in part by weighing the social benefit of extracting and burning a unit of fossil fuels against the costs that a unit of fuel imposes on society, known as the "social cost of carbon" or "SCC."

[129] *Greenhouse Effect: Shell Anticipates A Sea Change*, N.Y. TIMES (Dec. 20, 1989) http://www.nytimes.com/1989/12/20/business/greenhouse-effect-shell-anticipates-a-sea-change.html.

[130] *Id.*; Lieberman & Rust, *Big Oil braced for global warming while it fought regulations*, *supra* note 123.

150. Because climatic responses to atmospheric temperature increases are non-linear, and because greenhouse gas pollution accumulates in the atmosphere, some of which does not dissipate for potentially thousands of years (namely CO_2), there is broad agreement that SCC increases as emissions rise, and as the climate warms. Relatedly, as atmospheric CO_2 levels and surface temperature increase, the costs associated with remediating environmental injuries—such as the domoic acid outbreaks described herein—also increases. In short, each additional ton of CO_2 emitted into the atmosphere will have a greater net social cost as emissions increase, and each additional ton of CO_2 will have a greater net social cost as global warming accelerates.

151. A critical corollary of the non-linear relationship between atmospheric CO_2 concentrations and SCC is that delayed efforts to curb those emissions have increased environmental harms and increase the magnitude and cost to remediate harms that have already occurred or are locked in by previous emissions. Therefore, Defendants' campaign to obscure the science of climate change and to expand the extraction and use of fossil fuels greatly increased and continues to increase the harms and rate of harms suffered by Plaintiff.

152. The consequences of delayed action on climate change, exacerbated by Defendants' actions, has already drastically increased the cost of mitigating further harm. Had concerted action begun even as late as 2005, an annual 3.5% reduction in CO_2 emissions to lower atmospheric CO_2 to 350 ppm by the year 2100 would have restored Earth's energy balance[131] and halted future global warming, although such efforts would not forestall committed sea level rise already locked in.[132] If efforts do not begin until 2020, however, a 15% annual reduction will be required to restore Earth's energy balance by the end of the century.[133] Earlier steps to reduce emissions would have led to smaller—and less disruptive—measures needed to mitigate the impacts of fossil fuel production.

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[131] "Climate equilibrium" is the balance between Earth's absorption of solar energy and its own energy radiation. Earth is currently out of equilibrium due to the influence of anthropogenic greenhouse gases, which prevent radiation of energy into space. Earth therefore warms and move back toward energy balance. Reduction of global CO_2 concentrations to 350 ppm is necessary to re-achieve energy balance, if the aim is to stabilize climate without further global warming. *See* James Hansen et al., *Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, 8 PLOS ONE 1, 4–5 (Dec. 3, 2013).

[132] Hansen et al., *Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, *supra* note 1310, at 10.

[133] *Id.*

153. The costs of inaction and the opportunities to confront anthropogenic climate change caused by normal consumption of their fossil fuel products, were not lost on Defendants. In a 1997 speech by John Browne, Group Executive for BP America, at Stanford University, Browne described Defendants' and the entire fossil fuel industry's responsibility and opportunities to reduce use of fossil fuel products, reduce global CO_2 emissions, and mitigate the harms associated with the use and consumption of such products:

> A new age demands a fresh perspective of the nature of society and responsibility. We need to go beyond analysis and to take action. It is a moment for change and for a rethinking of corporate responsibility. . . .
>
> [T]here is now an effective consensus among the world's leading scientists and serious and well informed people outside the scientific community that there is a discernible human influence on the climate, and a link between the concentration of carbon dioxide and the increase in temperature.
>
> The prediction of the IPCC is that over the next century temperatures might rise by a further 1 to 3.5 degrees centigrade [1.8º – 6.3º F], and that sea levels might rise by between 15 and 95 centimetres [5.9 and 37.4 inches]. Some of that impact is probably unavoidable, because it results from current emissions. . . .
>
> [I]t would be unwise and potentially dangerous to ignore the mounting concern.
>
> The time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven … but when the possibility cannot be discounted and is taken seriously by the society of which we are part. . . .
>
> We [the fossil fuel industry] have a responsibility to act, and I hope that through our actions we can contribute to the much wider process which is desirable and necessary.
>
> BP accepts that responsibility and we're therefore taking some specific steps.
>
> To control our own emissions.
>
> To fund continuing scientific research.
>
> To take initiatives for joint implementation.
>
> To develop alternative fuels for the long term.
>
> And to contribute to the public policy debate in search of the wider global answers to the problem.[134]

154. Despite Defendants' knowledge of the foreseeable, measurable harms associated

[134] John Browne, *BP Climate Change Speech to Stanford*, Climate Files (May 19, 1997), http://www.climatefiles.com/bp/bp-climate-change-speech-to-stanford.

with the unabated consumption and use of their fossil fuel products, and despite the existence and Defendants' knowledge of technologies and practices that could have helped to reduce the foreseeable dangers associated with their fossil fuel products, Defendants continued to market and promote heavy fossil fuel use, dramatically increasing the cost of abatement. At all relevant times, Defendants were deeply familiar with opportunities to reduce the use of their fossil fuel products, reduce global CO_2 emissions associated therewith, and mitigate the harms associated with the use and consumption of such products. Examples of that recognition include, but are not limited to the following:

a. In 1963, Esso (Exxon) obtained multiple patents on technologies for fuel cells, including on the design of a fuel cell and necessary electrodes,[135] and on a process for increasing the oxidation of a fuel, specifically methanol, to produce electricity in a fuel cell.[136]

b. In 1970, Esso (Exxon) obtained a patent for a "low-polluting engine and drive system" that used an interburner and air compressor to reduce pollutant emissions, including CO_2 emissions, from gasoline combustion engines (the system also increased the efficiency of the fossil fuel products used in such engines, thereby lowering the amount of fossil fuel product necessary to operate engines equipped with this technology).[137]

155. Defendants could have made major inroads to mitigate Plaintiff's injuries through technology by developing and employing technologies to capture and sequester greenhouse gases emissions associated with conventional use of their fossil fuel products. Defendants had knowledge dating at least back to the 1960s, and indeed, internally researched and perfected many such technologies. For instance:

[135] Patents, *Fuel cell and fuel cell electrodes*, Exxon Research Engineering Co. (Dec. 31, 1963), https://www.google.com/patents/US3116169.

[136] Patents, *Direct production of electrical energy from liquid fuels*, Exxon Research Engineering Co. (Dec. 3, 1963), https://www.google.com/patents/US3113049.

[137] Patents, *Low-polluting engine and drive system*, Exxon Research Engineering Co. (May 16, 1970), https://www.google.com/patents/US3513929.

a. The first patent for enhanced oil recovery technology, a process by which CO_2 is captured and reinjected into oil deposits, was granted to an ARCO (BP) subsidiary in 1952.[138] This technology could have been further developed as a carbon capture and sequestration technique;

b. Phillips Petroleum Company (ConocoPhillips) obtained a patent in 1966 for a "Method for recovering a purified component from a gas" outlining a process to remove carbon from natural gas and gasoline streams;[139] and

c. In 1973, Shell patented a process to remove acidic gases, including CO_2, from gaseous mixtures.

156. Despite this knowledge, Defendants' later forays into the alternative energy sector were largely pretenses. For instance, in 2001, Chevron developed and shared a sophisticated information management system to gather greenhouse gas emissions data from its explorations and production to help regulate and set reduction goals.[140] Beyond this technological breakthrough, Chevron touted "profitable renewable energy" as part of its business plan for several years and launched a 2010 advertising campaign promoting the company's move towards renewable energy. Despite all this, Chevron rolled back its renewable and alternative energy projects in 2014.[141]

157. Similarly, ConocoPhillips' 2012 Sustainable Development report declared developing renewable energy a priority in keeping with their position on sustainable development and climate change.[142] Their 10-K filing from the same year told a different story: "As an independent E&P company, we are solely focused on our core business of exploring for,

[138] James P. Meyer, *Summary of Carbon Dioxide Enhanced Oil Recovery (CO_2EOR) Injection Well Technology*, American Petroleum Institute, at 1, http://www.api.org/~/media/Files/EHS/climate-change/Summary-carbon-dioxide-enhanced-oil-recovery-well-tech.pdf.

[139] Patents, *Method for recovering a purified component from a gas*, Phillips Petroleum Co. (Jan. 11, 1966), https://www.google.com/patents/US3228874.

[140] Chevron, *Chevron Introduces New System to Manage Energy Use* (press release) (Sept. 25, 2001), https://www.chevron.com/stories/chevron-introduces-new-system-to-manage-energy-use.

[141] Benjamin Elgin, *Chevron Dims the Lights on Green Power*, BLOOMBERG (May 29, 2014), https://www.bloomberg.com/news/articles/2014-05-29/chevron-dims-the-lights-on-renewable-energy-projects.

[142] ConocoPhillips, *Sustainable Development* (2013) http://www.conocophillips.com/sustainable-development/Documents/2013.11.7%201200%20Our%20Approach%20Section%20Final.pdf.

developing and producing crude oil and natural gas globally."[143]

158. Likewise, while Shell orchestrated an entire public relations campaign around energy transitions towards net zero emissions, a fine-print disclaimer in its 2016 net-zero pathways report reads: "We have no immediate plans to move to a net-zero emissions portfolio over our investment horizon of 10–20 years."[144]

159. BP, appearing to abide by the representations Lord Browne made in his speech described in paragraph 153 above, engaged in a rebranding campaign to convey an air of environmental stewardship and renewable energy to its consumers. This included renouncing its membership in the GCC in 2007, changing its name from "British Petroleum" to "BP" while adopting the slogan "Beyond Petroleum," and adopting a conspicuously green corporate logo. However, BP's self-touted "alternative energy" investments during this turnaround included investments in natural gas, a fossil fuel, and in 2007 the company reinvested in Canadian tar sands, a particularly high-carbon source of oil.[145] The company ultimately abandoned its wind and solar assets in 2011 and 2013, respectively, and even the "Beyond Petroleum" moniker in 2013.[146]

160. After posting a $10 billion quarterly profit, Exxon in 2005 stated that "We're an oil and gas company. In times past, when we tried to get into other businesses, we didn't do it well. We'd rather re-invest in what we know."[147]

161. Even if Defendants did not adopt technological or energy source alternatives that would have reduced use of fossil fuels, reduced global greenhouse gas pollution, and/or mitigated the harms associated with the use and consumption of such products, Defendants could have taken other practical, cost-effective steps to reduce the use of their fossil fuel products, reduce global greenhouse gas pollution associated therewith, and mitigate the harms associated with the use and

[143] ConocoPhillips Form 10-K, U.S. Securities and Exchange Commission Webpage (Dec. 31, 2012), https://www.sec.gov/Archives/edgar/data/1163165/000119312513065426/d452384d10k.htm.

[144] *Energy Transitions Towards Net Zero Emissions*, Shell (2016), https://drive.google.com/file/d/0B_L1nw8WLu0Bbi1QWnJRcHlZblE/view (accessed Nov. 6, 2018).

[145] Fred Pearce, *Greenwash: BP and the Myth of a World 'Beyond Petroleum'*, THE GUARDIAN (Nov. 20, 2008), https://www.theguardian.com/environment/2008/nov/20/fossilfuels-energy.

[146] Javier E. David, *'Beyond Petroleum' No More? BP Goes Back to Basics*, CNBC (Apr. 20, 2013), http://www.cnbc.com/id/100647034.

[147] James R. Healy, *Alternate Energy Not in Cards at ExxonMobil*, USA TODAY (Oct. 28, 2005), https://usatoday30.usatoday.com/money/industries/energy/2005-10-27-oil-invest-usat_x.htm.

consumption of such products. These alternatives could have included, among other measures:

a. Accepting scientific evidence on the validity of anthropogenic climate change and the damages it will cause people and communities, including Plaintiff, and the environment. Mere acceptance of that information would have altered the debate from *whether* to combat global warming to *how* to combat it; and avoided much of the public confusion that has ensued over nearly 30 years, since at least 1988;

b. Forthrightly communicating with Defendants' shareholders, banks, insurers, the public, regulators, and Plaintiff about the global warming and ocean temperature increase hazards of Defendants' fossil fuel products that were known to Defendants, would have enabled those groups to make material, informed decisions about whether and how to address climate change vis-à-vis Defendants' products;

c. Refraining from affirmative efforts, whether directly, through coalitions, or through front groups, to distort public debate, and to cause many consumers and business and political leaders to think the relevant science was far less certain that it actually was;

d. Sharing their internal scientific research with the public, and with other scientists and business leaders, so as to increase public understanding of the scientific underpinnings of climate change and its relation to Defendants' fossil fuel products;

e. Supporting and encouraging policies to avoid dangerous climate change, and demonstrating corporate leadership in addressing the challenges of transitioning to a low-carbon economy;

f. Prioritizing alternative sources of energy through sustained investment and research on renewable energy sources to replace dependence on Defendants' inherently hazardous fossil fuel products;

g. Adopting their shareholders' concerns about Defendants' need to protect their businesses from the inevitable consequences of profiting from their fossil fuel products. Over the period of 1990–2015, Defendants' shareholders proposed hundreds of resolutions to change Defendants' policies and business practices regarding climate change. These included increasing renewable energy investment, cutting emissions, and performing carbon risk assessments, among others.

162. Despite their knowledge of the foreseeable harms associated with the consumption of Defendants' fossil fuel products, and despite the existence and fossil fuel industry knowledge of opportunities that would have reduced the foreseeable dangers associated with those products, Defendants wrongfully and falsely promoted, campaigned against regulation of, and concealed the hazards of use of their fossil fuel products.

H. Defendants Caused Plaintiff's Injuries

163. Defendants individually and collectively extracted a substantial percentage of all raw fossil fuels extracted globally since 1965.

164. CO_2 emissions that are attributable to fossil fuels that Defendants extracted from the earth and injected into the market are responsible for a substantial percentage of greenhouse gas pollution since 1965.

165. Defendants' individual and collective conduct—including, but not limited to, their extraction, refining, and/or formulation of fossil fuel products; their introduction of fossil fuel products into the stream of commerce; their wrongful promotion of their fossil fuel products and concealment of known hazards associated with use of those products; and their failure to pursue less hazardous alternatives available to them—is a substantial factor in causing the increase in global mean sea surface temperature, marine heatwaves, harmful algal blooms, marine toxin outbreaks, and related injuries, among other consequences.

166. Defendants have actually and proximately caused the increase in mean sea surface temperature, marine heatwaves, harmful algal blooms, and domoic acid outbreaks; and the

consequent social and economic injuries associated with those physical and environmental impacts, which are the causes of Plaintiff's injuries and damages as described herein.

167. Plaintiff has already incurred, and will foreseeably continue to incur, injuries and damages because of domoic acid outbreaks caused by Defendants' conduct.

168. California's commercial Dungeness crab fishery is seasonal and normally runs for eight months (from November 15 to June 15 south of the Sonoma/Mendocino County line and from December 1 to July 1 north of that line to the California/Oregon border). In Oregon, the season runs from December 1 to August 14 under normal conditions. The early part of crab season is by far the most productive because at that time there are the most crabs on the crab grounds, the crabs' meat content (the ratio of meat weight to total weight) is at its highest, and the demand for crab spikes around the Thanksgiving, Christmas, New Year and Lunar New Year holidays, and the Super Bowl.

169. As a precaution to avoid poisoning humans with domoic acid, the State of California delayed opening the Dungeness crab season at the beginning of the 2015–16 and 2016–17 commercial seasons, and will delay the beginning of the 2018–19 season:

a. In 2015–16, the fishery south of the Sonoma/Mendocino County line opened approximately four-and-a-half months late; the fishery north of the Sonoma/Mendocino County line did not fully open until nearly six months after the normal opening date;

b. In 2016–17, the fishery opened piecemeal, with a large section of the southern management area and a portion of the northern management area from the Oregon border to Redwood Creek opening on time, and six distinct areas north of Point Reyes in Marin County opening either on time, or with a delay in the range of 18 days to one-and-a-half months.

c. The area from Bodega Head to the Sonoma/Mendocino County line will be closed to commercial crabbing indefinitely; the season will not open as scheduled on November 15, 2018. Sampling farther north has shown that crabs at fishing grounds accessible from ports in Crescent City and

Trinidad, in Del Norte and Humboldt Counties, have levels of domoic acid that exceed the action threshold.

170. As a precaution to avoid poisoning humans with domoic acid, the State of Oregon delayed the opening of the Dungeness crab season at the beginning of the 2015–16, 2016–17, and 2017–18 commercial Dungeness crab seasons:

a. In 2015–16, the entire coast of Oregon was closed to commercial crabbing until nearly five weeks after the normal season opening date.

b. In 2016–17, the commercial crabbing season was delayed by approximately one month. After being open for approximately one month, the season was interrupted when domoic acid was again identified in crab at levels exceeding the action threshold. In response, ODFW and ODA curtailed the fishery in several ways, including by closing large areas of the ocean to crabbing and by issuing mandatory evisceration orders, which prohibit crab wholesalers from purveying live crabs or any crab product containing the crab viscera.

c. In 2017–18, the statewide commercial crab season was again delayed over six weeks in response to domoic acid contamination. ODFW and ODA also imposed mandatory evisceration orders for certain times and areas.

d. As of this writing, the 2018 Oregon recreational crab fishery (which operates on a different schedule than the commercial fishery) is closed from Cape Blanco to the Oregon/California border due to high levels of domoic acid in crab.

171. Additional domoic acid-induced Dungeness crab fishery closures will occur in the future, with increasing frequency and severity, and with concomitant impacts on and injuries to Plaintiff and west coast fishing families, communities and businesses.

172. Due to domoic acid contamination and the resultant crab fishery closures, commercial fishermen were deprived of valuable opportunities to fish for Dungeness crab during substantial portions of the 2015–16, 2016–17, and 2017–18 crab seasons, and will be deprived of

crabbing opportunities in the 2018–19 crab season and future seasons. Fishermen and fishery-dependent businesses, including Plaintiff, were therefore deprived of a substantial portion of their annual revenue from the Dungeness crab fishery for those seasons, and many suffered additional financial injuries by incurring debt to pay for operating and living expenses during the closures. Fishermen and fishery-dependent businesses, including Plaintiff, will continue to suffer such injuries during future domoic acid-induced fishery closures.

173. Because fisheries are seasonal, fishermen often pursue multiple different fisheries throughout the year. The delayed opening of the crab fishery in 2015–16, 2016–17, and 2017–18, caused many fishermen, including Plaintiff, to delay their entry into other fisheries they would normally have pursued earlier, including salmon, coonstripe shrimp, albacore, and others. Because those other fisheries are open only for limited portions of the calendar year, those fishermen were deprived of valuable fishing opportunities, thereby diminishing their earnings in those fisheries. Fishermen and fishery-dependent businesses, including Plaintiff, were therefore deprived of a substantial portion of their annual revenue from those other fisheries during years impacted by domoic acid-induced crab fishery closures, and will continue to suffer such injuries during future domoic acid-induced fishery closures.

174. Onshore crab wholesalers and processors, including Plaintiff, were deprived of a substantial portion of their annual revenue during the 2015–16, 2016–17, and 2017–18 crab seasons, and will continue to suffer such injuries during future domoic acid-induced fishery closures. That revenue substantially depends on the supply of Dungeness crab and other species harvested by commercial fishermen, which were not available due to the crab fishery delays that curtailed and will continue to curtail fishing opportunity.

175. The market for crab products, including Plaintiff's, was and during future crab seasons will be artificially depressed because of the stigma that Plaintiff's crab products were and are unsafe for human consumption, which adversely affects Plaintiff and its members. That depressed market has caused Plaintiff and its members a substantial loss of income, and will continue to do so as long as domoic acid outbreaks threaten the crab fishery.

176. Due to domoic acid contamination and the resultant past and future fishery closures, Plaintiff and west coast fishing families, communities, and businesses have suffered and will continue to suffer other harms beyond direct economic harms, including, but not limited to, the loss of the iconic west coast commercial fishing lifestyle, loss of a regional commercial fishing culture and identity, and loss of public confidence in the safety and quality of west coast Dungeness crab products and the fishery itself.

177. Defendants' conduct as described herein is therefore an actual, substantial, and proximate cause of Plaintiff's domoic acid-related injuries.

178. Future injuries arising out of domoic acid contamination in the crab fishery are abatable. Examples of technologies that could be used to prevent or mitigate to Plaintiff and the crab industry include, but are not limited to, monitoring and testing technologies that could permit real-time domoic acid testing, which would permit fishermen to separate contaminated crabs from clean ones at the time of harvest, thereby assuaging the public health concerns that currently induce fishery closures;[148] or "depuration," the process by which crabs in an environment and food free of domoic acid will naturally rid themselves of domoic acid.[149] Given large enough depuration facilities, commercially harvested crabs could be depurated on an industrial scale, and thereafter brought to market even if they contain domoic acid at the time of harvest.

VI. CAUSES OF ACTION

FIRST CAUSE OF ACTION

(Nuisance)

(Against All Defendants)

179. Plaintiff incorporates by reference each and every allegation contained above, as though set forth herein in full.

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[148] *See, e.g.*, Nat'l Ctrs. For Coastal Ocean Science, "Fast Tool to Detect Toxic Shellfish" (2017) (announcing development of an antibody-based test kit for domoic acid that provides quick results), https://coastalscience.noaa.gov/project/fast-tool-detect-toxic-shellfish; Nat'l Science & Tech. Council Subcommittee on Ocean Science & Tech., *Harmful Algal Blooms and Hypoxia – Comprehensive Research Plan and Action Strategy; An Interagency Report* (Feb. 2016), http://www.whoi.edu/fileserver.do?id=230904&pt=10&p=19132 (discussing how development of a toxin test-kit enabled fishermen to determine when and where clams were safe to harvest, re-enabling access to valuable shellfish resources).

[149] *See, e.g.*, J.A.K. Lund, et al., *Domoic acid uptake and depuration in dungeness crab (Cancer magister Dana 1852)*, 16 JOURNAL OF SHELLFISH RESEARCH 225 (1997).

180. Defendants, and each of them, by their acts and omissions, created a condition and permitted that condition to persist, which constitutes a nuisance in the form of increased mean sea surface temperature and intense marine heatwaves, which caused recurring *Pseudo-nitzschia* algal blooms unprecedented in their range and toxicity, which caused and will continue to cause domoic acid to contaminate Dungeness crabs at potentially dangerous concentrations, all of which resulted in past injuries and will cause future injuries to Plaintiff.

181. The condition created by Defendants substantially and negatively affects the interests of the public at large. In particular, increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and domoic acid contamination: (1) are harmful and dangerous to human health; (2) are indecent and offensive to the senses of the ordinary person; and (3) obstruct and threaten to obstruct the free use of natural resources held in the public trust, so as to interfere with the comfortable enjoyment of life and property.

182. The condition created by Defendants affected, and will continue to affect, Plaintiff, because the economic impacts of fishery closures cascaded to impact entire fishery-dependent communities and businesses, and because the public was deprived of safe, local, and sustainable seafood.

183. The seriousness of the harms to Plaintiff caused by increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and domoic acid contamination are extremely grave, and outweigh the public benefit of Defendants' wrongful over-marketing and overpromotion of their dangerous fossil fuel products with knowledge of the harm that would result, and their long-standing efforts to sow doubt about the science surrounding the effects of their products on the world's climate and oceans, and campaigns to avoid regulation. The seriousness of the harm to Plaintiff outweighs the public benefit of Defendants' and each of their conduct, because

a. the interference with natural resources held in the public trust are expected to become regular, recurrent, and increasingly severe, so as to become a permanent ecological feature of the crab fishery;

b. the nature of the harm is the deprivation of the right to use and enjoy natural resources held in the public trust, as well as potential physical injury to consumers, rather than mere annoyance;

c. the interference borne by Plaintiff is the deprivation of the right to obtain and use natural resources held in the public trust, deprivation of the right to use commercial fishing privileges, the loss of normal and expected revenue from the use of those resources and privileges, and the deprivation of a livelihood that depends on those resources;

d. The natural resources contaminated with domoic acid as a direct consequence of Defendants' conduct are not suitable for such contamination because those resources are consumed by humans and other organisms;

e. the burden on Plaintiff to mitigate and prevent the interference with the natural resources held in the public trust, fishing privileges, and the right to use and enjoy those resources and privileges to pursue fishing community livelihoods, is significant and severe, as costs associated with preventing such interference or contamination are prohibitive;

f. the social benefit of placing fossil fuels into the stream of commerce, if any, is outweighed by the availability of other sources of energy that could have been placed into the stream of commerce that would not have caused increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and domoic acid contamination; Defendants, and each of them, knew of the external costs of placing their fossil fuel products into the stream of commerce, and rather than striving to mitigate those externalities, instead acted affirmatively to obscure them from public consciousness; and Defendants' over-promotion and over-marketing of their products with knowledge of the harm that would result, and their long-standing efforts to sow doubt about the science surrounding the effects of their products on the

world's climate and oceans, and campaigns to avoid regulation, have no social utility;

g. the social cost of each ton of CO_2 emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and

h. it was practical for Defendants, and each of them, in light of their extensive knowledge of the hazards of placing fossil fuel products into the stream of commerce and extensive scientific engineering expertise, to develop better technologies and to pursue and adopt known, practical, and available technologies, energy sources, and business practices that would have mitigated their greenhouse gas pollution and eased the transition to a lower carbon economy.

184. In addition to the harms suffered by the public at large, Plaintiff has suffered, and will continue to suffer, special injuries that are different in kind. Among other harms, Plaintiff suffered economic losses due to the prohibition on harvesting and transacting in Dungeness crabs, which constitute a substantial and significant portion of Plaintiff's revenue. Additionally, the markets for Plaintiff's products were artificially depressed because of public health concerns over the potential presence of domoic acid in those products. The public at large has not suffered the same deprivation of a livelihood as has Plaintiff.

185. Defendants' wrongful conduct was oppressive, malicious, and fraudulent, in that their conduct was willful, intentional, and in conscious disregard for the rights of others. Defendants' conduct was so vile, base, and contemptible that it would be looked down upon and despised by reasonable people, justifying an award of punitive and exemplary damages in an amount subject to proof at trial, and justifying equitable disgorgement of all profits Defendants obtained through their unlawful and outrageous conduct.

186. As a direct and proximate result of Defendants' conduct, as set forth above, Plaintiff has been unreasonably interfered with because Defendants knew or should have known that their

conduct would create a continuing problem with long-lasting significant negative effects on the rights of the public.

187. Defendants' actions are a direct and legal cause of the public nuisance.

188. Defendants' acts and omissions as alleged herein are substantial and indivisible causes of Plaintiff's injuries and damages as alleged herein.

189. Plaintiff is entitled to recover damages and other appropriate relief for the foregoing public nuisance.

190. Wherefore, Plaintiff prays for relief as set forth below.

SECOND CAUSE OF ACTION

(Strict Liability – Failure to Warn)

(Against All Defendants)

191. Plaintiff incorporates by reference each and every allegation contained above, as though set forth herein in full.

192. Defendants, and each of them, extracted raw fossil fuel products, including crude oil, coal, and natural gas from the earth, and placed those fossil fuel products into the stream of commerce.

193. Defendants, and each of them, extracted, refined, formulated, designed, packaged, distributed, tested, constructed, fabricated, analyzed, recommended, merchandised, advertised, promoted and/or sold fossil fuel products, which were intended by Defendants, and each of them, to be burned for energy, refined into petrochemicals, and refined and/or incorporated into petrochemical products including fuels and plastics.

194. Defendants, and each of them, heavily marketed, promoted, and advertised fossil fuel products and their derivatives, which were sold or used by their respective affiliates and subsidiaries. Defendants received direct financial benefit from their affiliates' and subsidiaries' sales of fossil fuel products. Defendants' role as promoter and marketer was integral to their respective businesses and a necessary factor in bringing fossil fuel products and their derivatives to the consumer market, such that Defendants had control over, and a substantial ability to influence, the manufacturing and distribution processes of their affiliates and subsidiaries.

195. Throughout the times at issue, Defendants individually and collectively knew or should have known, in light of the scientific knowledge generally accepted at the time, that fossil fuel products, whether used as intended or misused in a foreseeable manner, release greenhouse gases into the atmosphere that inevitably cause *inter alia* global warming, increased mean sea surface temperature, marine heatwaves, and harmful algal blooms with a capacity for producing marine toxins.

196. Throughout the times at issue and continuing today, fossil fuel products presented and still present a substantial risk of injury to Plaintiff through the climate and ocean temperature effects described above, whether used as intended or misused in a reasonably foreseeable manner.

197. Throughout the times at issue, the ordinary consumer would not recognize that the use or foreseeable misuse of fossil fuel products causes global and localized changes in climate and the world's oceans, including those effects described herein.

198. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the generally accepted scientific knowledge at the time, and advanced pseudo-scientific theories of their own, and developed public relations campaigns and materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, including those described herein.

199. Defendants, and each of them, failed to adequately warn customers, consumers, elected officials and regulators of known and foreseeable risk of climate change and the consequences that inevitably follow from the normal, intended use and foreseeable misuse of Defendants' fossil fuel products.

200. Defendants' wrongful conduct was oppressive, malicious, and fraudulent, in that their conduct was willful, intentional, and in conscious disregard for the rights of others. Defendants' conduct was so vile, base, and contemptible that it would be looked down upon and despised by reasonable people, justifying an award of punitive and exemplary damages in an amount subject to proof at trial, and justifying equitable disgorgement of all profits Defendants obtained through their unlawful and outrageous conduct.

201. As a direct and proximate result of the defects previously described, fossil fuel products caused and will continue to cause Plaintiff to sustain the injuries and damages set forth in this Complaint, including economic loss, damage to natural resources held in the public trust, deprivation of the right to use fishing privileges, and the creation and maintenance of a nuisance that interferes with the rights of Plaintiff and commercial fishery-dependent communities along the west coast.

202. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff's injuries and damages as alleged herein.

203. Plaintiff is entitled to recover damages and other appropriate relief for the foregoing failure to warn of product defects.

204. Wherefore, Plaintiff prays for relief as set forth below.

THIRD CAUSE OF ACTION

(Strict Liability – Design Defect)

(Against All Defendants)

205. Plaintiff incorporates by reference each and every allegation contained above, as though set forth herein in full.

206. Defendants, and each of them, extracted raw fossil fuel products, including crude oil, coal, and natural gas from the earth and placed those fossil fuel products into the stream of commerce.

207. Defendants, and each of them, extracted, refined, formulated, designed, packaged, distributed, tested, constructed, fabricated, analyzed, recommended, merchandised, advertised, promoted and/or sold fossil fuel products, which were intended by Defendants, and each of them, to be burned for energy, refined into petrochemicals, and refined and/or incorporated into petrochemical products including but not limited to fuels and plastics.

208. Defendants, and each of them, heavily marketed, promoted, and advertised fossil fuel products and their derivatives, which were sold or used by their respective affiliates and subsidiaries. Defendants' received direct financial benefit from their affiliates' and subsidiaries' sales of fossil fuel products. Defendants role as promoter and marketer was integral to their

respective businesses and a necessary factor in bringing fossil fuel products and their derivatives to the consumer market, such that Defendants had control over, and a substantial ability to influence, the manufacturing and distribution processes of their affiliates and subsidiaries.

209. Throughout the time at issue, fossil fuel products have not performed as safely as an ordinary consumer would expect them to because greenhouse gas emissions from their use cause numerous global and local changes to Earth's climate. In particular, ordinary consumers did not expect that:

a. fossil fuel products are the primary cause of global warming since the dawn of the industrial revolution, and by far the primary cause of global warming acceleration in the 20th and 21st centuries;

b. fossil fuel products would cause increase mean sea surface temperature;

c. fossil fuel products would cause increased frequency and intensity of marine heatwaves;

d. unmitigated use of fossil fuel products causes increased frequency and intensity of harmful algal blooms;

e. fossil fuel products cause increased frequency and intensity of marine toxin outbreaks and contamination of natural resources held in the public trust, including Dungeness crabs, necessitating commercial fishery closures and concordant economic injuries;

f. the social cost of each ton of CO_2 emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and

g. for these reasons and others, the unmitigated use of fossil fuel products present significant threats to the environment and human health and welfare, especially to coastal and ocean-dependent communities.

210. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the generally accepted scientific knowledge at the time,

advanced pseudo-scientific theories of their own, and developed public relations materials, among other public messaging efforts, that prevented reasonable consumers from forming an expectation that fossil fuel products would cause grave climate changes, including those described herein.

211. Additionally, and in the alternative, Defendants' fossil fuel products are defective because the risks they pose to consumers and to the public, including and especially to Plaintiff, outweigh their benefits.

a. The gravity of the potential harms caused by fossil fuel products is extreme; global warming and its attendant consequences are guaranteed to occur following the use or foreseeable misuse of fossil fuel products because fossil fuel products inherently release greenhouse gases into the atmosphere; and global warming would continue to occur for decades even if all greenhouse gas emissions ceased.

b. The social benefit of the purpose of placing fossil fuels into the stream of commerce is overshadowed by the availability of other sources of energy that could have been placed into the stream of commerce that would not have caused increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and marine toxin outbreaks, and accordingly Plaintiff's injuries; Defendants, and each of them, knew of the external costs of placing their fossil fuel products into the stream of commerce, and rather than striving to mitigate those externalities, instead acted affirmatively to obscure them from public consciousness.

c. Defendants' campaign of disinformation regarding global warming and the climatic effects of fossil fuel products prevented customers, consumers, regulators, and the general public from taking steps to mitigate the inevitable consequences of fossil fuel consumption, and incorporating those consequences into either short-term decisions or long-term planning.

d. The cost to society of each ton of CO_2 emitted into the atmosphere increases as total global emissions increase so that unchecked extraction and

consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption.

e. It was practical for Defendants, and each of them, in light of their extensive knowledge of the hazards of placing fossil fuel products into the stream of commerce, to pursue and adopt known, practical, and available technologies, energy sources, and business practices that would have mitigated their greenhouse gas pollution and eased the transition to a lower carbon economy, reduced global CO_2 emissions, and mitigated the harms associated with the use and consumption of such products.

212. Defendants' individual and aggregate fossil fuel products were used in a manner for which they were intended to be used, or misused in a manner foreseeable to Defendants and each of them, by individual and corporate consumers, the result of which was the addition of CO_2 emissions to the global atmosphere with attendant global and local consequences.

213. As a direct and proximate result of the defects in fossil fuel products described herein, Plaintiff sustained and will continue to sustain the injuries and damages set forth in this Complaint, including, but not limited to, economic losses due to commercial fishery closures.

214. Defendants' wrongful conduct was oppressive, malicious, and fraudulent, in that their conduct was willful, intentional, and in conscious disregard for the rights of others. Defendants' conduct was so vile, base, and contemptible that it would be looked down upon and despised by reasonable people, justifying an award of punitive and exemplary damages in an amount subject to proof at trial, and justifying equitable disgorgement of all profits Defendants obtained through their unlawful and outrageous conduct.

215. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff's injuries and damages as alleged herein.

216. Plaintiff is entitled to recover damages and other appropriate relief for the foregoing design defects.

217. Wherefore, Plaintiff prays for relief as set forth below.

FOURTH CAUSE OF ACTION

(Negligence)

(Against All Defendants)

218. Plaintiff incorporates by reference each and every allegation contained above, as though set forth herein in full.

219. Defendants knew or should have known of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including the likelihood and likely severity of increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and marine toxin outbreaks, and including Plaintiff's injuries and damages alleged herein.

220. Defendants, collectively and individually, had a duty to use due care in developing, designing, testing, inspecting and distributing their fossil fuel products. That duty obligated Defendants collectively and individually to, *inter alia*, prevent defective products from entering the stream of commerce, and prevent reasonably foreseeable harm that could have resulted from the ordinary use or reasonably foreseeable misuse of Defendants' products.

221. Defendants, and each of them, breached their duty of due care by, *inter alia*:

a. allowing fossil fuel products to enter the stream of commerce, despite knowing them to be defective due to their inevitable propensity to cause increased mean sea surface temperature, marine heatwaves, harmful algal blooms, marine toxin outbreaks, and related injuries;

b. failing to act on the information and warnings they received from their own internal research staff, as well as from the international scientific community, that the unabated extraction, promotion and sale of their fossil fuel products would result in material dangers to the public, including to Plaintiff;

c. failing to take actions including but not limited to pursuing and adopting known, practical, and available technologies, energy sources, and business practices that would have mitigated their greenhouse gas pollution and eased the transition to a lower carbon economy; shifting to non-fossil fuel

products, and researching and/or offering technologies to mitigate CO_2 emissions in conjunction with sale and distribution of their fossil fuel products; and pursuing other available alternatives that would have prevented or mitigated the injuries to Plaintiff caused by increased mean sea surface temperature, marine heatwaves, harmful algal blooms, and marine toxin outbreaks that Defendants, and each of them, knew or should have foreseen would inevitably result from use of Defendants' fossil fuel products;

d. engaging in a campaign of disinformation regarding global warming and the climatic effects of fossil fuel products that prevented customers, consumers, regulators, and the general public from staking steps to mitigate the inevitable consequences of fossil fuel consumption, and incorporating those consequences into either short-term decisions or long-term planning.

222. Defendants' individual and collective acts and omissions were actual, substantial causes of increased mean sea surface temperature, marine heatwaves, harmful algal blooms, marine toxin outbreaks, and related consequences, including Plaintiff's injuries and damages set forth herein, because the oceanographic conditions that caused Plaintiff's injuries would not have happened, or would not have reached expanse and toxicity that they did, but for Defendants' introduction of their fossil fuel products into the stream of commerce.

223. Defendants' individual and collective acts and omissions were proximate causes of increased mean sea surface temperature, marine heatwaves, harmful algal blooms, marine toxin outbreaks, and their consequences, including Plaintiff's injuries and damages set forth herein. No other act, omission, or natural phenomenon intervened in the chain of causation between Defendants' conduct and Plaintiff's injuries and damages, or superseded Defendants' breach of their duties' substantiality in causing Plaintiff's injuries and damages.

224. As a direct and proximate result of Defendants' and each of their acts and omissions, Plaintiff sustained and will continue to sustain injuries and damages as set forth herein.

225. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff's injuries and damages as alleged herein.

226. Defendants' wrongful conduct was oppressive, malicious, and fraudulent, in that their conduct was willful, intentional, and in conscious disregard for the rights of others. Defendants' conduct was so vile, base, and contemptible that it would be looked down upon and despised by reasonable people, justifying an award of punitive and exemplary damages in an amount subject to proof at trial, and justifying equitable disgorgement of all profits Defendants obtained through their unlawful and outrageous conduct.

227. Plaintiff is entitled to recover damages and other appropriate relief for the foregoing negligent conduct.

228. Wherefore, Plaintiff prays for relief as set forth below.

FIFTH CAUSE OF ACTION

(Negligence – Failure to Warn)

(Against All Defendants)

229. Plaintiff incorporates by reference each and every allegation contained above, as though set forth herein in full.

230. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including global warming, and the likely increases in frequency and severity of increased mean sea surface temperature, marine heatwaves, harmful algal blooms, marine toxin outbreaks, and the consequences of those phenomena, including Plaintiff's injuries and damages described herein.

231. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, that the climate effects described above rendered their fossil fuel products dangerous, or likely to be dangerous, when used as intended or misused in a reasonably foreseeable manner.

232. Throughout the times at issue, Defendants failed to adequately warn any consumers or any other party of the climate effects that inevitably flow from the use or foreseeable misuse of their fossil fuel products.

233. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the generally accepted scientific knowledge at the time, advanced pseudo-scientific theories of their own, and developed public relations materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, undermining and rendering ineffective any warnings that Defendants may have also disseminated.

234. Given the grave dangers presented by the climate effects that inevitably flow from the normal use or foreseeable misuse of fossil fuel products, a reasonable extractor, manufacturer, formulator, seller, or other participant responsible for introducing fossil fuel products into the stream of commerce, would have warned of those known, inevitable climate effects.

235. Defendants' conduct was a direct and proximate cause of Plaintiff's injuries and a substantial factor in the harms suffered by Plaintiff as described in this Complaint.

236. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff's injuries and damages as alleged herein.

237. Defendants' wrongful conduct was oppressive, malicious, and fraudulent, in that their conduct was willful, intentional, and in conscious disregard for the rights of others. Defendants' conduct was so vile, base, and contemptible that it would be looked down upon and despised by reasonable people, justifying an award of punitive and exemplary damages in an amount subject to proof at trial, and justifying equitable disgorgement of all profits Defendants obtained through their unlawful and outrageous conduct.

238. Plaintiff is entitled to recover damages and other appropriate relief for the foregoing negligent failure to warn.

239. Wherefore, Plaintiff prays for relief as set forth below.

VII. PRAYER FOR RELIEF

WHEREFORE, Plaintiff prays for judgment against Defendants as follows:

1. Compensatory damages in an amount according to proof;

2. Equitable relief, including abatement of the nuisance described herein;

3. Reasonable attorneys' fees pursuant to California Code of Civil Procedure 1021.5 or otherwise;

4. Punitive damages;

5. Disgorgement of profits;

6. Costs of suit; and

7. For such and other relief as the court may deem proper.

Dated: November 14, 2018

SHER EDLING LLP

By: _____

VICTOR M. SHER
MATTHEW K. EDLING
TIMOTHY R. SLOANE
KATIE H. JONES
MARTIN D. QUIÑONES
MEREDITH S. WILENSKY

Attorneys for Pacific Coast Federation of Fishermen's Associations Inc.

VIII. JURY DEMAND

Plaintiff demands a jury trial on all issues so triable.

Dated: November 14, 2018

SHER EDLING LLP

By: _____

VICTOR M. SHER
MATTHEW K. EDLING
TIMOTHY R. SLOANE
KATIE H. JONES
MARTIN D. QUIÑONES
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Attorneys for Pacific Coast Federation of Fishermen's Associations Inc.

Re: FW: materials

From:	Alexandra Klass <aklass@umn.edu>
To:	Michael Noble <Noble@fresh-energy.org>
Sent:	December 3, 2018 9:51:44 PM CST
Attachments:	City of New York v BP PLC.pdf

Thanks. Looks like the federal court in NY dismissed the NYC action in August so the second document you sent is the city's brief on appeal. Nice to see Zach Carter is still Corporation Counsel for City of NY. He used to be my partner at Dorsey & Whitney. Here is the district court decision.

Alex

Alexandra B. Klass
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University of Minnesota Law School
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Minneapolis, MN 55455
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On Mon, Dec 3, 2018 at 9:38 PM Michael Noble <Noble@fresh-energy.org> wrote:

> Here's the 3 docs I got. I only read through the Boulder one.
>
> Michael Noble
>
> Executive Director
>
> Fresh Energy
>
> Phone 651 726 7563
>
> www.fresh-energy.org | twitter.com/nobleideas
>
> -
>
> *Practical policy. Brighter future.* ***Support our work today****.*

From: Michael Noble
Sent: Monday, November 19, 2018 5:20 PM
To: Sarah Clark <clark@fresh-energy.org>
Subject: Fwd: materials

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

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From: Lee Wasserman <lwasserman@me.com>
Sent: Monday, November 19, 2018 4:25:19 PM
To: Michael Noble
Subject: materials

M, attached is a complaint and a couple of briefs.

I think this will give you some good background. The Boulder complaint is a page-turner. Probably worth checking out before you make initial calls.

thanks!

PS using this email for a specific reason we can discuss when we next talk. Happy Turkey Day.

1. City of New York v BP PLC.pdf

Type:	application/pdf
Size:	168 KB (172,043 bytes)

Klass, Alexandra 12/3/2018
For Educational Use Only

325 F.Supp.3d 466
United States District Court, S.D. New York.

CITY OF NEW YORK, Plaintiff,
v.
BP P.L.C., Chevron Corporation, ConocoPhillips, Exxon Mobil Corporation, and Royal Dutch Shell, PC, Defendants.

No. 18 Civ. 182 (JFK)
|
Signed 07/19/2018

Synopsis

Background: City brought cause of action against multinational oil and gas companies, seeking to recover for injuries that city sustained due to rising sea levels allegedly caused by emission of greenhouses gases from fuels sold by these companies. Companies moved to dismiss for lack of subject matter jurisdiction and failure to state claim.

Holdings: The District Court, John F. Keenan, J., held that:

city's global-warming tort claims could be pursued only under federal law, not under state common law;

any federal common law nuisance and trespass claims which city based on domestic emission of greenhouses gases from fuels sold by defendants were displaced by the Clean Air Act; and

to extent that city was seeking to hold companies liable for damages stemming, not just from domestic, but from foreign greenhouse gas emissions, city's claims were barred by presumption against extraterritoriality and need for judicial caution in face of serious foreign policy consequences.

Motion granted.

Procedural Posture(s): Motion to Dismiss for Lack of Jurisdiction; Motion to Dismiss for Failure to State a Claim.

Attorneys and Law Firms

***467** FOR PLAINTIFF CITY OF NEW YORK: Zachary W. Carter, Susan E. Amron, Kathleen C. Schmid, Margaret C. Holden, Noah Kazis, CORPORATION COUNSEL OF THE CITY OF NEW YORK, Steve W. Berman, Matthew F. Pawa, Benjamin A. Krass, Wesley Kelman, HAGENS BERMAN SOBOL SHAPIRO LLP, Christopher A. Seeger, Stephen A. Weiss, Diogenes P. Kekatos, SEEGER WEISS LLP.

FOR DEFENDANT CHEVRON CORPORATION: Caitlin J. Halligan, Andrea E. Neuman, Anne Champion, Theodore J. Boutrous, Jr., William E. Thomson, Joshua S. Lipshitz, GIBSON, DUNN & CRUTCHER LLP, Herbert J. Stern, Joel M. Silverstein, STERN & KILCULLEN, LLC, Neal S. Manne, Johnny W. Carter, Erica Harris, Steven Shepard, Laranda Walker, Kemper Diehl, Michael Adamson, SUSMAN GODFREY LLP.

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Klass, Alexandra 12/3/2018
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FOR DEFENDANT CONOCOPHILLIPS: John F. Savarese, Jeffrey M. Wintner, Ben M. Germana, Johnathan Siegel, WACHTELL, LIPTON, ROSEN & KATZ, Tracie J. Renfroe, Carol M. Wood, KING & SPALDING LLP.

OPINION & ORDER

JOHN F. KEENAN, United States District Judge:

***468** Before the Court is a motion by Defendants Chevron Corporation ("Chevron"), ConocoPhillips, and Exxon Mobil Corporation ("Exxon") (together, the "U.S.-based Defendants") to dismiss Plaintiff City of New York's (the "City") amended complaint under Federal Rules of Civil Procedure 12(b)(1) and 12(b)(6). For the reasons stated below, Defendants' motion is granted and the City's amended complaint is dismissed.

I. Background

The following facts and allegations are taken from the amended complaint. Defendants BP P.L.C. ("BP"), Chevron, ConocoPhillips, Exxon, and Royal Dutch Shell ("Shell") (together, "Defendants") are multinational oil and gas companies. (Am. Compl. ¶¶ 16-20.) Defendants produce, market, and sell mass quantities of fossil fuels, primarily oil and natural gas. (Id. ¶ 1.) Defendants are, respectively, the first (Chevron), second (Exxon), fourth (BP), sixth (Shell), and ninth (ConocoPhillips) largest cumulative producers of fossil fuels worldwide from the mid-nineteenth century to present. (Id. ¶ 76.) Defendants are collectively responsible, through their production, marketing, and sale of fossil fuels, for over eleven percent of all the carbon and methane pollution from industrial sources that has accumulated in the atmosphere since the Industrial Revolution. (Id. ¶ 3.)

Climate science clearly demonstrates that the burning of fossil fuels is the primary cause of climate change. (Id. ¶¶ 69-70.) When combusted, fossil fuels emit greenhouse gases, including carbon dioxide, the "largest contribut[or]" to climate change of any source. (Id. ¶ 74.) Additionally, one of Defendants' primary fossil fuel products, natural gas, is composed of methane, which is the second largest greenhouse gas contributor to global warming. (Id.) Global warming, or the gradual heating of the Earth's surface and atmosphere caused by accumulation of greenhouse gas pollution in the atmosphere, has led to hotter temperatures, longer and more severe heat waves, extreme precipitation events including heavy downpours, rising sea levels, and other severe and irreversible harms. (Id. ¶ 2.) The City alleges that, through their production and sale of fossil fuel products, Defendants have contributed to the temperature increases and global-warming-induced sea-level rise affecting New York City. (Id. ¶ 24.)

According to the amended complaint, Defendants have known for decades that their fossil fuel products pose risks of severe impacts on the global climate through the warnings of their own scientists, or those of the U.S. trade association, American Petroleum Institute ("API"). (Id. ¶¶ 72, 80.) Beginning in the 1950s, API began warning its members that fossil fuels pose a grave threat to the global climate. (Id. ¶ 82.) Between 1979 and 1983, the API and Defendants, their predecessors, and agents formed a task force to monitor and share climate research, called the "Climate and Energy Task Force" (the "Task Force"). (Id.) The minutes from Task Force meetings show that the Task ***469** Force was aware of a scientific consensus on the likelihood of a significant global temperature rise resulting from increased carbon

dioxide levels that would cause "globally catastrophic events." (Id.) Defendants' internal documents also demonstrate that Defendants were aware of the "catastrophic" threat that fossil fuels posed to the global climate. (Id. ¶¶ 85, 88.)

Despite their early knowledge of climate change risks, Defendants extensively promoted fossil fuels for pervasive use, while denying or downplaying these threats. (Id. ¶¶ 93-94.) Defendants engaged in an overt public relations campaign intended to cast doubt on climate science. (Id. ¶ 94.) Initially, the campaign tried to show that climate change was not occurring or was not caused by Defendants' products. (Id.) More recently, the campaign has sought to minimize the risks and harms from climate change. (Id.) Meanwhile, beginning in the mid-1980s, Exxon and other major oil and gas companies, including Mobil and Shell, took actions to protect their own business assets from the impacts of climate change, including raising the decks of offshore platforms, protecting pipelines from coastal erosion, and designing helipads, pipelines, and roads in the warming Arctic. (Id. ¶ 91.) Although the amended complaint contains extensive allegations regarding Defendants' past attempts to deny or downplay the effects of fossil fuel use on climate change, in their motion to dismiss, Defendants do not dispute the scientific consensus that greenhouse gas emissions from fossil fuel use have contributed to global warming.

According to the New York City Panel on Climate Change ("NPCC"), the expert committee convened to provide scientific advice, guidance, and projections on climate change, climate change is already affecting New York City and will have a significant impact in the future. (Id. ¶ 10.) The average annual temperature in New York City has increased at a rate of 0.79°F per decade over the last thirty years. (Id. ¶ 57.) Without mitigation, the hotter summers projected for 2020 could cause an estimated thirty to seventy percent increase in heat-related deaths in the New York City. (Id. ¶ 61.) In addition, New York City is exceptionally vulnerable to sea-level rise due to its long coastline and its large floodplain that is home to more than 218,000 New Yorkers. (Id. ¶ 64.) Sea-level rise in New York City has averaged 1.2 inches per decade since 1900, nearly twice the observed global rate of 0.5 to 0.7 inches per decade over a similar time period. (Id. ¶ 57.) Approximately sixty percent of the relative sea-level rise is driven by climate-related factors. (Id.)

Given New York City's particular vulnerability to climate change, the City has been forced to take proactive steps to protect itself and its residents from the dangers and impacts of global warming. (Id. ¶ 117.) After Hurricane Sandy, the City launched a $20 billion-plus multilayered investment program in climate resiliency. (Id. ¶ 119.) The first steps of this effort include constructing levees and sea walls, elevating facilities and streets, and waterproofing and hardening infrastructure. (Id.) In addition, the City must promptly take more robust measures to make New York City more resilient and protect the public and City property from climate change, including enlarging existing storm and wastewater storage facilities and installing additional new facilities, as well as associated infrastructure and pumping facilities, to prevent flooding in low-lying areas that are vulnerable to rising seas or increasingly severe downpours. (Id. ¶ 122.)

The City alleges that Defendants' ongoing conduct continues to exacerbate global warming and cause recurring injuries to New York City. (Id. ¶ 9.) Defendants continue ***470** to produce, market, distribute, and sell fossil fuels in massive quantities; to promote fossil fuel consumption in these massive quantities; and to downplay the threat posed by climate change. (Id. ¶ 131.) This ongoing conduct will cause increasingly severe injuries to New York City, including new and more significant encroachments upon and interferences with City property, and increasingly severe threats to public health. (Id.) The City brings this suit to "shift the costs of protecting the City from climate change impacts back onto the companies that have done nearly all they could to create this existential threat." (Id. ¶ 2.)

The City alleges three causes of action against Defendants: (1) public nuisance, (2) private nuisance, and (3) trespass. (Id. ¶¶ 132-152.) The City requests compensatory damages for past and future costs incurred by the City to protect its infrastructure and property, and to protect the public health, safety, and property of its residents from the impacts of climate change. (Id. at 73-74.) The City also requests an equitable order ascertaining damages and granting an injunction

to abate the public nuisance and trespass that would not be effective unless Defendants fail to pay the court-determined damages for the past and permanent injuries inflicted (a "Boomer injunction"). (Id. at 74.)

On March 30, 2018, the U.S.-based Defendants moved to dismiss the amended complaint under Rules 12(b)(1) and 12(b)(6). [1] The U.S.-based Defendants argue in their joint motion that (1) the City's claims arise under federal common law and should be dismissed, (2) the City's claims are independently barred by numerous federal doctrines, (3) the amended complaint does not allege viable state-law claims, (4) the City's claims are not justiciable, and (5) the City has failed to allege proximate cause.

1 Exxon and ConocoPhillips also moved to dismiss under Rule 12(b)(2) for lack of personal jurisdiction. Per agreement of the parties, the Court deferred further briefing on this issue until the Court rules on the motion to dismiss under Rules 12(b)(1) and 12(b)(6). In addition, BP and Shell's (the "foreign Defendants") time to respond to the complaint has been adjourned pending the Court's decision on the instant motion to dismiss.

II. Discussion

A. Legal Standard

Rule 12(b)(1) requires dismissal when "the district court lacks the statutory or constitutional power to adjudicate it." Makarova v. United States, 201 F.3d 110, 113 (2d Cir. 2000). A "plaintiff asserting subject matter jurisdiction has the burden of proving by a preponderance of the evidence that it exists." Id. (citing Malik v. Meissner, 82 F.3d 560, 562 (2d Cir. 1996)). Under Rule 12(b)(1), the court must accept all factual allegations in the complaint as true and draw inferences in the light most favorable to the plaintiff. Jaghory v. N.Y. State Dep't of Educ., 131 F.3d 326, 329 (2d Cir. 1997).

To survive a motion to dismiss under Rule 12(b)(6), a complaint need only provide "sufficient factual matter, accepted as true, to state a claim to relief that is plausible on its face." Ashcroft v. Iqbal, 556 U.S. 662, 678, 129 S.Ct. 1937, 173 L.Ed.2d 868 (2009). "A claim has facial plausibility when the plaintiff pleads factual content that allows the court to draw the reasonable inference that the defendant is liable for the misconduct alleged." Id. On a motion to dismiss, a court must accept the factual allegations in the complaint as true and draw reasonable inferences in the plaintiff's favor. Tsirelman v. Daines, 794 F.3d 310, 313 (2d Cir. 2015).

*471 B. Analysis

1. Federal Common Law Displaces The City's State Law Claims

The Court agrees that the City's claims are governed by federal common law. The Supreme Court has recognized that there are some limited areas in which a federal rule of decision is "necessary to protect uniquely federal interests." Tex.

Indus. Inc. v. Radcliff Materials, Inc., 451 U.S. 630, 640, 101 S.Ct. 2061, 68 L.Ed.2d 500 (1981) (quoting Banco Nacional de Cuba v. Sabbatino, 376 U.S. 398, 426, 84 S.Ct. 923, 11 L.Ed.2d 804 (1964)). Where "the interstate or international nature of the controversy makes it inappropriate for state law to control ... our federal system does not permit the controversy to be resolved under state law." Id. at 641, 101 S.Ct. 2061. The Supreme Court has held that "the control of interstate pollution is primarily a matter of federal law." Int'l Paper Co. v. Ouellette, 479 U.S. 481, 492, 107 S.Ct. 805, 93 L.Ed.2d 883 (1987); see also Illinois v. City of Milwaukee, 406 U.S. 91, 103, 92 S.Ct. 1385, 31 L.Ed.2d 712 (1972) ("Milwaukee I") ("When we deal with air and water in their ambient or interstate aspects, there is a federal common law."); Native Vill. of Kivalina v. ExxonMobil Corp., 696 F.3d 849, 855 (9th Cir. 2012) ("Post-Erie, federal common law includes the general subject of environmental law and specifically includes ambient or interstate air and water pollution."). "Federal common law and not the varying common law of the individual States is ... necessary to be recognized as a basis for dealing in uniform standard with the environmental rights of a State against improper impairment by sources outside its domain." Milwaukee I, 406 U.S. at 107 n.9, 92 S.Ct. 1385.

The City's global-warming tort claims are based on Defendants' worldwide fossil fuel production and "the use of their fossil fuel products [which] continue[ ] to emit greenhouse gases and exacerbate global warming." (Am. Compl. ¶¶ 76, 143.) As pointed out on page three, Defendants are among the largest cumulative producers of fossil fuels worldwide since the mid-nineteenth century. (Id. ¶ 76.) Defendants are allegedly collectively responsible, through their production, marketing, and sale of fossil fuels, for over eleven percent of all the carbon and methane pollution from industrial sources that has accumulated in the atmosphere since the Industrial Revolution. (Id. ¶ 3.) The City itself alleges that "[g]reenhouse gas molecules cannot be traced to their source, and greenhouse gases quickly diffuse and comingle in the atmosphere. However, because of their rapid and widespread global dispersal, greenhouse gas emissions from each of Defendants' fossil fuel products are present in the atmosphere in New York State." (Id. ¶ 75.) Widespread global dispersal is exactly the type of "transboundary pollution suit[ ]" to which federal common law should apply. Kivalina, 696 F.3d at 855-58; see also California v. BP P.L.C., No. C 17-06011(WHA), 2018 WL 1064293, at *3 (N.D. Cal. Feb. 27, 2018) ("[T]he transboundary problem of global warming raises exactly the sort of federal interests that necessitate a uniform solution.").

Although the City agrees that "federal common law has long applied to" suits against "direct emitters of interstate pollution," it contends that its claims are not governed by federal common law because "the City bases liability on defendants' production and sale of fossil fuels–not defendants' direct emissions of [greenhouse gases]." (Pl.'s Mem. of L. in Opp'n to Defs.' Mot. to Dismiss at 27-29, ECF No. 101 (filed May 4, 2018) [hereinafter Pl.'s Mem.].) However, regardless of the manner in which the City frames its claims in its opposition brief, the amended complaint ***472** makes clear that the City is seeking damages for global-warming related injuries resulting from greenhouse gas emissions, and not only the production of Defendants' fossil fuels.

According to the amended complaint, "[greenhouse gas] pollution from the burning of fossil fuels is the dominant cause" of global warming. (Am. Compl. ¶ 52.) Indeed, the City alleges that Defendants are substantial contributors to climate change through their production of massive quantities of fossil fuels, because, when combusted, these fossil fuels emit carbon dioxide and other greenhouse gases. (Id. ¶¶ 73-74.) "[A]s [Defendants] know, the use of their fossil fuel products continues to emit greenhouse gases and exacerbate global warming and the City's injuries." (Id. ¶¶ 143, 151.) "Defendants ... should reasonably expect their tortious acts to have consequences ... includ[ing] increasing the concentration of [greenhouse gases], including carbon dioxide, as well as global warming injuries, including accelerated

sea-level rise and heat impacts." (Id. ¶ 46.) "The City's waterfront is ... being harmed by global warming ... due to past and continuing [greenhouse gas] pollution." (Id. ¶ 64.)

Thus, the City's claims are ultimately based on the "transboundary" emission of greenhouse gases, indicating that these claims arise under federal common law and require a uniform standard of decision. See BP, 2018 WL 1064293, at *3 ("If ever a problem cried out for a uniform and comprehensive solution, it is the geophysical problem described by the complaints, a problem centuries in the making (and studying) with causes ranging from volcanoes, to wildfires, to deforestation to stimulation of other greenhouse gases–and, most pertinent here, to the combustion of fossil fuels.").

2. The Clean Air Act Displaces the City's Claims

To the extent that the City brings nuisance and trespass claims against Defendants for domestic greenhouse gas emissions, the Clean Air Act displaces such federal common law claims under American Electric Power Co. v. Connecticut, 564 U.S. 410, 131 S.Ct. 2527, 180 L.Ed.2d 435 (2011) ("AEP") and Native Village of Kivalina v. ExxonMobil Corp., 696 F.3d 849 (9th Cir. 2012). Legislative displacement of federal common law "does not require the 'same sort of evidence of a clear and manifest [congressional] purpose' demanded for preemption of state law" because "it is primarily the office of Congress, not the federal courts, to prescribe national policy in areas of special federal interest." AEP, 564 U.S. at 423-424, 131 S.Ct. 2527 (quoting City of Milwaukee v. Illinois & Michigan, 451 U.S. 304, 317, 101 S.Ct. 1784, 68 L.Ed.2d 114 (1981) ("Milwaukee II")). "The test for whether congressional legislation excludes the declaration of federal common law is simply whether the statute 'speak[s] directly to [the] question' at issue." Id. at 424, 131 S.Ct. 2527 (quoting Mobil Oil Corp. v. Higginbotham, 436 U.S. 618, 625, 98 S.Ct. 2010, 56 L.Ed.2d 581 (1978)); see also Kivalina, 696 F.3d at 856 ("The salient question is 'whether Congress has provided a sufficient legislative solution to the particular [issue] to warrant a conclusion that [the] legislation has occupied the field to the exclusion of federal common law.' ") (quoting Michigan v. U.S. Army Corps Of Eng'rs, 667 F.3d 765, 777 (7th Cir. 2011)).

In AEP, eight states, the City, and three private land trusts brought a public nuisance suit under federal common law against the five largest emitters of carbon dioxide in the United States. AEP, 564 U.S. at 418, 131 S.Ct. 2527. The plaintiffs alleged that "defendants' carbon-dioxide ***473** emissions created a 'substantial and unreasonable interference with public rights' " and sought abatement of the carbon-dioxide emissions. Id. at 419, 131 S.Ct. 2527. The Supreme Court examined whether plaintiffs' claims were displaced by the Clean Air Act, which directs the EPA Administrator to "establish standards of performance for emission of pollutants" from stationary sources, and to regulate existing stationary sources and issue emission guidelines. Id. at 424, 131 S.Ct. 2527 (citing 42 U.S.C. § 7411). The Clean Air Act also "provides multiple avenues for enforcement" by the Environmental Protection Agency ("EPA"), including "impos[ing] administrative penalties for noncompliance" and "commenc[ing] civil actions against polluters in federal court." Id. at 425, 131 S.Ct. 2527. The Court noted that the Clean Air Act "itself [ ] provides a means to seek limits on emissions of carbon dioxide from domestic power plants–the same relief the plaintiffs seek by invoking federal common law." Id. Accordingly, the Court held that "the Clean Air Act and the EPA actions it authorizes displace any federal common law right to seek abatement of carbon-dioxide emissions from fossil-fuel fired power plants." Id. at 424, 131 S.Ct. 2527.

In the Kivalina case, a small city in Alaska brought a public nuisance action against multiple oil, energy, and utility companies, alleging that the defendants' "emissions of large quantities of greenhouse gases" had resulted in global-warming related damages, including sea-level rise and severe erosion. Kivalina, 696 F.3d at 854. Unlike in AEP, the plaintiff did not seek abatement of emissions, but rather damages for harm caused by past emissions. Id. at 857. The Ninth Circuit held that, under AEP, the Clean Air Act displaced plaintiff's federal common law claim seeking damages for harm caused by past emissions, as the Clean Air Act already provides a means to regulate carbon dioxide emissions from domestic power plants. Id. at 856-58. In so doing, the court noted that "the Supreme Court has instructed that the type of remedy asserted is not relevant to the applicability of the doctrine of displacement." Id. at 857.

Here, the City seeks damages for global warming-related injuries caused by greenhouse gas emissions resulting from the combustion of Defendants' fossil fuels. To determine liability for trespass and nuisance, factfinders would have to consider whether emissions resulting from the combustion of Defendants' fossil fuels created an "unreasonable interference" and an "unlawful invasion" on City property. Milwaukee II, 451 U.S. at 348, 101 S.Ct. 1784; In re Methyl Tertiary Butyl Ether (MTBE) Prod. Liab. Litig., 725 F.3d 65, 119 (2d Cir. 2013). As an initial matter, it is not clear that Defendants' fossil fuel production and the emissions created therefrom have been an "unlawful invasion" in New York City, as the City benefits from and participates in the use of fossil fuels as a source of power, and has done so for many decades. More importantly, Congress has expressly delegated to the EPA the determination as to what constitutes a reasonable amount of greenhouse gas emission under the Clean Air Act. See AEP, 564 U.S. at 428-29, 131 S.Ct. 2527 (holding that requiring individual federal judges in public nuisance suits to determine what amount of carbon dioxide emissions is unreasonable "cannot be reconciled with the decisionmaking scheme Congress enacted" with the Clean Air Act); Kivalina, 696 F.3d at 857 ("Congress ha[s] acted to empower the EPA to regulate greenhouse gas emissions"). Thus, under AEP and Kivalina, the Clean Air Act displaces the City's claims seeking damages for past and future domestic greenhouse gas emissions brought under federal common law. See ***474** County of San Mateo v. Chevron Corp., 294 F.Supp.3d 934, 937 (2018) ("Kivalina stands for the proposition that federal common law is not just displaced when it comes to claims against domestic sources of emissions but also when it comes to claims against energy producers' contributions to global warming and rising sea levels.").

The City argues that its claims are not displaced because "[d]isplacement of federal common law occurs only where Congress has spoken directly to the particular issue." (Pl.'s Mem. at 31.) The City concedes that "[i]t is common ground here that the [Clean Air Act] would displace a federal common law public nuisance claim seeking abatement of greenhouse gas emissions from out of state" under AEP, but because the Clean Air Act "does not regulate the production and sale of fossil fuels," the City contends that its claims are not displaced. (Id.) As discussed above, however, the City alleges that its climate-change related injuries are the direct result of the emission of greenhouse gases from the combustion of Defendants' fossil fuels, and not the production and sale of those fossil fuels. Thus, the City ultimately seeks to hold Defendants liable for the same conduct at issue in AEP and Kivalina: greenhouse gas emissions. As Defendants note, "[the City]'s alleged injuries arise (if at all) only because third-party users of fossil fuels–located in all 50 states and around the world–emit greenhouse gases." (Defs.' Reply Mem. of L. in Supp. of Mot. to Dismiss at 4, ECF No. 109 (filed May 4, 2018).)

Thus, because the Clean Air Act has spoken "directly to the question" of domestic greenhouse gas emissions, the City's claims are displaced. See, e.g., San Mateo, 294 F.Supp.3d at 937 (plaintiffs' claims that defendant's contributions to

greenhouse gas emissions constitute "a substantial and unreasonable interference with public rights" are displaced by the Clean Air Act under Kivalina).

The City also argues that, if the Clean Air Act displaces its federal common law claims, state law claims then become available to the extent they are not preempted by statute. (Pl.'s Mem. at 30); see also BP, 2018 WL 1064293, at *4 ("[W]hen congressional action displaces federal common law, state law becomes available to the extent it is not preempted by statute."). In AEP, the Supreme Court noted that because the Clean Air Act displaced claims brought against domestic emitters for transboundary pollution, state law claims could be brought, to the extent they are not also preempted, under "the law of each State where the defendants operate power plants." AEP, 564 U.S. at 429, 131 S.Ct. 2527.

However, the City has not sued under New York law for claims related to the production of fossil fuels in New York. The City brings claims for damages caused by global greenhouse gas emissions resulting from the combustion of Defendants' fossil fuels, which are produced and used "worldwide." (Am. Compl. ¶ 76.) As discussed above, these types of "interstate pollution" claims arise under federal common law, and the Clean Air Act displaces claims arising from damages caused by domestic greenhouse gas emissions because Congress has expressly delegated these issues to the EPA. Given the interstate nature of these claims, it would thus be illogical to allow the City to bring state law claims when courts have found that these matters are areas of federal concern that have been delegated to the Executive Branch as they require a uniform, national solution. See Milwaukee II, 451 U.S. at 313 n.7, 101 S.Ct. 1784 ("[I]f federal common law exists, it is because state law cannot be used."). Climate change is a fact of life, as is not contested by Defendants. But the ***475** serious problems caused thereby are not for the judiciary to ameliorate. Global warming and solutions thereto must be addressed by the two other branches of government.

3. The City's Claims Interfere with Separation of Powers and Foreign Policy

As the City points out, and as courts have recognized, the Clean Air Act regulates only domestic emissions. [2] See AEP, 564 U.S. at 425, 131 S.Ct. 2527 ("The [Clean Air] Act thus provides a means to seek limits on emissions of carbon dioxide from domestic power plants."); see also BP, 2018 WL 1064293, at *4 ("The Clean Air Act displaced the nuisance claims asserted in Kivalina and AEP because the Act 'spoke directly' to ... domestic emissions of greenhouse gases."). Here, the City has brought suit against two foreign oil and gas companies, BP and Shell, in addition to the U.S.-based Defendants, and all of the Defendants produce and sell fossil fuels on a global scale. (See Am. Compl. ¶ 76.) Thus, to the extent that the City seeks to hold Defendants liable for damages stemming from foreign greenhouse gas emissions, the City's claims are barred by the presumption against extraterritoriality and the need for judicial caution in the face of "serious foreign policy consequences." Jesner v. Arab Bank, PLC, —— U.S. ——, 138 S.Ct. 1386, 1407, 200 L.Ed.2d 612 (2018).

2 One provision of the Clean Air Act, Section 115, authorizes the EPA to address the effects of air pollution from sources inside the United States in foreign countries. 42 U.S.C. § 7415(a). However, the City's claims pertain to "worldwide" greenhouse gas emissions, not only those that originate in the United States.

"The [Supreme] Court's recent precedents cast doubt on the authority of courts to extend or create private causes of action even in the realm of domestic law, where [the Supreme] Court has 'recently and repeatedly said that a decision to create a private right of action is one better left to legislative judgment in the great majority of cases.' " Jesner, 138

S.Ct. at 1402 (quoting Sosa v. Alvarez-Machain, 542 U.S. 692, 727, 124 S.Ct. 2739, 159 L.Ed.2d 718 (2004)). The Supreme Court recently held in Jesner v. Arab Bank, PLC, —— U.S. ——, 138 S.Ct. 1386, 200 L.Ed.2d 612 (2018), that where an action may have significant foreign relations implications, "recognizing such causes should make courts particularly wary of impinging on the discretion of the Legislative and Executive Branches in managing foreign affairs." Id. at 1399 (quoting Sosa, 542 U.S. at 727, 124 S.Ct. 2739). "The political branches, not the Judiciary, have the responsibility and institutional capacity to weigh foreign-policy concerns." Id. at 1403.

Here, the City seeks to hold Defendants liable for the emissions that result from their worldwide production, marketing, and sale of fossil fuels. (Am. Compl. ¶¶ 3, 70, 76, 79.) The City alleges that "Defendants' cumulative production of fossil fuels over many years makes each Defendant among the top sources of [greenhouse gas] pollution in the world." (Id. ¶ 76.) Such claims implicate countless foreign governments and their laws and policies. This type of claim is the subject of international agreements, including–although the United States has expressed its intent to withdraw–the Paris Climate Accords. The Court recognizes that the City, and many other governmental entities around the United States and in other nations, will be forced to grapple with the harmful impacts of climate change in the coming decades. However, the immense and complicated problem of global warming requires a comprehensive solution that weighs the global benefits of fossil fuel use with the gravity ***476** of the impending harms. To litigate such an action for injuries from foreign greenhouse gas emissions in federal court would severely infringe upon the foreign-policy decisions that are squarely within the purview of the political branches of the U.S. Government. Accordingly, the Court will exercise appropriate caution and decline to recognize such a cause of action.

The City argues that its claims do not present political questions because the Second Circuit in AEP "reviewed this issue in detail and rejected it, and the Supreme Court affirmed." (Pl.'s Mem. at 23.) However, the plaintiffs in AEP sought only to "limit emissions from six domestic coal-fired electricity plants." Connecticut v. Am. Elec. Power Co., 582 F.3d 309, 325 (2d Cir. 2009), rev'd on other grounds by AEP, 564 U.S. 410, 131 S.Ct. 2527. The Second Circuit found that "[a] decision by a single federal court concerning a common law of nuisance cause of action, brought by domestic plaintiffs against domestic companies for domestic conduct, does not establish a national or international emissions policy." Id. The City's claims against both foreign and domestic corporations, all five of whom produce and sell fossil fuels worldwide, are thus clearly distinguishable in this regard.

CONCLUSION

For the reasons stated above, the U.S.-based Defendants' motion to dismiss is GRANTED and the City's amended complaint is dismissed with prejudice in its entirety. The Clerk of Court is respectfully directed to terminate the motions docketed at ECF Nos. 95, 99, and 102 and to close this case.

SO ORDERED.

All Citations

325 F.Supp.3d 466

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Re: FW: materials

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: December 3, 2018 9:54:04 PM CST

Larry Shapiro is the person I've met at RFF who has worked on pipeline issues.

https://www.rffund.org/about/staff

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Mon, Dec 3, 2018 at 9:38 PM Michael Noble <Noble@fresh-energy.org> wrote:

> Here's the 3 docs I got. I only read through the Boulder one.
>
> Michael Noble
>
> Executive Director
>
> Fresh Energy
>
> Phone 651 726 7563
>
> www.fresh-energy.org | twitter.com/nobleideas
>
> -
>
> *Practical policy. Brighter future.* ***Support our work today****.*

From: Michael Noble
Sent: Monday, November 19, 2018 5:20 PM
To: Sarah Clark <clark@fresh-energy.org>
Subject: Fwd: materials

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

From: Lee Wasserman <lwasserman@me.com>
Sent: Monday, November 19, 2018 4:25:19 PM
To: Michael Noble
Subject: materials

M, attached is a complaint and a couple of briefs.

I think this will give you some good background. The Boulder complaint is a page-turner. Probably worth checking out before you make initial calls.

thanks!

PS using this email for a specific reason we can discuss when we next talk. Happy Turkey Day.

Re: FW: materials

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: December 3, 2018 10:06:42 PM CST

And here's a nice summary of all the state/city climate lawsuits against the oil companies.

http://climatecasechart.com/case-category/common-law-claims/

Alexandra B. Klass
Distinguished McKnight University Professor
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thanks!

PS using this email for a specific reason we can discuss when we next talk. Happy Turkey Day.

I'm driving electric 🚘

From:	Michael Noble <info@fresh-energy.org>
To:	aklass@umn.edu
Sent:	December 18, 2018 10:00:58 AM CST
Received:	December 18, 2018 10:01:04 AM CST

View this email in your browser

Michael gets an electric vehicle... at last!

Fresh Energy's staff, board, and families own a total of nine plug-in electric vehicles. Until recently, that number didn't include our executive director, Michael Noble. Find out why it was so hard for Michael to buy electric.

Early bird registration open for Beyond Gas

When we use natural gas to power our communities, we invest in carbon-intensive fossil fuels—and put our health at risk. Join us on January 24 for a discussion of how to reduce natural gas in our buildings with clean electricity.

Make way for clean electric transportation

The Public Utilities Commission announced that utilities will now be required to file detailed plans next year on how they will help increase electric vehicle adoption. This is a big step for Minnesota. Learn why.

Carbon sequestration is part of the package

To reduce greenhouse gas emissions and slow climate change, we must decarbonize our energy systems. Our senior policy associate, Margaret Cherne-Hendrick explains how carbon sequestration can help.

Our legislative priorities for 2019
Where do energy and climate fit into Minnesota's new legislative landscape? Learn from our government affairs director, Justin Fay, what items will likely be at the top of the list for discussion.

Upcoming Events

December 19 | Live discussion: Reflections on COP24, United Nations' Global Climate Change Summit
What did our science policy director, J. Drake Hamilton, take home from the global climate discussions? Join our live chat tomorrow to get the insider details.

January 24 | Beyond Gas: How can we live better with clean electricity? Hear from two experts on how we can all move toward clean electricity with super-efficient buildings that only require small amounts of wind and solar electricity to heat and cool.

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Michael finally gets an electric vehicle: why was it so hard? | Fresh Energy

From: Alexandra Klass <aklass@umn.edu>
To: Noble@fresh-energy.org

Sent: December 18, 2018 10:14:35 AM CST
Received: December 18, 2018 10:14:36 AM CST

Good article! Have I ever told you [redacted] And also a funny story when I [redacted] many years ago. Remind me next time I see you.

https://fresh-energy.org/michael-finally-gets-an-electric-vehicle-why-was-it-so-hard/

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
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612-625-0155
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Help us reach our goal.

From: Dan Haugen <haugen@fresh-energy.org>
To: Alexandra <aklass@umn.edu>

Sent: December 28, 2018 8:59:49 AM CST
Received: December 28, 2018 8:59:55 AM CST

View this email in your browser

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Thank you for reading,

Dan Haugen
Managing Editor
Energy News Network

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Re: FW: materials

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: December 29, 2018 3:55:17 PM CST

What's the status?

Alex

Alexandra B. Klass
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Bio: https://www.law.umn.edu/profiles/alexandra-klass

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thanks!

PS using this email for a specific reason we can discuss when we next talk. Happy Turkey Day.

Re: materials

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: December 29, 2018 5:13:54 PM CST

What did you discus with Prentiss about his role? Since I hadn't heard from you I thought he was perhaps handling it. I'm happy to write something up on the substance of the lawsuits although Prentiss is the expert on the issue of AG authority. Should the three of us speak with the folks at Rockefeller?

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
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229-19th Avenue South
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Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Sat, Dec 29, 2018 at 4:43 PM Michael Noble <Noble@fresh-energy.org> wrote:

> You can have more time. We have 3 parts to present to Ellison: your memo, an organizing and grassroots support plan; a summary of damages and impacts to MN industry, infrastructure, agriculture, natural resources.
> His transition team people say give him a couple weeks after swearing in, so I would be happy to have the memo by mid to late Jan.
> Do you want to do a phone call with the lawyers advising Rockefeller family fund?
> Michael Noble
> Executive Director
> Fresh Energy
> Direct: 651 726-7563
> Mobile: 612 963-1268
> Web: Www.fresh-energy.org
> Twitter: @NobleIdeas
>
> **From:** Alexandra Klass <aklass@umn.edu>
> **Sent:** Saturday, December 29, 2018 3:55 PM
> **To:** Michael Noble
> **Subject:** Re: FW: materials
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> Alex
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> Distinguished McKnight University Professor
> University of Minnesota Law School
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Michael Noble

Executive Director

Fresh Energy

Phone 651 726 7563

www.fresh-energy.org | twitter.com/nobleideas

-

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Sent: Monday, November 19, 2018 5:20 PM
To: Sarah Clark <clark@fresh-energy.org>
Subject: Fwd: materials

Michael Noble

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From: Michael Noble <Noble@fresh-energy.org>
To: Alexandra Klass <aklass@umn.edu>
Sent: December 29, 2018 6:10:53 PM CST
Received: December 29, 2018 6:10:58 PM CST

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From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: December 29, 2018 9:46:35 PM CST

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Sent: December 30, 2018 8:45:16 AM CST

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From: Michael Noble <Noble@fresh-energy.org>
To: Alexandra Klass <aklass@umn.edu>
Sent: December 30, 2018 8:48:06 AM CST
Received: December 30, 2018 8:48:12 AM CST

Yes we have funding and we can write a simple contract

Michael Noble
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Sent: December 30, 2018 2:49:33 PM CST
Received: December 30, 2018 2:49:39 PM CST

I'm super excited about this project. I think the politics of the day will give him cover. We only accepted a modest amount of money because I don't want to launch any big effort unless he wants to do it.

I'll call the folks in NY and we'll get the whole team on a call.

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>
> aklass@umn.edu
>
> Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Sat, Dec 29, 2018 at 6:10 PM Michael Noble <Noble@fresh-energy.org> wrote:

Prentiss says he absolutely has total authority as “father of the people”. Doesn’t need anyone’s approval.

Prentiss has some advisor role on strategy there, perhaps clout it seems over how Keith will respond. He was one of 4-5 transition team members I talked to who didn’t want me to talk to him before he gets settled in.

I asked him to assist you on the legal authority question. He said he would but it was a simple “yes”.

Michael Noble
Executive Director
Fresh Energy
Direct: 651 726-7563
Mobile: 612 963-1268
Web: Www.fresh-energy.org
Twitter: @NobleIdeas

From: Alexandra Klass <aklass@umn.edu>
Sent: Saturday, December 29, 2018 5:14 PM
To: Michael Noble
Subject: Re: materials

What did you discus with Prentiss about his role? Since I hadn't heard from you I thought he was perhaps handling it. I'm happy to write something up on the substance of the lawsuits although Prentiss is the expert on the issue of AG authority. Should the three of us speak with the folks at Rockefeller?

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Sat, Dec 29, 2018 at 4:43 PM Michael Noble <Noble@fresh-energy.org> wrote:

You can have more time. We have 3 parts to present to Ellison: your memo, an organizing and grassroots support plan; a summary of damages and impacts to MN industry, infrastructure, agriculture, natural resources.

His transition team people say give him a couple weeks after swearing in, so I would be happy to have the memo by mid to late Jan.

Do you want to do a phone call with the lawyers advising Rockefeller family fund?

Michael Noble
Executive Director
Fresh Energy
Direct: 651 726-7563
Mobile: 612 963-1268
Web: Www.fresh-energy.org
Twitter: @NobleIdeas

From: Alexandra Klass <aklass@umn.edu>
Sent: Saturday, December 29, 2018 3:55 PM
To: Michael Noble
Subject: Re: FW: materials

What's the status?

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Mon, Dec 3, 2018 at 9:38 PM Michael Noble <Noble@fresh-energy.org> wrote:

Here's the 3 docs I got. I only read through the Boulder one.

Michael Noble

Executive Director

Fresh Energy

Phone 651 726 7563

www.fresh-energy.org | twitter.com/nobleideas

-

Practical policy. Brighter future. ***Support our work today****.*

From: Michael Noble
Sent: Monday, November 19, 2018 5:20 PM
To: Sarah Clark <clark@fresh-energy.org>
Subject: Fwd: materials

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

From: Lee Wasserman <lwasserman@me.com>

Sent: Monday, November 19, 2018 4:25:19 PM

To: Michael Noble

Subject: materials

M, attached is a complaint and a couple of briefs.

I think this will give you some good background. The Boulder complaint is a page-turner. Probably worth checking out before you make initial calls.

thanks!

PS using this email for a specific reason we can discuss when we next talk. Happy Turkey Day.

Double your impact. We need you now.

From:	Ken Paulman <paulman@fresh-energy.org>
To:	Alexandra <aklass@umn.edu>
Sent:	December 31, 2018 8:00:21 AM CST
Received:	December 31, 2018 8:00:31 AM CST

View this email in your browser

Last day to double your support!

Dear friend,

I'll keep this short: We need your help to reach our fundraising goal of $10,000 by midnight tonight. We're so close, with over 50% already raised, and your donation could be the one that gets us past the finish line.

Regional, independent journalism like ours is needed now more than ever, but we truly can't do it alone. What do you say? Will you join the cause?

Make your tax-deductible, double-your-impact donation by midnight to keep our accountability journalism thriving.

Donate by midnight!

NewsMatch has generously committed to match every new monthly donation and double every one-time donation up to $1,000. Don't miss your chance to help us make the most of these matching funds.

Thank you for reading, and all the best to you in 2019.

Ken Paulman
Director
Energy News Network

P.S. Please help us spread the word! Forward this email to friends and colleagues who you think would be interested in helping support our work.

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Our mailing address is:
Energy News Network
408 Saint Peter St
Suite 220
St. Paul, MN 55102

Want to change how you receive these emails?
You can Update your preferences or unsubscribefrom this list.

Last chance: It's not too late!

From:	Ken Paulman <paulman@fresh-energy.org>
To:	Alexandra <aklass@umn.edu>
Sent:	December 31, 2018 7:59:37 PM CST
Received:	December 31, 2018 7:59:45 PM CST

View this email in your browser

Final hours to double your impact!

Dear Friend,

There are only a few hours left to double your impact to the Energy News Network. When the clock strikes midnight, NewsMatch 2018 will come to a close.

This year has been great for the Energy News Network and we couldn't have done it without you!

Give now to double your gift make the most of your investment.

Donate Now

Happy New Year and thank you for reading,

Ken Paulman
Director
Energy News Network

P.S. Please help us spread the word! Forward this email to friends and colleagues who you think would be interested in helping support our work.

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Our mailing address is:
Energy News Network
408 Saint Peter St
Suite 220
St. Paul, MN 55102

Want to change how you receive these emails?
You can Update your preferences or unsubscribefrom this list.

Talk with our NY attorney friend?

From:	Michael Noble <Noble@fresh-energy.org>
To:	aklass@umn.edu
Cc:	Sarah Clark <clark@fresh-energy.org>
Sent:	January 2, 2019 12:10:21 PM CST
Received:	January 2, 2019 12:10:25 PM CST

Hi Alex

Her name is Judith Enck at Climate Integrity, formerly at NY AG.

We'll try to reach her today for a call tomorrow or next day. What are all your open time slots those 2 days?

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

Re: Talk with our NY attorney friend?

From: Alexandra Klass <aklass@umn.edu>
To: Michael Noble <Noble@fresh-energy.org>
Sent: January 2, 2019 1:42:51 PM CST
Received: January 2, 2019 1:42:52 PM CST

[redacted] and have some flexibility so why don't you see what works for her.

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155

On Jan 2, 2019, at 10:10 AM, Michael Noble <Noble@fresh-energy.org> wrote:

> Hi Alex
> Her name is Judith Enck at Climate Integrity, formerly at NY AG.
> We'll try to reach her today for a call tomorrow or next day. What are all your open time slots those 2 days?
> Michael Noble
> Executive Director
> Fresh Energy
> Direct: 651 726-7563
> Mobile: 612 963-1268
> Web: Www.fresh-energy.org
> Twitter: @NobleIdeas

RE: Talk with our NY attorney friend?

From: Sarah Clark <clark@fresh-energy.org>
To: Michael Noble <Noble@fresh-energy.org>, aklass@umn.edu
Sent: January 2, 2019 3:27:12 PM CST
Received: January 2, 2019 3:27:17 PM CST

Hi Alex –

Does Thursday (1/3) at noon Central Time work for you? The afternoon works generally for Judith – we could make other times work on our end with some juggling. Let us know.

Thanks!

Sarah

From: Alexandra Klass <aklass@umn.edu>

Sent: Wednesday, January 2, 2019 1:42 PM

To: Michael Noble

Subject: Re: Talk with our NY attorney friend?

[redacted] and have some flexibility so why don't you see what works for her.

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
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>
> Michael Noble
>
> Executive Director

Fresh Energy
Direct: 651 726-7563
Mobile: 612 963-1268

Web: Www.fresh-energy.org
Twitter: @NobleIdeas

Climate change litigation webinar

From:	Alexandra Klass <aklass@umn.edu>
To:	Savannah Eldridge <savannah@sheredling.com>
Sent:	January 2, 2019 3:37:38 PM CST
Received:	January 2, 2019 3:37:41 PM CST

Hi Savannah, I participated in the webinar back in May and was hoping to get a copy of the slides that were used as well as any updated information you may have on the various cases since that time (if you have an updated summary).

Thanks for any help you can provide and happy new year.

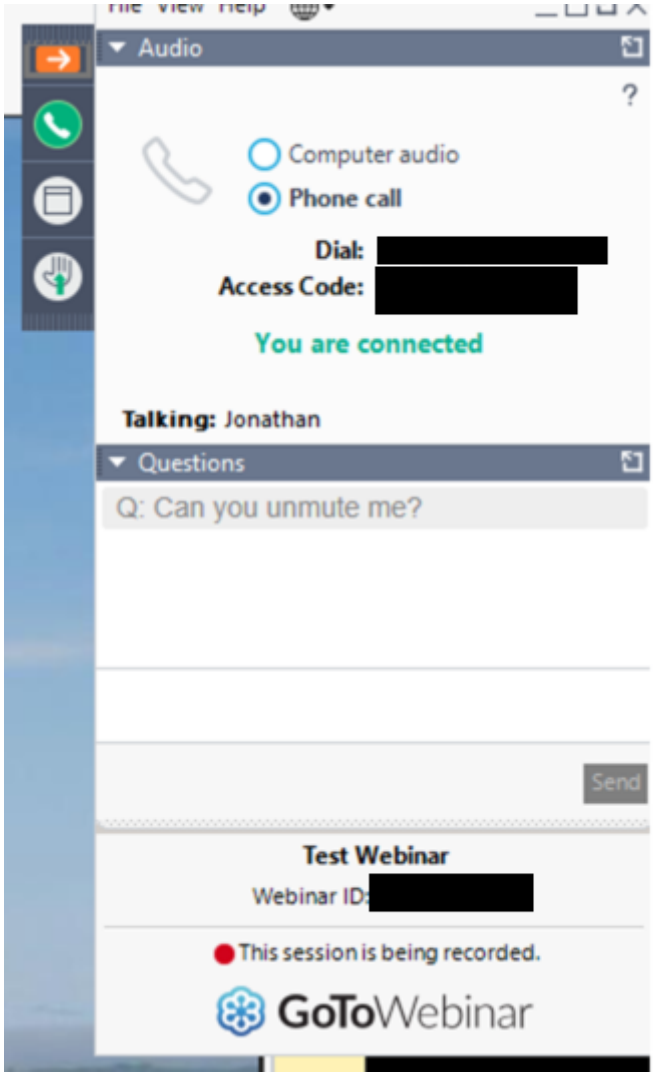
Best,

Alex Klass

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155
Bio: https://www.law.umn.edu/facultyprofiles/klassa.html

On May 18, 2018, at 11:11 AM, Savannah Eldridge <savannah@sheredling.com> wrote:

> Hi all,
>
> I wanted to let you know that all attendees will be muted. Please send in any questions you have through the question section of the control panel on your screen. I have included an image below of what this should look like. Let me know if you have any questions.



Thank you,
Savannah

Savannah Eldridge
Administrative & Case Assistant

SHER EDLING LLP
100 Montgomery St., Ste. 1410
San Francisco CA 94104
(628) 231-2527| sheredling.com

From: Ann Carlson <moorcarlson@me.com>
Sent: Thursday, May 17, 2018 6:55 PM
To: william buzbee <william.buzbee@law.georgetown.edu>; Gregory Dotson <gdotson@uoregon.edu>; vflatt@central.uh.edu; rmfrank@ucdavis.edu; ohouck@tulane.edu; Sharon Jacobs <sharon.jacobs@colorado.edu>; aklass@umn.edu; Doug Kysar <douglas.kysar@yale.edu>; alexandra.lahav@uconn.edu; Richard Lazarus <lazarus@law.harvard.edu>; mlivermore@law.virginia.edu; jpidot@law.du.edu; JB Ruhl <jb.ruhl@Law.Vanderbilt.Edu>; eryan@fsu.edu; James Salzman <salzman@bren.ucsb.edu>; David Spence <David.Spence@mccombs.utexas.edu>; gt276@cornell.edu; verchick@loyno.edu; mwood@uoregon.edu; Adell Amos <aamos@uoregon.edu>; Hannah Wiseman <hwiseman@fsu.edu>; michael.vandenbergh@law.vanderbilt.edu; emerson@law.ucla.edu
Cc: Kevin Kirchner <kevin@sheredling.com>; Patrick Parenteau <PPARENTEAU@vermontlaw.edu>; Vic Sher <vic@sheredling.com>; Matt Edling <matt@sheredling.com>; Savannah Eldridge <savannah@sheredling.com>
Subject: Webinar Access Info

Hi all,

Here is the sign in information for tomorrow's webinar. Looking forward to seeing you virtually!

> Please register for: *Climate Consequences: Using Tort Law to Recover Costs of Climate Change* on May 18, 2018 10:30 AM PDT
> at: https://attendee.gotowebinar.com/register/6719432607450942210
>
> After registering, you will receive a confirmation email containing information about joining the webinar.

Best,

Ann

Re: Talk with our NY attorney friend?

From:	Alexandra Klass <aklass@umn.edu>
To:	Sarah Clark <clark@fresh-energy.org>
Cc:	Michael Noble <Noble@fresh-energy.org>
Sent:	January 2, 2019 3:46:36 PM CST
Received:	January 2, 2019 3:46:37 PM CST

Hi Sarah, would it work if we talked at 2 pm CT tomorrow? I know I can be available then. Later than afternoon, say up until 4 pm CT, is OK too.

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155
Bio: https://www.law.umn.edu/facultyprofiles/klassa.html

On Jan 2, 2019, at 1:27 PM, Sarah Clark <clark@fresh-energy.org> wrote:

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>
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>
> Thanks!
>
> Sarah
>
> **From:** Alexandra Klass <aklass@umn.edu>
>
> **Sent:** Wednesday, January 2, 2019 1:42 PM
>
> **To:** Michael Noble
>
> **Subject:** Re: Talk with our NY attorney friend?
>
> _____ and have some flexibility so why don't you see what works for her.
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> Alex
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> Alexandra B. Klass
> Distinguished McKnight University Professor
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612-625-0155

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>
> Web: Www.fresh-energy.org
> Twitter: @NobleIdeas

RE: Talk with our NY attorney friend?

From:	Sarah Clark <clark@fresh-energy.org>
To:	Alexandra Klass <aklass@umn.edu>
Cc:	Michael Noble <Noble@fresh-energy.org>, Jillian Theuer <theuer@fresh-energy.org>
Sent:	January 2, 2019 3:52:02 PM CST
Received:	January 2, 2019 3:52:08 PM CST

Hi Alex –

Judith can't talk between 2 and 3. Sounds like 3PM CT would be ok for you? Looping in Jillian Theuer who can get all of us on the calendar together with a call in number.

Thanks!

Sarah

From: Alexandra Klass <aklass@umn.edu>
Sent: Wednesday, January 2, 2019 3:47 PM
To: Sarah Clark <clark@fresh-energy.org>
Cc: Michael Noble <Noble@fresh-energy.org>
Subject: Re: Talk with our NY attorney friend?

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>
> **From:** Alexandra Klass <aklass@umn.edu>
>
> **Sent:** Wednesday, January 2, 2019 1:42 PM

To: Michael Noble

Subject: Re: Talk with our NY attorney friend?

[redacted] and have some flexibility so why don't you see what works for her.

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155

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> Twitter: @NobleIdeas

Re: Talk with our NY attorney friend?

From:	Alexandra Klass <aklass@umn.edu>
To:	Sarah Clark <clark@fresh-energy.org>
Cc:	Michael Noble <Noble@fresh-energy.org>, Jillian Theuer <theuer@fresh-energy.org>
Sent:	January 2, 2019 3:57:42 PM CST
Received:	January 2, 2019 3:57:43 PM CST

Yes, let's plan on that.

Thanks,

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155
Bio: https://www.law.umn.edu/facultyprofiles/klassa.html

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Sent: Wednesday, January 2, 2019 1:42 PM

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Subject: Re: Talk with our NY attorney friend?

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> Direct: 651 726-7563
> Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

Phone Call - Michael Noble, Sarah Clark, Judith Eck, Alex Klass

From:	Michael Noble <Noble@fresh-energy.org>
To:	Sarah Clark <clark@fresh-energy.org>, Judith Eck <judith@climateintegrity.org>, aklass@umn.edu
Sender:	Jillian Theuer <theuer@fresh-energy.org>
Sent:	January 2, 2019 4:06:14 PM CST
Received:	January 2, 2019 4:06:17 PM CST

Dial-in:
Access:

You're invited: Power Pairing on January 24

From: Fresh Energy <info@fresh-energy.org>
To: Alexandra <aklass@umn.edu>

Sent: January 3, 2019 11:14:21 AM CST
Received: January 3, 2019 11:14:23 AM CST

View this email in your browser

Beyond Gas:

How can we live better with clean electricity?

Greetings Alexandra,

As a Fresh Energy Power Circle member, we invite you to be our guest at our upcoming Power Pairing event—Beyond Gas: How can we live better with clean electricity? Join Fresh Energy for a conversation about how to reduce gas in our buildings, and what it will take for new homes and developments, such as the Saint Paul Ford site, to be built with zero carbon and no gas.

Space is limited, and registration is required. To register for your complimentary ticket, please click the blue "Register today" button below. On the second page of registration, select the last ticket type, "Fresh Energy Power Circle members/Guest of Fresh Energy" and complete your registration.

Thank you for supporting Fresh Energy. We hope you can join us on January 24 for what promises to be an exciting conversation!

Register today

Thursday, January 24, 2019

7:00 - 8:30 AM

Town and Country Club

300 North Mississippi River Boulevard

Saint Paul, Minnesota 55104

When we use natural gas to power our communities, we invest in carbon-intensive fossil fuels—and put our health at risk. Children who live in homes with gas cooking stoves are at a higher risk for asthma complications and recent gas explosions are chilling reminders that when we depend on gas, we are combusting volatile fuels in and around the places we call home.

What would it take to move beyond gas, with super-efficient buildings that only require small amounts of wind and solar electricity to heat and cool?

Join Fresh Energy for a conversation with Bruce Nilles, internationally known for his leadership in moving the United States off of fossil fuel, and Sherri Billimoria, an expert in the economics of electrification.

With a dynamic format, Fresh Energy's Power Pairings breakfast events are an opportunity to hear two leaders share their expertise and participate in an engaging conversation around key energy issues facing Minnesota.

Bruce Nilles is well known for leading Sierra Club's Beyond Coal campaign and has now, as a Senior Fellow at the Rocky Mountain Institute, turned his attention to

electrifying the buildings sector.

Sherri Billimoria recently authored a ground-breaking report on the economics of electrifying buildings and focuses on low-income communities and energy solutions at the in the Rocky Mountain Institute's Electricity Practice.

Register today

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Our mailing address is:
Fresh Energy
408 Saint Peter Street, Suite 220
Saint Paul, MN 55102

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unsubscribe from this list update subscription preferences

great to connect

From:	Alyssa Johl <alyssa@climateintegrity.org>
To:	aklass@umn.edu
Sent:	January 3, 2019 4:02:58 PM CST
Received:	January 3, 2019 4:03:13 PM CST
Attachments:	Case Docket - US Climate Liability.xlsx

Hi Alex,

It was a pleasure speaking with you this afternoon. Attached is the resource I mentioned, I will take a look through my files to see what else might be useful to you (I won't inundate you, I promise!). All of the info provided here is publicly available, but I would ask that you not share this document beyond your core research team.

Please do not hesitate to contact me or Judith with any questions as you pursue this research.

Many thanks,
Alyssa

--
Alyssa Johl
Legal Counsel
Center for Climate Integrity
T: +1-510-435-6892 | E: alyssa@climateintegrity.org

1. Case Docket - US Climate Liability.xlsx

Type:	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
Size:	47 KB (48,449 bytes)

Case Name	Case No
Damages Cases	
County of San Mateo v Chevron	18-15499, 18-15502, 18-15503, 18-16376
People of State of CA v BP	18-16663
City of New York v BP	18-2188
Boulder County v Suncor	18-cv-01672
State of Rhode Island v Shell	18-cv-00395
City of Baltimore v BP	18-cv-02357
PCFFA v Chevron	18-cv-7477
Countersuits	
Exxon v City of San Francisco	02-18-00106-CV
Exxon v Healey	18-1170
Inactive Cases (dismissed/stayed pending appeal)	
County of San Mateo v Chevron	17-cv-04929, 17-cv-04934, 17-cv-04935
People of State of CA v BP	17-cv-06011, 17-cv-06012
City of Santa Cruz v Chevron	18-cv-00458
County of Santa Cruz v Chevron	18-cv-00450
City of New York v BP	18-cv-00182
City of Richmond v Chevron	18-cv-00732
Exxon v City of San Francisco	096-297222-18
Exxon v Healey	17-cv-02301
King County v BP	18-cv-00758

Total damages lawsuits filed:

1. San Mateo County
2. Marin County
3. City of Imperial Beach
4. San Francisco (City and County)
5. Oakland
6. Santa Cruz
7. Santa Cruz County
8. New York City
9. Richmond
10. Boulder, Boulder County, San Miguel County
11. King County
12. Rhode Island
13. Baltimore
14. PCFFA

Date Filed

3/26/18
8/24/18
7/26/18
4/17/18
7/2/18
7/20/18
11/14/18

4/9/18
4/23/18

7/17/17
9/19/17
12/20/17
12/20/17
1/9/18
1/22/18
1/8/18
3/30/17
5/9/18

CA
CA
CA
CA
CA
CA
CA
NY
CA
CO
WA
RI
MD
CA

Plaintiffs

37 FF cos
San Francisco (city and county), Oakland
New York City
Boulder County, San Miguel County, City of Boulder
Rhode Island
Baltimore
Pacific Coast Federation of Fisherman's Association

Matt Pawa, John Beiers, John Maltbie, Jennifer Lyon, Andy Hall, Serge Dedina, Brian Washington, Matth
Exxon

San Mateo County, Marin County, Imperial Beach
San Francisco (city and county), Oakland
Santa Cruz
Santa Cruz County
New York City
Richmond
Exxon
Exxon
King County

Defendants

San Mateo County, Imperial Beach, Marin County, Richmond, Santa Cruz (city and county)
BP, Chevron, ConocoPhilipps, Exxon, Shell
BP, Chevron, ConocoPhilipps, Exxon, Shell
Exxon, Suncor
21 FF cos
26 FF cos
30 FF cos

Exxon
Maura Healey, Barbara Underwood

37 FF cos
BP, Chevron, ConocoPhilipps, Exxon, Shell
29 FF cos
29 FF cos
BP, Chevron, ConocoPhilipps, Exxon, Shell
29 FF cos
Matt Pawa, John Beiers, John Maltbie, Jennifer Lyon, Andy Hall, Serge Dedina, Brian Washington, Matth
Maura Healey, Barbara Underwood
BP, Chevron, ConocoPhilipps, Exxon, Shell

Lawyers	Court
Sher Edling	Ninth Circuit
Sher Edling	Ninth Circuit
Hagens Berman	Second Circuit
Hannon Law Firm/ERI/Niskanen Center	CO District Court
Sher Edling	RI District Court
Sher Edling	MD District Court
Sher Edling	CA Northern District
Hagens Berman/Sher Edling	TX Court of Appeals
MA and NY Attorneys General	Second Circuit
Sher Edling	CA Northern District
Hagens Berman	CA Northern District
Sher Edling	CA Northern District
Sher Edling	CA Northern District
Hagens Berman	NY Southern District
Sher Edling	CA Northern District
Hagens Berman/Sher Edling	District Court of Tarrant County (TX)
MA and NY Attorneys General	NY Southern District
Hagens Berman	WA Western District

Judge

Schroeder, Silverman, Smith Jr

Crews
Smith
Hollander
Chhabria

Winter

Chhabria
Alsup
Chhabria
Chhabria
Keenan
Chhabria
Wallace Jr
Caproni
Lasnik

Procedural Status

Parties to file briefs re appeal of remand orders
Parties to file briefs re appeal of dismissal
Parties to file briefs re appeal of dismissal
Remand issue fully briefed
Remand issue fully briefed
Parties to file briefs re remand issue
Parties to file briefs re remand issue

Appellants to file reply brief on Dec 17
Appeal fully briefed; oral argument TBD

Judge's orders to remand stayed pending appeal
Case dismissed on 6/25/18
Judge's orders to remand stayed pending appeal
Judge's orders to remand stayed pending appeal
Case dismissed on 7/19/18
Judge's orders to remand stayed pending appeal
Request for pre-trial discovery granted; defendants filed notice of appeal w TX Court of Appeals
Case dismissed on 3/30/18
Stayed pending resolution of cases before Ninth Circuit

Upcoming Deadlines/Milestones

Dec 2018/Jan 2019
Dec 2018/Jan 2019
Nov/Dec 2018
TBD: hearing on motion to remand
Feb 6: hearing on motion to remand

Complaint

http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documen
http://www.riag.ri.gov/documents/KilmartinVChevronEtAl.pdf
https://law.baltimorecity.gov/sites/default/files/Climate%20Change%20Complaint.pdf

http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documen
http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documen
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http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documen

Other Notes

case manager is Wilson Dudley, 212-857-8539
ıts/2018/20180417_docket-2018CV030349_complaint.pdf

ıts/2017/20171220_docket-17CV03243-_complaint.pdf
ıts/2017/20171220_docket-17CV03242-_complaint.pdf
ıts/2018/20180109_docket-118-cv-00182_complaint-1.pdf
ıts/2018/20180122_docket-C18-00055_complaint.pdf

ıts/2018/20180509_docket-18-2-11859-0-_complaint.pdf

Re: great to connect

From:	Alexandra Klass <aklass@umn.edu>
To:	Alyssa Johl <alyssa@climateintegrity.org>
Sent:	January 4, 2019 6:23:29 PM CST
Received:	January 4, 2019 6:23:34 PM CST

Thanks Alyssa. Can you give me Judith's contact info too?

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155

On Jan 3, 2019, at 2:02 PM, Alyssa Johl <alyssa@climateintegrity.org> wrote:

> Hi Alex,
>
> It was a pleasure speaking with you this afternoon. Attached is the resource I mentioned, I will take a look through my files to see what else might be useful to you (I won't inundate you, I promise!). All of the info provided here is publicly available, but I would ask that you not share this document beyond your core research team.
>
> Please do not hesitate to contact me or Judith with any questions as you pursue this research.
>
> Many thanks,
> Alyssa
>
> --
> Alyssa Johl
> Legal Counsel
> Center for Climate Integrity
> T: +1-510-435-6892 | E: alyssa@climateintegrity.org
>
> <Case Docket - US Climate Liability.xlsx>

Re: great to connect

From:	Alyssa Johl <alyssa@climateintegrity.org>
To:	Alexandra Klass <aklass@umn.edu>
Cc:	Judith Enck <judith@climateintegrity.org>
Sent:	January 7, 2019 10:37:26 AM CST
Received:	January 7, 2019 10:37:40 AM CST

Hi Alex,

Absolutely. I had intended to cc Judith on my message but apparently forgot!

Judith's email is judith@climateintegrity.org.

Thanks,
Alyssa

On Fri, Jan 4, 2019 at 7:23 PM Alexandra Klass <aklass@umn.edu> wrote:

> Thanks Alyssa. Can you give me Judith's contact info too?
>
> Alex
>
> Alexandra B. Klass
> Distinguished McKnight University Professor
> University of Minnesota Law School
> aklass@umn.edu
> 612-625-0155
>
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> > Alyssa Johl
> > Legal Counsel
> > Center for Climate Integrity
> > T: +1-510-435-6892 | E: alyssa@climateintegrity.org
> >
> > <Case Docket - US Climate Liability.xlsx>

$3K contract

From:	Michael Noble <Noble@fresh-energy.org>
To:	Ellen Palmer <palmer@fresh-energy.org>
Cc:	Alexandra Klass <aklass@umn.edu>
Sent:	January 8, 2019 11:21:00 AM CST
Received:	January 8, 2019 11:21:03 AM CST

Ellen,

Alex is verifying with the law school financial people to make sure this can all go to its intended purpose, but she also strongly agrees that there shouldn't be Fresh Energy funding law students direct.

This would be very likely be 100% expended all by 1/31/19 (but maybe you or Alex would rather write the contract for 2 months instead of one.

I'm indifferent.

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

RE: $3K contract

From:	Ellen Palmer <palmer@fresh-energy.org>
To:	Michael Noble <Noble@fresh-energy.org>
Cc:	Alexandra Klass <aklass@umn.edu>
Sent:	January 8, 2019 11:26:59 AM CST
Received:	January 8, 2019 11:27:04 AM CST

Great, thanks. The contract should cover the period in which the work takes place, whether that be one or two months.

Ellen Palmer
Chief Operations and Finance Officer
Fresh Energy
Phone 651 294 7142
www.fresh-energy.org | twitter.com/freshenergy

Practical policy. Brighter future. ***Support our work today****.*

From: Michael Noble <Noble@fresh-energy.org>
Sent: Tuesday, January 8, 2019 11:21 AM
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Alexandra Klass <aklass@umn.edu>
Subject: $3K contract

Ellen,

Alex is verifying with the law school financial people to make sure this can all go to its intended purpose, but she also strongly agrees that there shouldn't be Fresh Energy funding law students direct.

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I'm indifferent.

Michael Noble

Executive Director
Fresh Energy
Direct: 651 726-7563
Mobile: 612 963-1268

Web: Www.fresh-energy.org
Twitter: @NobleIdeas

Re: $3K contract

From: Alexandra Klass <aklass@umn.edu>
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Michael Noble <Noble@fresh-energy.org>
Sent: January 8, 2019 12:05:12 PM CST

Dear Ellen and Michael: Let's make it for 2 months as you suggest. Here are details from our finance department:

(1) The contract should be between Fresh Energy and the "Regents of the University of Minnesota through its Law School." The law school's finance director, Robin Dittmann, will sign the contract.
(2) The check should be made payable to The University of Minnesota Foundation. You can mail it to the Law School at:

University of Minnesota Law School
Attn Robin Dittmann
229 19th Avenue South
Minneapolis, MN 55455

Best,

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Tue, Jan 8, 2019 at 11:27 AM Ellen Palmer <palmer@fresh-energy.org> wrote:

> Great, thanks. The contract should cover the period in which the work takes place, whether that be one or two months.

Ellen Palmer

Chief Operations and Finance Officer

Fresh Energy

Phone 651 294 7142

www.fresh-energy.org | twitter.com/freshenergy

Practical policy. Brighter future. ***Support our work today****.*

From: Michael Noble <Noble@fresh-energy.org>
Sent: Tuesday, January 8, 2019 11:21 AM
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Alexandra Klass <aklass@umn.edu>
Subject: $3K contract

Ellen,

Alex is verifying with the law school financial people to make sure this can all go to its intended purpose, but she also strongly agrees that there shouldn't be Fresh Energy funding law students direct.

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I'm indifferent.

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

Talk by phone?

From:	J. Drake Hamilton <Hamilton@fresh-energy.org>
To:	aklass@umn.edu
Sent:	January 8, 2019 1:50:16 PM CST
Received:	January 8, 2019 1:50:22 PM CST

Hi Alex,

I am at a workshop in the Arizona desert with almost no connectivity . Can we talk by phone on Thursday after 2 or Friday afternoon ?

Thank you.

J.

Get Outlook for Android

Re: Talk by phone?

From:	Alexandra Klass <aklass@umn.edu>
To:	J. Drake Hamilton <Hamilton@fresh-energy.org>
Sent:	January 8, 2019 2:02:28 PM CST
Received:	January 8, 2019 2:02:28 PM CST

How about Friday at 2?

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155
Bio: https://www.law.umn.edu/facultyprofiles/klassa.html

On Jan 8, 2019, at 1:50 PM, J. Drake Hamilton <Hamilton@fresh-energy.org> wrote:

> Hi Alex,
>
> I am at a workshop in the Arizona desert with almost no connectivity . Can we talk by phone on Thursday after 2 or Friday afternoon ?
>
> Thank you.
>
> J.
>
> Get Outlook for Android

Re: Talk by phone?

From: Alexandra Klass <aklass@umn.edu>
To: J. Drake Hamilton <Hamilton@fresh-energy.org>
Sent: January 8, 2019 2:31:46 PM CST

Call my cell phone at [redacted]

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Tue, Jan 8, 2019 at 2:27 PM J. Drake Hamilton <Hamilton@fresh-energy.org> wrote:

Yes, I will call you then at the number in your signature block unless you prefer another #.

Get Outlook for Android

From: Alexandra Klass <aklass@umn.edu>
Sent: Tuesday, January 8, 2019 3:02:28 PM
To: J. Drake Hamilton
Subject: Re: Talk by phone?

How about Friday at 2?
Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
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Thank you.

J.

Get Outlook for Android

Re: Talk by phone?

From: J. Drake Hamilton <Hamilton@fresh-energy.org>
To: Alexandra Klass <aklass@umn.edu>
Sent: January 8, 2019 2:35:32 PM CST
Received: January 8, 2019 2:35:35 PM CST

Got it.

Get Outlook for Android

From: Alexandra Klass <aklass@umn.edu>
Sent: Tuesday, January 8, 2019 3:31:46 PM
To: J. Drake Hamilton
Subject: Re: Talk by phone?

Call my cell phone at
Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

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Get Outlook for Android

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Sent: Tuesday, January 8, 2019 3:02:28 PM
To: J. Drake Hamilton
Subject: Re: Talk by phone?

How about Friday at 2?
Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
aklass@umn.edu
612-625-0155
Bio: https://www.law.umn.edu/facultyprofiles/klassa.html

On Jan 8, 2019, at 1:50 PM, J. Drake Hamilton <Hamilton@fresh-energy.org> wrote:

> Hi Alex,
>
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Thank you.

J.

Get Outlook for Android

Article Draft -- Regulating the Energy "Free Riders"

From:	Alexandra Klass <aklass@umn.edu>
To:	Allen Gleckner <gleckner@fresh-energy.org>
Sent:	January 9, 2019 11:27:03 AM CST
Attachments:	Regulating the Free Riders Draft 1 8 2019.docx

Dear Allen -- Happy new year! I hope all is well. I was hoping you might have time to read an early draft of a new article that discusses free riding arguments in state public utility commission proceedings involving energy efficiency, distributed solar, and EV charging. It is very rough, and I would love your comments/suggestions to make it better!

Best,

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

1. Regulating the Free Riders Draft 1 8 2019.docx

Type:	application/vnd.openxmlformats-officedocument.wordprocessingml.document
Size:	255 KB (261,464 bytes)

DRAFT – DO NOT CITE OR QUOTE WITHOUT AUTHOR'S PERMISSION

REGULATING THE ENERGY "FREE RIDERS"

Alexandra B. Klass*

This Article explores "free rider" arguments in energy policy. It focuses on how state public utility commissions have addressed free rider arguments in three different types of contemporary ratemaking proceedings: ratepayer funded energy efficiency programs; utility compensation for customer-generated rooftop solar energy; and utility investments in electric vehicle ("EV") charging infrastructure. In doing so, this Article evaluates the merits of the free riding arguments in each of these contexts, considers the impacts of the "free riding" label on policymaking in each area, and considers the weight policymakers should give to free rider concerns.

This Article claims that regulators should be cautious in evaluating free riding arguments and, in particular, consider the broader financial motivations of the parties making the free riding arguments. This is particularly true if free riding arguments are being made in opposition to the program in question rather than to evaluate the cost-effectiveness of the program. For instance, in the energy efficiency context, identifying free riders is a well-established metric in determining the cost-effectiveness of a particular energy efficiency program rather than an argument used to oppose energy efficiency programs in general. By contrast, in the rooftop solar and EV charging contexts, free riding and related arguments of fairness and cross subsidies are used strategically to oppose these programs when they are contrary to particular financial interests. Moreover, with regard to all free riding claims, it is important for regulators to consider both the present and future benefits of the program in question. In other words, if a goal of the program is to build infrastructure for a long-term policy goal, such as shifting to cleaner energy resources or reducing overall energy demand, program evaluators should consider future program beneficiaries in addition to current program beneficiaries. Moreover, regulators should use a range of tools to develop appropriate metrics to determine cost-effectiveness of programs supporting both distributed solar energy and EV charging investments, building on work done over the past decades in the energy efficiency context.

I. INTRODUCTION

As state regulators, electric utilities, and other interested parties attempt to develop programs to encourage a range of beneficial consumer behavior with regard to energy use, critics often are quick to argue that the beneficiaries of these programs are "free riders."[1] In its simplest terms, free riding is the receipt of a public good

---

* Distinguished McKnight University Professor, University of Minnesota Law School. Scott Dewey, Connie Lenz, and Hudson Peters provided excellent research assistance.

[1] *See, e.g.*, Charles E. Bayless, *Piggybacking on the Grid*, PUB. UTILS. FORT. (July 2015), https://perma.cc/SH9U-KJTD (comparing rooftop solar to "Piggyback Air," a mythical

without paying for its associated costs.[2] This Article will examine the use of free riding arguments in contemporary energy regulation. In particular, it will examine how state public utility commissions address arguments regarding free riding in three specific contexts: ratepayer funded energy efficiency programs; electric utility compensation for customer generated rooftop solar energy (also referred to as "net metering"); and electric utility investments in electric vehicle ("EV") charging infrastructure.

This Article claims that regulators should exercise caution in evaluating free riding arguments. In particular, regulators should always consider which parties are making free riding arguments, what their motivations might be, and consider a full range of costs and benefits associated with the policy under consideration before reaching a conclusion that free riding is occurring, that an unreasonable shift of costs between customer classes is taking place, or that the policy fails to meet a statutory requirement that it be "just and reasonable."[3]

Equally important, regulators need to be cognizant of the information asymmetries that permeate the utility regulatory proceedings involving claims of free riding. In many of the proceedings, "hard" data on program costs and benefits either is not available or is developed by the electric utility in question, at least at the start of the program. In the face of incomplete information, who should bear the burden of proving that a program such as energy efficiency, rooftop solar, or EV charging provides system-wide benefits and extent of those benefits? What if present-day benefits are modest but long-term benefits have the potential to be significant and measurable? These are important questions regulatory commissions are forced to answer in the early stages of customer-funded utility programs and labels of free

---

airline that works by attaching its engineless planes to the roofs of its competitors' aircraft); Prosper Org, *Ice Cream for Fairness*, YOUTUBE (Oct. 21, 2013), https://www.youtube.com/watch?reload=9&v=zJ8tToIeQ_U (electric utility-funded television advertisement suggesting that utility net metering programs are akin to a man bringing his own ice cream to an ice cream truck to take advantage of the free toppings provided with the ice cream sold at the truck, thus causing the owner to raise prices on ice cream for everyone else); Herman K. Trabish, *NV Energy CEO: Solar has Gotten a 'Free Ride' on the Grid*, GTM, (Aug. 19, 2013).

[2] Garrett Cullity, *Moral Free Riding*, 24 PHIL. & PUB. AFF., 3, 7 (1995) ("a free rider is someone whose failure to pay for nonrival goods . . . makes her conduct unfair.").

[3] Most state statutes governing public utilities require that utility rates and charges be "just and reasonable" and that state public utility commissions ensure that rates are just and reasonable through the rate regulation process. *See* JIM LAZAR, ELECTRICITY REGULATION IN THE US: A GUIDE 49-61 (2d ed. 2016); Ari Peskoe, *Unjust, Unreasonable, and Unduly Discriminatory: Electric Utility Rates and the Campaign Against Rooftop Solar*, 11 Tex. J. Oil, Gas & Energy L. 101 & n.77 (2016) (citing state statutes).

riding or cross subsidies can limit or stall programs with potentially significant future system-wide benefits if the burden of providing information is misplaced.

The regulatory applications explored in this Article—energy efficiency programs, utility compensation for customer-generated rooftop solar energy, and utility investment in EV charging infrastructure—were chosen for two primary reasons. First each application involves the development of a state policy governing electric utilities within a regulated monopoly system.[4] This means that for each policy, the state public utility commission requires the electric utility to implement a program that will be paid for by all utility customers (also known as "ratepayers") but that may not provide identical benefits to all customers. This understandably leads to arguments by the utilities, various customer classes, or other interested parties that one group of customers is "free riding" off of the program to the detriment of other groups of customers or that there is a "cross-subsidy"—the idea that one group of customers (e.g., EV drivers, rooftop solar owners) is being subsidized by another group of customers and such a result is "unfair" or is not "just and reasonable."[5]

Second, these applications provide helpful case studies because electric utilities as a group have taken different positions with regard to their support or opposition to the program in question. With regard to energy efficiency, in the early stages of these programs in the 1980s, utilities often opposed such programs because they would reduce utility revenues due to lost electricity sales. However, as state legislatures and public utility commissions developed programs to "decouple" utility revenues from energy sales, and to otherwise compensate utilities for implementing energy efficiency programs, utility opposition declined and free riding concerns became more a function of measuring the cost-effectiveness of particular program designs rather than opposition to energy efficiency programs in general.[6]

As for rooftop solar, utilities have attempted to impose significant limits on state "net metering" programs that require utilities to compensate electricity customers for

---

[4] For a discussion of how the states regulate electric and gas utilities as regulated monopolies through the state public utility ratemaking process, see, e.g. LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY Ch. 4 (West Academic Publishing 2d ed. 2018); Alexandra B. Klass, *Public Utilities and Transportation Electrification*, 104 IOWA L. REV. 545, 567-69 (2019) (discussing basic of electric utility ratemaking); Melissa Whited, The Ratemaking Process (Synapse Energy Economics, July 2017), http://www.synapse-energy.com/sites/default/files/Ratemaking-Fundamentals-FactSheet.pdf (summarizing the fundamentals of utility ratemaking and rate design).

[5] *See infra* note __ and accompanying text (discussing electric utility laws and ratemaking procedures).

[6] *See infra* notes __ - __ and accompanying text.

the energy their solar panels produce at retail electricity rates.[7] Such required purchases reduce utility revenues by reducing the amount of electric energy net metering customers purchase from the utility. In opposing net metering policies, utilities often raise free riding arguments—namely, that customers with solar panels are paying less than their "fair share" of the costs to support the electric grid. Because solar panel owners pay less for electricity each month but still use the electric grid when the sun is not shining, utilities argue that the costs of supporting the grid are unfairly shifted to non-solar customers, who are often less affluent. The extent of this "cross-subsidy" is a matter of significant controversy in state legislatures and state public utility commissions.

With regard to utility investment in EV charging infrastructure, utilities generally support these policies as they create an investment opportunity to build new infrastructure for which they can recover not only their costs but also a rate of return. As a result, in this context it is the oil companies, not electric utilities, who stand to lose from program adoption and have raised free riding arguments in regulatory proceedings.[8] They content that requiring all utility customers to pay for such utility investments to support transportation electrification is an unfair "cross subsidy" between EV owners and non-EV owners, despite a growing body of evidence that greater use of EVs will, at least in the future, benefit all utility customers through overall reductions in electricity rates due to more efficient use of electric grid resources.[9]

Notably, environmental groups generally support all three types of policies as they all potentially lead to reduced reliance on fossil fuels to generate electricity. Likewise, consumer advocacy groups often oppose all three policies because they can lead to higher (or at least disproportionate) costs on lower income customers in the short term. Thus, utilities in some cases invoke free riding and cross subsidy arguments on behalf of certain customer classes and in some cases do not, mostly depending on whether the utility itself stands to benefit financially from the policy.

These differences in the free riding and cross subsidy arguments in each of applications allows for greater insights into the evaluation of free riding arguments. They also provide a window into the motivations of the regulated utilities and third parties making the free riding and cross-subsidy arguments in the first place.

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[7] *See infra* notes __ - __ and accompanying text.

[8] *See infra* notes __ - __ and accompanying text.

[9] *Id.*

Part II sets forth various definitions of free riding from multiple academic disciplines. It then surveys some common free riding arguments in both legal scholarship and case law outside the energy policy field. This review shows that both scholars and courts use the concept free riding to encompass two different concerns to be addressed through law and regulation: (1) the inefficiency and ineffectiveness of policies that would subsidize desired conduct that would have occurred even without the subsidy and (2) the "unfairness" of certain groups receiving a greater benefit from programs and investments paid for by everyone.

Part III turns to regulatory and judicial treatment of free riding arguments in energy law and policy. After exploring how federal regulators and courts have responded to free rider concerns in energy policy in the past, this Part evaluates more closely the use of free riding, fairness, and cross subsidy arguments in the three contemporary state public utility ratemaking challenges described above: (1) ratepayer funded energy efficiency programs; (2) utility compensation for customer-generated rooftop solar energy; and (3) utility investment in EV charging infrastructure. In each case, state public utility regulators must evaluate free riding arguments and determine how much weight to give them in setting policies to govern these programs. In each situation, regulator decision-making is complicated by rapid technological developments, uncertainties regarding program impacts, concerns associated with future environmental harms such as climate change, and limited ability to assess program effectiveness now for benefits that may not accrue until years into the future.

Part IV makes the claim that regulators should be cautious in accepting free riding arguments and that any conclusions regarding free riding or cross subsidies should be informed by the broader financial motivations of the party making the free riding or cross-subsidy argument.[10] This is particularly true if free riding arguments

[10] Scholars have raised a similar concern in recent years in the context of utility arguments regarding "fairness" and cross subsidies in the context of rooftop solar compensation. *See, e.g.*, Shelley Welton, *Clean Electrification*, 88 U. COLO. L. REV. 571, 605 (2017) ("The fact that utilities so frequently filter their protectionist concerns through discussions of equity . . . serves to underscore its importance in electricity law; utilities make these arguments because they are aware that regulators care about the equities of clean energy policies."); Ari Peskoe, *Unjust, Unreasonable, and Unduly Discriminatory: Electric Utility Rates and the Campaign Against Rooftop Solar*, 11 TEX. J. OIL, GAS & ENERGY L. 101, 108-09 (2016) (contending that the utility "focus on supposed cost shifts among individual ratepayers is self-serving, and that [public utility commissions] have routinely allowed or ignored potential cross-subsidization among individual ratepayers, particularly when subsidies benefit the utility system."); Troy Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115 (2014-15) (cataloguing different fairness and cross-subsidy arguments utilities make in the context of rooftop solar compensation).

are being made in opposition to the program in question rather than to evaluate the cost-effectiveness of the program. For instance, in the energy efficiency context, identifying free riders is a well-established metric in determining the cost-effectiveness of a particular energy efficiency program rather than an argument used to oppose energy efficiency in general. By contrast, in the rooftop solar and EV charging contexts, free riding and related arguments of fairness and cross subsidies are used strategically to oppose these programs when they are contrary to particular financial interests.

Moreover, with regard to all free riding claims, it is important for regulators to consider both the present and future benefits of the program in question. In other words, if a goal of the program is to build infrastructure for a long-term policy goal, such as a shift to cleaner energy resources or reducing overall energy demand, program evaluators should consider future program beneficiaries in addition to current program beneficiaries. This has already been recognized to some extent for energy efficiency policies, where utilities and regulators realize that reduced energy demand means that utilities need not invest in new energy generation plants, including fossil fuel plants, in order to meet customer demand in the future. With a few exceptions,[11] the debate in the energy efficiency realm has shifted away from whether utilities should implement energy efficiency programs at all and instead focuses on developing appropriate evaluation, measurement, and verification metrics to design programs that are cost-effective and incentivize behavior that would not occur in the absence of the program.

This shift has not yet occurred in the context of utility compensation for rooftop solar or utility investment in EV charging infrastructure. In both cases, opponents of those programs—electric utilities in the case of rooftop solar and oil companies in the case of EV charging—are relying on free riding and cross subsidy arguments to question the very existence of the policy in question and focusing on alleged unfair cost shifts with regard to different classes of current customers. Supporters of both types of programs are marshaling evidence to rebut arguments that an unreasonable cost shift among customer classes will occur, with mixed success.

In the face of incomplete information that exists at the start of a new program with the potential for significant public benefits, regulators should be cautious in concluding that free riding or cross subsidy concerns should defeat the project in question. Instead, in those circumstances, it may be more reasonable to use free riding concerns to place limits on subsidies for particularly investments, such as

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[11] For exceptions to this general statement, *see infra* notes __ - __ and accompanying text (discussing legislative rollbacks of energy efficiency programs).

rebates for residential or commercial EV charging stations, but to allow investments in longer term grid improvements that may benefit all utility customers in the long run. Moreover, such an approach allows regulators and electric utilities to develop similar metrics already used in the energy efficiency context and apply them to developing programs in the rooftop solar and EV charging infrastructure contexts.

II. FREE RIDING DEFINITIONS AND APPLICATIONS

The concept of free riding originates in moral philosophy, and arguably dates back to Plato's Republic.[12] In moral philosophy, free riding hinges on the unfairness of the receipt of a benefit without paying its associated costs.[13] In defining "fairness," John Rawls states:

> a person is [morally] required to do his part as defined by the rules of an institution when two conditions are met: first, the institution is just (or fair), that is, it satisfies the two principles of justice; and second, one has voluntarily accepted the benefits of the arrangement or taken advantage of the opportunities it offers to further one's interests.[14]

In economics, free riding is a broadly defined principle that concerns the receipt of unpaid-for benefits.[15] Concerns over free riding generally focus on "public goods." In other words, markets and regulation should be designed to prevent a party (the "free rider") from receiving the benefit of a public good without

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[12] *The Free Rider Problem*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY (May 21, 2003), https://plato.stanford.edu/entries/free-rider/ (citing PLATO, THE REPUBLIC bk. 2, 360b–c (C.D.C. Reeve. trans., Hackett, 2004)) (noting Glaucon's argument to disobey the law when one cannot be caught). *See also* Hossein Haeri & M. Sawi Kawaja, *The Trouble With Free Riders*, PUB. UTIL. FORTNIGHTLY 34 (Mar. 2012) (discussing origins of the concept of free riding dating back to Plato's Republic; 18th and 19th century political philosophers, including Hume and Mill; and later Paul Samuelson and Mancur Olson in the 1950s and 1960s).

[13] Garrett Cullity, *Moral Free Riding*, 24 PHIL. & PUB. AFF., 3, 7 (1995) ("a free rider is someone whose failure to pay for nonrival goods under conditions C makes her conduct unfair.").

[14] JOHN RAWLS, A THEORY OF JUSTICE 111–12 (1971). Rawls' two principles of justice mandate (1) equal access to universal basic liberties and (2) social and economic inequalities are arranged to the benefit of the least well-off. *Id.* at 26.

[15] DONALD RUTHERFORD, *Free Rider*, *in* ROUTLEDGE DICTIONARY OF ECON. 233 (1995) ("An individual who does not pay for the goods or services he or she consumes."). *See also* JAMES R. KEARL, PRINCIPLES OF ECONOMICS 441 (1993) ("Free riding occurs when a person benefits from or uses a valuable good or service without having to pay for it.").

contributing to its cost.[16] Definitions of a "public good" vary, but in general a public good is defined as one that is available to everyone if anyone has access (jointness in supply), no one can be excluded from its use without excessive cost (nonexcludability), use by one person doesn't diminish the amount available for consumption by others (jointness in consumption), enjoyment by one person of the good does not diminish the benefits available to others (nonrivalness), no one can avoid using the good if anyone does (compulsoriness), everyone receives the same amount of the good (equality), and each user of the good consumes its total output (indivisibility).[17] Classic public goods include national defense, street lighting, and environmental protection.[18] Economists and regulators attempt to design markets and regulations to avoid free riding to ensure sufficient investment in public goods and avoid overconsumption of public goods.

Free riding arguments appear across a broad range of contexts, from the auto industry, to voting, to international trade negotiations, or to any area where someone contends that unpaid-for benefits have been accrued.[19] In his classic 1965 work *The Logic of Collective Action: Public Goods and the Theory of Groups*, Mancur Olson Jr. brought the economic theory of free riding into the public policy realm, with his application of the concept to the social science issue of collective action.[20] Though he didn't explicitly refer to free riding, Olson described the collective action problem that individuals are more likely to free ride as group size increases.[21] Because individuals are able to derive most, if not all, of the benefits of a public good regardless of their individual contributions, and because the comparative value of any individual

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[16] *See* Cullity, *supra* note 13, at 2; *see also* William Nordhaus, *Climate Clubs: Overcoming Free-riding in International Climate Policy*, 105 AM. ECON. REV. 1339, 1339 (2015).

[17] Cullity, *supra* note 13, at 3–4; R. HARDIN, COLLECTIVE ACTION 17 (1982); D. MUELLER, PUBLIC CHOICE 14 (1954); Paul A. Samuleson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. & STATISTICS 387 (1954).

[18] Thomas W. Merrill, *The Economics of Public Use*, 72 CORNELL L. REV. 61, 73, n.45 (2006).

[19] *Compare* Ellen Sewell & Charles Bodkin, *The Internet's Impact on Competition, Free Riding and the Future of Sales Service in Retail Automobile Markets*, 35 EASTERN ECON. J. 96, (2009) (discussing ability of online car dealers to free ride on physical services of brick-and-mortar dealers), *with* Rodney D. Ludema & Anna Maria Mayda, *Do Countries Free Ride on MFN?*, 77 J. INT'L ECON. 137 (2009) (discussing ability of countries to free ride on efforts of other countries' negotiations in international trade deals); Björn Tyrefors Hinnerich, *Do Merging Local Governments Free Ride on Their Counterparts When Facing Boundary Reform?*, 93 J. Pub. Econ. 721 (2009) (applying economic free riding analysis to politics).

[20] MANCUR OLSON JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS 14 (1965).

[21] Olson, *supra* note 20, at 35; *see also* Vincent Anesi, *Moral Hazard and Free Riding in Collective Action*, 32 SOC. CHOICE & WELFARE 197, 197–98 (2009).

contribution decreases as group size increases, it is rational for individuals to free ride off the contributions of other group members.

Equally important for social science scholarship of free riding was Anthony Downs' 1957 book *An Economic Theory of Democracy*, which applied free riding concepts to democratic voting habits.[22] Downs found that once voting has at least some costs associated with it, it is individually rational for some people to not vote because they can still derive the benefits of their preferred policies being implemented without incurring those voting costs. Thus, social science tends to rely on a game theoretical approach, and recontextualizes free riding from the perspective of the free rider.[23]

Considerations of free riding in the environmental protection context can be traced back to Garrett Hardin's 1968 article *The Tragedy of the Commons*.[24] Hardin's work stems from the social science model of free riding, as it focuses on the selfish following of one's own interests to inefficient results. In categorizing the environment as a public good, he observed that it is individually rational for environmental polluters to not incur the costs of preventing pollution because they are greater than any damage suffered as an individual user of the environment. Other scholars have built on Hardin's work to suggest either allocating property rights in resources, enacting regulations prohibiting resource destruction, or a combination of both approaches as a solution to this dilemma.[25] At the same time, however, the traditional articulation of free riding—obtaining a public good without sharing the costs—is also a focus of evaluating environmental policies such as waste reduction programs and climate policy.[26] As a result, both of these articulations of free riding can be found in the environmental policy context.

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[22] ANTHONY DOWNS, AN ECONOMIC THEORY OF DEMOCRACY 260–74 (1957). Downs described why there is individual incentive not to vote despite the presumed benefits. Downs' book predates the game theoretical analysis of free riding, and instead uses an economic-style definition.

[23] Cullity, *supra* note 13, at 4.

[24] Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243 (1968) (considering the collective action problem of joint public use of the environment and concluding that there is incentive for each individual to exploit it because the amount of benefit received outweighs the aggregate cost incurred).

[25] *See, e.g.*, William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1 (2003) (discussing scholarship in the area); Carol Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1 (1991) (same).

[26] *See, e.g.*, Magali Delmas & Arturo Keller, *Free Riding in Voluntary Environmental Programs: The Case of the U.S. EPA WasteWise Program*, 38 POL. SCI. 91, 91 (2005) ("Free riding occurs when one firm benefits from the actions of another without sharing the costs."); Nordhaus,

Notably, questions of "fairness" often arise in conjunction with free riding arguments. In the legal academy, what role "fairness" should play in developing legal policy remains highly contested, as illustrated by the work of Professors Steven Shavell, Louis Kaplow, and other scholars.[27] The merits of this debate are beyond the scope of this Article but serve as an important backdrop to the discussion that follows, namely, how advocates in energy utility proceedings use both free riding and fairness arguments to promote their interests and particularly how advocates use free riding arguments as a proxy for fairness arguments, and vice versa.

III. FREE RIDING DEBATES IN CONTEMPORARY ENERGY POLICY

Free riding arguments are often raised in the context of energy law and policy proceedings, where regulators routinely determine who will bear the costs and benefits of energy investments, rates, and charges. This occurs in "ratemaking" proceedings before the Federal Energy Regulatory Commission ("FERC") and state public utility commissions as well as in court proceedings reviewing federal and state regulatory decisions.[28] These decisions use free riding arguments in the various forms discussed in Part II. They include the situation where advocates in a proceeding involving a utility subsidy program argue that participants in the program are being paid for actions or conduct they would have engaged in anyway without the subsidy, thus rendering the program inefficient or "unjust and unreasonable" under governing law. They also include arguments over cross-subsidies—that a group of industry actors or customer classes are obtaining excess benefits from costs shared

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supra note 16, at 1339 ("Free-riding occurs when a party receives the benefits of a public good without contributing to the costs.").

[27] *See, e.g.* LOUIS KAPLOW & STEVEN SHAVELL, FAIRNESS VERSUS WELFARE (Harv. U. Press 2002) (arguing that "notions of fairness like corrective justice should receive no independent weight in the assessment of legal rules" and that, instead, a "welfare-based normative approach" should be used exclusively instead); Louis Kaplow & Steven Shavell, *Fairness v. Welfare*, 114 HARV. L. REV. 961 (2001) (same); FAIRNESS IN LAW AND ECONOMICS (Lee Anne Fennell & Richard H. McAdams, eds., Edward Elgar Pub. 2013); Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. OF CLIMATE & ENERGY L. 115 (2014-15) (relying on Kaplow and Shavell to argue that claims of "fairness" to oppose compensation for rooftop solar energy should be viewed with skepticism and discussing the role of fairness in legal policy more broadly).

[28] *See, e.g.*, Melissa Whited, The Ratemaking Process (Synapse Energy Economics, July 2017), http://www.synapse-energy.com/sites/default/files/Ratemaking-Fundamentals-FactSheet.pdf (summarizing the fundamentals of utility ratemaking and rate design); LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY, Ch. 4 (West Academic Publishing, 2d ed. 2018) (discussing federal and state ratemaking processes and judicial review of same).

by all industry actors or customer classes and correspondingly, some industry actors or customer classes are overpaying or underpaying for the benefits they receive.

For instance, in the context of FERC proceedings, parties—often investor-owned electric utilities—argue for or against a change in FERC policy on the grounds that it permits or even encourage free riding. As an example, in 2011, in Order 1000, FERC imposed new regional transmission planning requirements and cost allocation rules on utilities.[29] In response, some utilities argued that other utilities and their customers were free riding by not paying a proportional amount of the associated costs associated with new electric transmission lines covered by the Order and that the new lines would be benefit some utility customers more than others.[30] Those utilities criticizing the rule argued that FERC must follow the "cost-causation principle," a requirement derived from the Federal Power Act's mandate that rates be "just and reasonable." The utilities argued that the cost-causation principle requires that FERC can only approve rates that charge consumers roughly proportionally to the benefits they receive.[31]

As one federal court put it, the "cost causation principle targets something called the 'free rider problem,' which FERC acknowledged that it sought to 'address through its cost allocation reforms' in Order No. 1000."[32] Although the facial challenges to FERC Order 1000 were not successful, both the Order itself, in which FERC referenced free riding issues, as well as the court decisions evaluating Order

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[29] Order No. 1000-A, ¶ 578, 77 Fed. Reg. at 32,274 (defining "free riders" as "entities who are being subsidized by those who pay the costs of the benefits that free riders receive for nothing" and that in the electric transmission line context, free riders "do not bear cost responsibility for benefits that they receive in their use of the transmission grid. . . ." *Id.* at ¶ 576, 77 Fed. Reg. at 32,273; El Paso Elec. Co. v. FERC, 832 F.3d 495, 499 (5th Cir. 2016). *See also* Herman K. Trabish, *Has FERC's Landmark Transmission Planning Effort Made Transmission Harder to Build?*, UTILITY DIVE, July 17, 2018 (discussing Order 1000).

[30] *See* Order No. 1000–A, 139 FERC 61,132, ¶ 498, 77 Fed. Reg. at 32,274 (May 17, 2012).

[31] *See* Ill. Commerce Comm'n v. F.E.R.C., 576 F.3d 470, 476 (7th Cir. 2009) (quoting KN Energy, Inc. v. FERC, 968 F.2d 1295, 1300 (D.C.Cir.1992)) ("FERC is not authorized to approve a pricing scheme that requires a group of utilities to pay for facilities from which its members derive no benefits, or benefits that are trivial in relation to the costs sought to be shifted to its members. '[A]ll approved rates [must] reflect to some degree the costs actually caused by the customer who must pay them.'").

[32] El Paso Elec. Co. v. FERC, 832 F.3d 495 (5th Cir. 2016) (quoting Order No. 1000–A ¶ 562, 77 Fed. Reg. at 32,271).

1000, recognized the potential for free riding in federal transmission planning and cost allocation.[33]

At the state level, public utility commissions and public service commissions frequently address free riding arguments in the context of commissions setting rates for electric, gas, and telecommunications utilities. For example, in the early 2000s, telecommunications companies in Illinois and Michigan argued that their competitors were free riding on their phone infrastructure when the competitors used that infrastructure to offer local call pricing for longer distance calls.[34] For electric and gas utilities, most state statutes direct utility commission to ensure that utility rates, charges, and programs are "just and reasonable."[35] Thus, free riding arguments associated with one class of ratepayers cross subsidizing another class of ratepayers is an argument that a particular rate, program, or charge is unjust and unreasonable or, in a broader sense "unfair."[36]

When it comes to utility-funded energy efficiency programs, the question is often whether utilities or government actors are subsidizing conduct, such as residential or commercial customer energy efficiency investments (e.g., weatherproofing, energy efficient light bulbs, energy efficient boilers), that would have been undertaken even absent the subsidy.[37] The idea is that if conduct that would have otherwise occurred

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[33] *See, e.g.,* South Carolina Pub. Serv. Auth. v. FERC, 762 F.3d 41 (D.C. Cir. 2014) (upholding challenges to FERC Order 1000); *supra* note __ (discussing Order 1000 and references to free riding).

[34] In Re Focal Comm. Corp., 00-0027, 2001 WL 902639 (Ill. C.C.) (May 8, 2001); In Re Coast to Coast Telecom., Inc., U-12382, 2000 WL 1409759 (Mich. P.S.C.) (Aug. 17, 2000).

[35] *See supra* note __, and accompanying text (discussing state statutes).

[36] *See, e.g.*, Peskoe, *supra* note __ at 123 (discussing state court decisions reviewing public utility commission rate design issues surrounding cost shifts between customer classes and concluding that most courts defer to commissions so long as such allocation in rate design is reasonable).

[37] *See, e.g.*, Marie-Laure Nauleau, *Free-Riding on Tax Credits for Home Insulation in France: An Econometric Assessment Using Panel Data*, 46 ENERGY ECON. 78, 79 (2014) ("free-ridership, which is defined as behavior occurring when the agents targeted by the policy take the incentives but would have made the investment anyway.") (internal quotations omitted); Nicholas Rivers & Leslie Shiell, *Free Riding on Energy Efficiency Subsidies: The Case for Natural Gas Furnaces in Canada* Abstract (Univ. of Ottowa, Working Paper No. 1404E, 2015) ("We assess the extent to which subsidies for home energy efficiency improvements in Canada have been paid to households that would have undertaken the improvements anyway—the so-called free rider rate"); Kenneth E. Train, *Estimation of Net Savings From Energy-Conservation Programs*, 19 ENERGY 423, 424 (1994) ("The customers who implemented measures under a program even though they would have installed the measures without the program (for example, customers who received rebates for measures that they would have installed anyway) are called "free riders.").

is being subsidized, the program causes an unreasonable cost shift among different customer classes. This is because all utility customers pay the utility for administering the program (at a rate determined by the state utility commission), those customers who would have invested in energy efficiency even absent the program are receiving a subsidy paid for by others, and thus those investments shouldn't "count" as program benefits because they would have occurred anyway. Because of these concerns, which most energy efficiency experts characterize as free riding, government regulators, utilities, and industry experts have created a range of metrics and conducted empirical studies to evaluate the cost-effectiveness of these programs and determine the level of free riding.[38]

In other energy-related contexts, such as utility compensation for customer-generated rooftop solar and utility investments in EV charging infrastructure, free riding is described somewhat differently. In these cases, rather than labeling behavior that would have occurred even in the absence of a program subsidy as free riding, the claim centers more directly on a certain class of utility customers paying "less than their fair share" of a public benefit provided by the utility. For instance, rooftop solar owners are labeled as free riders because they pay less in utility bills than customers without rooftop solar—because solar owners receive bill credits for the solar energy they generate—but solar owners still use the electric grid when the sun is not shining. Likewise, if all utility customers pay for the utility to install EV charging stations within the utility's service territory, but only some customers own EVs and benefit from the charging station, then non-EV owners are subsidizing EV owners and EV owners are free riders. These alleged cost shifts between customer classes are often targeted as unfair and, as a legal matter, "unjust and unreasonable."

Of course, in all three instances, if the public benefits to all utility customers associated with the energy efficiency upgrades, rooftop solar energy generation, or use of EVs is above some determined threshold, the claims of free riding are neutralized. The difficulty, though is determining the nature and amount of the benefits these programs provide on both a near-term basis and a long-term basis. How interested parties, experts, and state utility commissions evaluate these issues is topic of the remainder of this Article.

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[38] *See* Matthew Collins & John Curtis, *Willingness-to-Pay and Free-Riding in a National Energy Efficiency Retrofit Grand Scheme: A Revealed Preference Approach* 7 (ESRI, Working Paper No. 551, 2016), http://www.esri.ie/pubs/WP551.pdf (using empirical definition of "comparison of the total cost of the completed retrofit, the cost to the household of the retrofit following the award of grant aid, and the total willingness-to-pay of each household for that retrofit."); Peter Grösche & Colin Vance, *Willingness-to-Pay for Energy Conservation and Free-Ridership on Subsidization: Evidence from Germany*, 30 ENERGY J. 135 (2009); Nauleau, *supra* note __; Rivers & Shiell, *supra* note __.

A. Energy Efficiency Programs

Energy efficiency is a means of reducing energy consumption by using less energy to attain the same output.[39] Energy efficiency is divided into three broad categories—(1) buildings (reducing electricity and space heating needs in buildings through new technologies, increased insulation, and the like); (2) transportation (increasing the efficiency of vehicles and vehicle fuels); and (3) industrial energy use. In the United States, energy use has become significantly more efficient over the past few decades, allowing energy consumption to remain flat even in the face of economic growth.[40] Programs to improve energy efficiency include vehicle fuel economy standards and appliance efficiency standards at the federal level, as well as a range of local and state policies to promote energy efficiency in buildings and appliances through mandates and tax incentives.[41]

Energy efficiency in residential and commercial buildings is particularly significant as it represents a low cost opportunity to reduce U.S. energy usage as well as the associated greenhouse gas ("GHG") emissions. In 2017, the electric power sector consumed 38% of total U.S. energy, the residential and commercial sector consumed 11%, the transportation sector consumed 29%, and the industrial sector consumed 22%.[42] With regard to greenhouse gas ("GHG") emissions, in 2016, the transportation sector and electric power sector both represented 28% of U.S. emissions, with the commercial/residential sector representing 11%, industry 22%, and agriculture 9%.[43] Notably, in 2017, residential and commercial buildings, which require energy for electricity and for space heating, consumed approximately 40% of U.S. energy and represented approximately the same percentage of U.S. CO_2 emissions.[44] In large urban centers such as New York City and Chicago, buildings constitute over 70% of energy use.[45]

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[39] Although "energy efficiency" is often used interchangeably with "energy conservation," they are different concepts. Energy efficiency involves "accomplishing an objective—such as heating a room to a certain temperature—while using less energy" while energy conservation involves changing behavior to use less energy such as turning down the thermostat in the winter. NAT'L ACADEMY OF SCIENCES, ET AL., REAL PROSPECTS FOR ENERGY EFFICIENCY IN THE UNITED STATES 21 n.1 (Nat'l Academies Press 2010).

[40] LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY 137-38 (West Academic Press, 2d ed. 2018).

[41] *Id.*

[42] U.S. Energy Info. Admin., U.S. Energy Facts, Explained, https://www.eia.gov/energyexplained/?page=us_energy_home.

[43] U.S. EPA, Source of Greenhouse Gas Emissions, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

[44] U.S. Energy Info. Admin., How Much Energy is Consumed in U.S. Residential and Commercial Buildings? (last updated May 3, 2018),

Thus, to the extent the United States can reduce energy use in residential and commercial buildings through energy efficiency, there will be significant cost savings and environmental benefits.[46] Indeed, experts show that, when treated as an energy resource (i.e., as an equivalent to generating power), energy efficiency is the third largest U.S. energy resources (behind coal and natural gas and in front of nuclear energy) and is also the lowest cost resource.[47] As a result of these potential savings and other benefits, there has been a significant emphasis on policymaking at the state level to support energy efficiency programs in general and utility funded energy efficiency programs in particular.

1. Utility-funded energy efficiency programs

Since the 1980s, utilities have offered energy efficiency programs to customers either voluntarily or as a result of state mandates. Today, such programs exist one form or another in all 50 states and the District of Columbia and include "financial incentives, such as rebates and loans; technical services, such as audits, retrofits, and training for architects, engineers, and building owners; behavioral strategies; and educational campaigns about the benefits of energy efficiency improvements."[48] States spent nearly $8 billion on energy efficiency programs in the utility sector in

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https://www.eia.gov/tools/faqs/faq.php?id=86&t=1; Alliance to Save Energy, *Overview*, https://www.ase.org/initiatives/buildings ("Buildings—offices, homes, and stores—use 40% of our energy and 70% of our electricity. Buildings also emit over one-third of U.S. greenhouse gas emissions, which is more than any other sector of the economy."). *See also* U.S. Green Building Council, Benefits of Green Buildings (updated May 2018), https://www.usgbc.org/articles/green-building-facts (U.S. buildings account for 40% of U.S. CO_2 emissions, more than the transportation and industrial sectors).

[45] Iain Campbell & Coben Calhoun, *Old Buildings are U.S. Cities' Biggest Sustainability Challenge*, HARV. BUS. REVIEW (Jan. 21, 2016).

[46] *See, e.g.*, Alexandra B. Klass & Elizabeth J. Wilson, *Remaking Energy: The Critical Role of Energy Consumption Data*, 104 CAL. L. REV. 1095, 1098-99 (2016) (citing statistics form McKinsey & Co. estimating that "investing $520 billion in nontransportation energy efficiency by 2020 could generate energy savings worth $1.2 trillion, reduce end-use energy demand by 23 percent compared to current projection, and eliminate over 1.1 gigatons of greenhouse gas emissions annually.") (citing MCKINSEY & CO., UNLOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY iii (July 2009)).

[47] AMERICAN COUNCIL FOR AN ENERGY-EFFICIENCY ECONOMY, THE GREATEST ENERGY STORY YOU HAVEN'T HEARD: HOW INVESTING IN ENERGY EFFICIENCY CHANGED THE US POWER SECTOR AND GAVE US A TOOL TO TACKLE CLIMATE CHANGE 5-6 (Oct. 2016),

2017, paid for by utility customers through their monthly electric and gas bills.[49] According to the American Council for an Energy-Efficiency Economy ("ACEEE"), these programs resulted in over 27 million megawatt hours of electricity saved in 2017.

The U.S. EPA describes the benefits of energy efficiency in the context of electric and gas utility programs as including environmental benefits, such as lowering GHG emissions and decreasing water use; economic benefits associated with reduced energy costs and boosting the local economy; utility system benefits by lowering baseload and peak energy demand and reducing the need for new generation plants and transmission lines; and risk management through diversifying utility resource portfolios.[50]

As Michael Vandenbergh and Jim Rossi have noted, the utility is a critical player in efforts to reduce electricity demand through energy efficiency measures:

> [T]he distribution utility serves as an intermediary and gatekeeper between the consumer and the electric grid. A utility that has incentives to reduce household or other demand for electricity can play its information, service, and access roles in ways that will induce widespread uptake of efficiency and conservation measures. A utility that does not can discourage widespread uptake of these measures and can do so in a variety of nontransparent ways, whether by

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https://aceee.org/sites/default/files/publications/researchreports/u1604.pdf; Annie Gilleo, *New Data, Same Results—Saving Energy is Still Cheaper than Making Energy*, ACEEE, Dec. 1, 2017, https://aceee.org/blog/2017/12/new-data-same-results-saving-energy (showing cost comparisons of energy efficiency with other energy resources).

[48] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD vi (Oct. 2018). *See also* Joseph Eto, THE PAST, PRESENT, AND FUTURE OF U.S. UTILITY DEMAND-SIDE MANAGEMENT PROGRAMS 2 (Lawrence Berkeley Nat'l Lab., Dec. 1996) (detailing different types of utility-funded energy efficiency programs, such as: "(1) general information to increase customer awareness of energy use and of opportunities to save energy; (2) technical information, including energy audits, which identify specific recommendations for improvements in energy use; (3) financial assistance in the form of loans or direct payments to lower the first cost of energy-efficient technologies; (4) direct or free installation of energy-efficient technologies; (5) performance contracting, in which a third party contracts with both the utility and a customer and guarantees energy performance").

[49] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD vi (Oct. 2018).

[50] U.S. EPA, Energy Resources for State and Local Governments, https://www.epa.gov/statelocalenergy/state-energy-efficiency-benefits-and-opportunities.

> increasing consumers' transaction costs (e.g., by requiring numerous or slow approvals for household solar photovoltaic installation, by understaffing key positions necessary for promotion of efficiency and conservation programs, and by imposing stringent requirements on grid access), or by limiting the extent or efficacy of information provided to consumers (e.g., by not making prompt, in-home energy use feedback easily available).[51]

For decades, policymakers have attempted to design programs to align the interests of electric utilities with the goals of energy efficiency. Because utility revenues were historically tied to volumetric sales of electricity, energy efficiency programs resulted in reduced utility revenues.[52] Not surprisingly then, in the early days of energy efficiency programs, utilities argued against such programs on grounds they led to free riding and unfair cross subsidies among customer classes.[53] State legislatures and public utility commissions have put in place a variety of mechanisms to minimize or eliminate the adverse financial impact on utilities from energy efficiency programs. The most common mechanisms are: (1) allowing the utility to recover from ratepayers the direct costs of energy efficiency programs; (2)

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[51] Michael P. Vandenbergh & Jim Rossi, *Good for You, Bad for Us: The Financial Disincentive for Net Demand Reduction*, 65 VAND. L. REV. 1527, 1544-45 (2012).

[52] American Council for an Energy Efficient Economy, *Incentivizing Utility-Led Energy Efficiency Programs*, https://aceee.org/sector/state-policy/toolkit/utility-programs ("it is widely recognized that spending on energy efficiency programs has a detrimental effect on utility revenues, by reducing sales of the utility's core product, electricity or gas. The reasoning is straightforward: while a utility's variable costs change in proportion to sales volume, fixed costs associated with distribution and customer service do not. Therefore, a reduction in sales due to efficiency improvements leads to a reduction in revenue that is larger than the costs avoided. This net lost revenue affects the utility's balance sheet, reducing the return to its investors and providing a strong incentive for utilities not to invest in programs that help their customers use energy more efficiently."). *See also* Vandenbergh & Rossi, *supra* note __, at 1546 ("To the extent the dominant approach to utility rate structures favors volumetric rates, utilities are encouraged to offer low per-unit rates while increasing their total sales. This allows them to recoup the business costs associated with their capital investments in base load power and transmission, and to increase net revenues over the long term."); Will Nissen & Samantha Williams, *The Link Between Decoupling and Success in Utility-Led Energy Efficiency*, 29 ELECTRICITY J. 59, 62 (2016) (discussing benefits of decoupling and noting that as of January 2016, 15 states had implemented electricity decoupling with proposals pending in eight additional states).

[53] *See, e.g.*, Peskoe, *supra* note __, at 181 ("In the 1970s and 1980s, it was the [utilities] that raised concerns about intra-class subsidization. The 'paradox of conservation' was that ratepayer-subsidized programs to reduce consumption — in contrast to earlier subsidies designed to increase [utility] sales—could harm non-participating consumers by raising overall rates.").

lost margin recovery or "decoupling" programs that ensure that "[a]ctual utility earnings are . . . brought in line with earnings authorized by the governing body, removing—or at least mitigating—the utility's disincentive to invest in energy efficiency programs due to reduced sales"; and (3) performance incentives that allow the utility to earn a return on investments in energy efficiency, similar to the return on investment it earns for earned for building a power plant or transmission infrastructure.[54]

In general, these programs have succeeded in reducing utility opposition to energy efficiency programs, leaving arguments about free riding, evaluation of program performance metrics, and the like to a range of economists and other experts.[55] That does not mean free riding arguments are absent from energy efficiency policy debates. On the contrary, they are front and center. The difference, however, is that it is not generally the utility making the free riding argument.[56]

2. Free riding as a metric for determining cost effectiveness of energy efficiency programs

According to the U.S. Department of Energy, "[f]ree-ridership issues are by no means peculiar to energy efficiency; they arise in many policy areas, whenever economic agents are paid an incentive to do what they might have done anyway."[57]

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[54] American Council for an Energy-Efficient Economy, *supra* note __. *See also* American Council for an Energy-Efficient Economy, *Lost Margin Recovery*, https://aceee.org/sector/state-policy/toolkit/utility-programs/lost-margin-recovery.

[55] *See infra* note __ and accompanying text. *See also* Martin Kushler, et al., *Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives*, Report No. U061 (ACEEE, Oct. 2006) (concluding that state regulatory approaches to overcoming utility disincentives to promote energy efficiency such as decoupling and performance incentives are effective in the states in which they are used); Eto, *supra* note __, at 10 (These new ratemaking procedures were instrumental in stimulating aggressive utility pursuit of DSM energy-efficiency programs. The success of these new regulatory approaches has often been cited as a key factor in changing utilities' perception of their role, from providing an energy commodity to one of providing energy services.").

[56] This is not to say that utilities have become strong supporters of energy efficiency programs. Indeed, as Professors Vandenbergh and Rossi have stated, "so long as volumetric pricing and guaranteed cost recovery through regulated rates leads utilities to view efficiency and conservation as revenue erosion, they will have incentives to create an appearance of demand reduction (e.g., to maintain reputation, satisfy regulators' demands, etc.), but under the existing approach neither utilities nor customers can be expected to be firmly committed to reducing the aggregate usage of electricity." Vandenbergh & Rossi, *supra* note __, at 1548. *See also* Peskoe, *supra* note __, at 153 (detailing arguments of the Edison Electric Institute, the trade association for investor-owned utilities, that decoupling efforts remain insufficient

The reason free-ridership is important in this context is to ensure that the utility makes "prudent use of energy efficiency dollars."[58] In other words:

> If program dollars are spent on people who would have taken the actions anyway, without program support, then those people are free riders, and those dollars were perhaps misspent. Evaluators are tasked with studying how much of a program's resources were spent on free riders, and what the program savings were, net of free riders. . . .[59]

Energy efficiency experts have developed specific tests to evaluate the cost-effectiveness of utility-funded energy efficiency programs. The most common ones are: (1) Total Resource Cost Test, ("TRC") which compares benefits to society as a whole (avoided supply-side cost benefits, additional resource savings benefits) with cost to participants of installing the measure plus cost of program administration; (2) Societal Cost Test ("SCT"), which is similar to the TRC except that it "explicitly quantifies externality benefits such as pollutant emissions not represented in market prices and other non-energy benefits (e.g., improved health/productivity)"; (3) Program Administrator Cost Test ("PACT") (also known as the Utility Cost Test ("UCT"), which compares the utility's avoided costs benefits with program expenditures (both the incentives and the administrative costs); (4) Participant Cost Test ("PCT"), which compares "participant benefits (incentives plus bill savings with participant costs (incremental or capital cost, installation O&M, etc.)"; and (5) Ratepayer Impact Measure Test ("RIM"), which "compares the utility's avoided cost

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to address the "transformative threats" to the utility industry model and that energy efficiency programs continue to act as "cross subsidies" between those customers who directly benefit from energy efficiency programs and those who do not).

[57] U.S. DEP'T OF ENERGY, SEE ACTION, ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE, CH. 5, DETERMINING NET ENERGY SAVINGS 5-8 (Dec. 2012), https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf.

[58] *Id.*

[59] *Id. See also* CARL BLUMSTEIN, CENTER FOR STUDY OF ENERGY MARKETS, PROGRAM EVALUATION AND INCENTIVES FOR ADMINISTRATORS OF ENERGY-EFFICIENCY PROGRAMS: CAN EVALUATION SOLVE THE PRINCIPAL/AGENT PROBLEM? 5 (Oct. 2010) ("It is not desirable to reward IOUs for the energy savings of free riders for two reasons: (1) the payments are unearned and (2) payments for free-rider savings would bias IOU programs in favor of programs in which consumers already had a strong predilection to participate."); U.S. EPA, MODEL ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE 5-1-5-3 (Nov. 2007) (defining free ridership, spillover effects, and other factors to consider to differentiate gross savings and net savings from energy efficiency programs).

benefits with the cost of administering energy efficiency programs plus lost revenue from reductions in customer energy consumption."[60]

According to the U.S. EPA, "there is no single best test for evaluating the cost-effectiveness of energy-efficiency."[61] Many states use multiple tests to evaluate cost-effectiveness of energy efficiency programs for a more comprehensive approach as each test "provides different information about the impacts of energy efficiency programs from distinct vantage points in the energy system." The EPA states:

> The most common primary measurement of energy efficiency cost-effectiveness is the TRC, followed closely by the SCT. A positive TRC result indicates that the program will produce a net reduction in energy costs in the utility service territory over the lifetime of the program. The distributional tests (PCT, PACT, and RIM) are then used to indicate how different stakeholders are affected. Historically, reliance on the RIM test has limited energy efficiency investment, as it is the most restrictive of the five cost-effectiveness tests.[62]

Many states require utilities to collect data and provide analysis from more than one test to determine cost effectiveness of energy efficiency programs.[63]

Across all these tests, energy efficiency programs are generally evaluated for cost-effectiveness to account for both free riders and "spillovers," with spillovers defined as "additional reductions in energy consumption or demand that are due to program

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[60] ENERGY EFFICIENCY GUIDEBOOK FOR PUBLIC POWER COMMUNITIES 30 (Oct. 2009), https://www.seventhwave.org/sites/default/files/guidebook.pdf.

[61] U.S. EPA, UNDERSTANDING COST-EFFECTIVENESS OF ENERGY EFFICIENCY PROGRAMS, BEST PRACTICES, TECHNICAL METHODS, AND EMERGING ISSUES FOR POLICYMAKERS, ES-1-2 (Nov. 2008).

[62] *Id. See also* ENERGY EFFICIENCY GUIDEBOOK FOR PUBLIC POWER COMMUNITIES, *supra* note __, at 30; Elizabeth Daykin, et al., The Cadmus Group, *Whose Perspective? The Impact of the Utility Cost Test*, Association of Energy Services National Conference (2012) (discussing different cost-effectiveness tests); NATIONAL EFFICIENCY SCREENING PROJECT, NAT'L STANDARD PRACTICE MANUAL, FOR ASSESSING COST-EFFECTIVENESS OF ENERGY EFFICIENCY RESOURCES, Edition 1, Executive Summary (Spring 2017), https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_Exec_Summary_5-17-17.pdf (explaining cost-effectiveness tests).

[63] *See* Nat'l Standard Practice Manual, Database of State Efficiency Screening Practices, https://nationalefficiencyscreening.org/state-database-dsesp/ (showing tests used in all 50 states).

influences beyond those directly associated with program participation."[64] According to the U.S. Environmental Protection Agency ("EPA") this is done through evaluating the "net-to-gross ratio" ("NTG ratio") across all program tests, which "deducts energy savings that would have been achieved without the efficiency program (e.g., 'free-riders') and increases savings for any 'spillover' effect that occurs as an indirect result of the program."[65]

In its evaluation of cost-effectiveness metrics, the National Renewable Energy Laboratory recognizes three different types of free riders in the context of energy efficiency programs: (1) total free riders (who would invested in the program measure or practice even in the absence of the program); (2) partial free riders (who would have implemented a lesser amount or lower level of efficiency than that provided by the program); and (3) deferred free riders (who would have implemented the measure or practice sometime after the program timeframe).[66] Likewise, with regard to spillovers, there are different types of spillovers that result in benefits that should not be attributed to the program under review, including additional program-induced actions at the project site, energy efficiency measures program participants take at project sites not enrolled in the program, and energy efficiency actions taken by non-program participants that were influenced by the program.[67] Of course, identifying the impact of both free riders and spillovers is extremely difficult, and there is a large body of literature discussing various methods

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[64] Nat'l Renewable Energy Lab., Estimating Net Savings: Common Practices, Ch. 17, at 3 (Sept. 2014), https://www.energy.gov/sites/prod/files/2015/01/f19/UMPChapter17-Estimating-Net-Savings.pdf. Experts also attempt to evaluate the "rebound effect" associated with energy efficiency programs, which refers to changes in consumer behavior to increase the use of energy such as raising the thermostat in the winter, using more air conditioning in the summer, driving more often or longer distances because of technical improvements in energy efficiency that result in lower energy costs to consumers. Although experts agree that the direct rebound effect is real, there are significant debates over its magnitude. *See, e.g.*, HOWARD GELLER & SOPHIE ATTALI, THE EXPERIENCE WITH ENERGY EFFICIENCY POLICIES AND PROGRAMMES IN IEA COUNTRIES: LEARNING FROM THE CRITICS 5 (Int'l Energy Agency Aug. 2005) (explaining rebound effect in energy efficiency and summarizing studies); U.S. EPA, MODEL ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE 5-2 (Nov. 2007) ("Rebound is a change in energy-using behavior that increases the level of service and results from an energy efficient action.").

[65] U.S. EPA, *supra* note __, AT ES-3. *See also* AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD 18 (Oct. 2018) ("Net savings are those attributable to the program, typically estimated by subtracting savings from free riders (program participants who would have implemented or installed the measures without the incentive, or with a lesser incentive), and adding in estimates of savings from free riders (nonparticipants who implemented or installed the measure due to the program.").

to obtain this information through surveys and other data collection methods that is beyond the scope of this Article.[68]

3. Criticisms of energy efficiency programs and state legislative action

As stated above, virtually all evaluations of utility-funded energy efficiency programs attempt to evaluate the role of free riders and spillovers in determining the cost-effectiveness of the program. Debates over the cost-effectiveness of energy efficiency programs will undoubtedly continue and experts will continue to refine the methodological approaches to evaluating free riders. Moreover, in recent years, some state legislatures have increased utility funded energy efficiency programs while others have scaled them back.

For instance in Illinois, in 2016, the legislature enacted the Future Energy Jobs Act which contained, among other provisions, significant additional funding for utility-sponsored energy efficiency programs, including the ability of utilities to earn a rate of return on investments in energy efficiency programs.[69] Other states have also strengthened utility funded energy efficiency programs, with total spending in those programs approaching $8 billion in 2017 nationwide, up from approximately $4 billion in 2010.[70] According to the American Council for an Energy-Efficient Economy ("ACEEE"), "[e]nergy efficiency remains the nation's third-largest

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[66] Nat'l Renewable Energy Lab., *supra* note __ at 3. *See also* William P. Saxonis, *Free Ridership and Spillover: A Regulatory Dilemma*, 2007 Energy Program Evaluation Conference, Chicago at p. 533 (2007) (reviewing studies and literature on evaluating free ridership and spillovers and reviewing data in New York on same).

[67] *Id.* at 4. *See also* CARL BLUMSTEIN, CENTER FOR STUDY OF ENERGY MARKETS, PROGRAM EVALUATION AND INCENTIVES FOR ADMINISTRATORS OF ENERGY-EFFICIENCY PROGRAMS: CAN EVALUATION SOLVE THE PRINCIPAL/AGENT PROBLEM? 5 (Oct. 2010) ("'Spillover' is the other side of the free rider issue. Spillover occurs when the effects of an energy-efficiency program spill over to affect other behavior. Examples of spillover would be a consumer taking action as the result of an energy-efficiency program but not receiving any of the incentives offered by the program (non-participant spillover) or a program participant stimulated to pursue additional energy saving actions that are not subsidized by the program (participant spillover).").

[68] *See, e.g.*, PWP, INC., CURRENT METHODS IN FREE RIDERSHIP AND SPILLOVER POLICY AND ESTIMATION (Feb. 2017), https://www.energytrust.org/wp-content/uploads/2017/07/FR_Spillover_170206.pdf; SEE ACTION, SEE ACTION GUIDE FOR THE STATES: EVALUATION, MEASUREMENT, AND VERIFICATION FRAMEWORKS—GUIDANCE FOR ENERGY EFFICIENCY PORTFOLIOS FUNDED BY UTILITY CUSTOMERS (Jan. 2018), https://www4.eere.energy.gov/seeaction/system/files/documents/EMV-Framework_Jan2018.pdf; Berkeley Lab, Electricity, Policy, and Markets Group, Utility Customer-Funded Programs https://emp.lbl.gov/projects/utility-customer-funded ("The

electricity resource, employing 2.25 million Americans and typically providing the lowest-cost way to meet customers' energy needs."[71]

Other states, however, have used free riding concerns to scale back existing energy efficiency programs. For instance, in 2018, the Iowa legislature significantly scaled back what had been a long-term and robust energy efficiency program, primarily on grounds that it was too expensive and resulted in unfair cost shifts. As detailed by ACEEE, the law imposed a new spending cap on efficiency programs; removed efficiency program requirements on municipal utilities and electric cooperatives; and allowed customers "to opt-out of paying for efficiency programs that fail to satisfy the ratepayer impact [measurement] ("RIM") test, a cost-effectiveness measure rejected by most states as inequitable."[72] During the legislative debates over the law, one senator criticized the fact that customers pay for these programs but the amounts aren't shown as a separate line item on utility bills and that "if you don't take advantage of the program, guess what, you're paying in and somebody else gets it."[73] The law passed despite opponents of the bill who focused their arguments on the total savings to all customers and citing "$400 million a year in net savings to customers" associated with energy efficiency programs.[74]

In addition to legislative program cutbacks, scholars continue to question the scale of overall benefits of utility-sponsored energy efficiency programs. As early as

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EMP Group tracks and analyzes trends in utility ratepayer-funded energy efficiency programs and enabling policies, and provides technical and policy support to regional authorities, state regulatory commissions, and program administrators by analyzing current practices and projected future spending and savings for efficiency programs."); American Council for an Energy-Efficient Economy ("ACEEE"), Energy Efficiency Programs, https://aceee.org/portal/programs (discussing founding of ACEEE in 1980, during the early period of energy efficiency programs, to provide research and policy development for utility energy efficiency); U.S. Dep't of Energy, Office of Energy Efficiency and Renewable Energy, https://www.energy.gov/eere/slsc/evaluation-measurement-and-verification-energy-data (discussing the importance of evaluation, measurement, and verification (EM&V) data to "inform recommendations for improvements in [energy efficiency] program performance."); U.S. DEP'T OF ENERGY, SEE ACTION, *supra* note __, Ch. 5 (defining free riding, spillovers, net savings in context of determining cost-effectiveness of utility-funded energy efficiency programs).

[69] *See* Commonwealth Edison Press Release, *New Energy Efficiency Benefits Coming to Illinois Consumers*, June 28, 2017; Future Energy Jobs Act, *About*, https://www.futureenergyjobsact.com/about; Kari Lyderson, *Q&A: Going Beyond Decoupling to Drive Utility Investments in Energy Efficiency*, MIDWEST ENERGY NEWS, Sept. 18, 2017, (discussing ability of utility to place energy efficiency investments in rate base and earn rate of return in Illinois as well as several other states, including Maryland and Utah).

[70] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD 24 (Oct. 2018).

the 1990s, Professors Paul Joskow and Donald Marron argued that data from utility companies did not bear out the grand claims of overall cost savings from utility-funded energy efficiency programs because of the failure to account for free riding.[75] These criticisms led to significant changes in the measurement and evaluation of the effectiveness of energy efficiency programs to address these and other concerns and to ensure the cost-effectiveness of such programs.[76] More recently, in 2016, Professor Arik Levinson has argued that despite forty years of experience with energy efficiency programs, program benefits continue to be overstated, particularly in the context of state energy building codes.[77]

Nevertheless, because of decades with experience with energy efficiency programs, and a general recognition that energy efficiency programs can provide benefits for all ratepayers when designed properly, the debate has shifted toward how to identify free riders to improve the cost-effectiveness of programs rather than using free riding concerns as a reason to not have a program in the first place.

The same cannot be said for solar net metering programs and utility investment in EV charging infrastructure. Utility subsidies for these programs are subject to

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[71] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD vi (Oct. 2018); AM. COUNCIL FOR AN ENERGY-EFFICIENCY ECONOMY, THE GREATEST ENERGY STORY YOU HAVEN'T HEARD, *supra* note __, at 5-6.

[72] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD x, 15, 44 (Oct. 2018).

[73] Testimony of Iowa Sen. Breitbach, Senate Proceedings of March 6, 2018, timestamp 9:15:30–9:18:00, http://www.legis.state.ia.us/dashboard?view=video&chamber=S&clip=s20180306203727440&dt=2018-03-06.

[74] Testimony of Iowa Sen. Bolkcom, Senate Proceedings of March 6, 2018, timestamp 9:18:00–9:21:00, http://www.legis.state.ia.us/dashboard?view=video&chamber=S&clip=s20180306203727440&dt=2018-03-06.

[75] Paul L. Joskow & Donald B. Marron, *What Does a Negawatt Really Cost? Evidence form Utility Conservation Programs*, 13 ENERGY J. 41 (1992); Paul L. Joskow & Donald B. Marron, *What Does a Negawatt Really Cost?, Further Thoughts and Evidence*, 6 ELECTRICITY J. 14 (1993) (responding to criticisms of earlier paper). *But see* Eto, *supra* note __, at 11-12 (finding more savings attributable to energy efficiency programs that reported by Joskow & Marron but acknowledging not all utilities were effective at running such programs).

[76] *See, e.g.*, Geller & Attali, *supra* note __ at 18-19 (discussing program design to account for free rider and spillover effects as a result of criticisms by Joskow, Marron, and others).

[77] Arik Levinson, *How Much do Energy Building Codes Save? Evidence from California Houses*, 106 AM. ECON. REV. 2867 (2016); Arik Levinson, *Energy Efficiency Standards are More Regressive Than Energy Taxes: Theory and Evidence*, Georgetown University and NBER (May 8, 2018), http://faculty.georgetown.edu/aml6/pdfs&zips/RegressiveMandates.pdf. *See also* David S.

significant debate, with the role of free riders, "fairness" and cross subsidies at the center of arguments over whether these programs should exist at all. The next Sections turn to these issues.

B. Net Metering: Utility Compensation for Customer-Generated Rooftop Solar Energy

One of the most frequent, contemporary uses of free riding arguments in energy policy involves utility compensation for customer-generated rooftop solar energy, also referred to as "distributed generation," "distributed energy," or "distributed solar."[78] Beginning as early as the 1980s, states adopted policies requiring electric utilities to compensate rooftop solar panel owners for the electricity generated by the solar panels that is sent back to the grid in order to incentivize the adoption of rooftop solar.[79] Such polices are often referred to as "net metering" or "net energy metering" because the electricity meter on the home or commercial building now runs two ways: it meters electric energy flowing to the customer when the solar panels are not providing all the necessary electricity to the building and also meters the electricity flowing back to the utility and the electric grid when the solar panels are producing more electricity than the building requires.[80] Over a monthly or yearly billing period, the customer pays the "net" of the electricity the building uses and produces, resulting in significantly lower electricity bills for the customer, and in some cases, a net profit for the customer.[81]

In the Energy Policy Act of 2005, Congress provided additional support for state net metering policies by encouraging states to adopt them and also to provide tax

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Loughran & Jonathan Kulick, *Demand Side Management and Energy Efficiency in the United States*, 25 ENERGY L.J. 19 (2004) (reviewing data and finding that actual electricity savings resulting from energy efficiency program were less than that reported by utilities).

[78] *See* Richard L. Revesz & Burcin Unel, *Managing the Future of the Electric Grid: Distributed Generation and Net Metering*, 41 HARV. ENVTL. L. REV. 43, 44 (2017) ("'Distributed generation' is a term used to describe electricity that is produced at our near the location where it is used. Distributed generation systems, also known as 'distributed energy resources,' can rely on a variety of energy sources, such as solar, wind, fuel cells, and combined heat and power. Distributed solar energy is produced by photovoltaic cells, popularly referred to as solar panels, which can be placed on rooftops or mounted on the ground.").

[79] Revesz & Unel, *supra* note __, at 59-64 (describing history of net metering programs).

[80] JIM LAZAR, ELECTRICITY REGULATION IN THE US: A GUIDE 78-79 (2d ed. 2016); ALEXANDRA B. KLASS & HANNAH J. WISEMAN, ENERGY LAW 153-54 (Foundation Press 2017).

[81] KLASS & WISEMAN, *supra* note __, at 153-54. For a more detailed description of various types of net metering, along with diagrams, see Minn. Pub. Utils. Comm'n, Net Metering & Compensation, https://mn.gov/puc/energy/distributed-energy/net-metering/.

benefits to customers installing solar generation.[82] Although one can argue that a sale of electric energy by a utility customer to the utility is a wholesale sale of electricity subject to Federal Energy Regulatory Commission ("FERC") jurisdiction under the Federal Power Act, both the Energy Policy Act of 2005 and numerous FERC decisions have disclaimed federal jurisdiction over net metering and instead have encouraged states to regulate the practice as a matter of state jurisdiction over retail sales.[83]

As of 2017, thirty-eight states and Washington, D.C. offer some form of net metering and utilities in some of the remaining states have adopted net metering programs on a voluntary basis.[84] "Conventional" net metering compensates customers with solar panels at the retail electricity rate—the price the customers pays to buy electricity from the utility.[85] A few other states have compensation rules that are not considered to be "net metering" because they compensate customers at something other than the retail rate, such as a lower, wholesale rate, or they have a so-called "buy all, sell all" program where there is one meter for the customer's purchases of electricity and another meter for the customer's sale of electricity to the

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[82] Revesz & Unel, *supra* note __, at 59-60; U.S. Dep't of Energy, Residential Renewable Energy Tax Credit, ENERGY.GOV, https://www.energy.gov/savings/residential-renewable-energy-tax-credit.

[83] *See* Revesz, *supra* note __, at 59-60; David Raskin, *The Regulatory Challenge of Distributed Generation*, 4 HARV. BUS. L. REV. 38, 42-45 (2013) (criticizing net metering as an unfair subsidy and arguing for federal jurisdiction over net metering); State Power Project, *Net Metering and Federal State Jurisdiction*, https://statepowerproject.files.wordpress.com/2015/05/net-metering-policymaker-summary1.pdf; Jim Rossi, *Federalism and the Net Metering Alternative*, 29 ELEC. J. 13 (January-February 2016) (disagreeing with Raskin and arguing for continued state jurisdiction over net metering).

[84] National Council of State Legislatures, State Net Metering Policies, Nov. 2017; DSIRE, Net Metering Map, Nov. 2017, http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/11/DSIRE_Net_Metering_November2017.pdf.

[85] Retail electricity rates—the price end use customers pay to the utility—are always higher than wholesale electricity rates—the price at which the utility buys or sells electricity

utility.[86] As discussed in more detail below,[87] Minnesota has adopted a "Value of Solar Tariff" for designated utility purchases of certain types of distributed solar generation that attempts to value the full costs and benefits of solar energy on the grid, and to avoid the bluntness of compensating customer-generated solar energy based on a retail or wholesale electricity rate.

Beyond the rate of compensation, states vary considerably with regard to other aspects of net metering programs. Many states have capacity limits on individual customer solar systems, such as a 20 kilowatt (kW), 1 megawatt (MW), or 10 MW size limit on the system, with twenty-three jurisdictions imposing a size limit below 100 kW.[88] Other states place limits on capacity based on the customer's total electricity load, such as Arizona's limit of 125% of the customer's total load. States also have imposed limits on aggregate installed solar capacity within a utility's service territory or within a state. For instance, Georgia limits solar installations to .2% of a utility's peak demand, California has a cap of 5% of the utility's peak demand, Vermont has an aggregate capacity of limit of 15% of the state's peak demand, and Utah's limit is 20% of state peak demand.[89] States also vary in how long customers can maintain bill credits (e.g., next monthly billing period, 12-month period,

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to or from another wholesale provider of electricity such as a neighboring utility, a utility-scale wind farm, a natural gas generator, etc. Wholesale electricity rates vary significantly based on supply and demand and also based on the type of resource producing the electricity—natural gas, coal, nuclear, wind, or solar energy. By contrast, retail electricity rates are set by state public utility commissions and generally do not vary based on scarcity or resources, with some exceptions such as when a customer enrolls in a "time of use" program that ties retail rates to low and high peak demand times of day. In most states, the "avoided cost rate" (the cost of the utility to purchase energy as wholesale or generate the energy itself) are much lower that retail electricity rates. *See* Revesz & Unel, *supr*a note __, at 60-61 (comparing avoided costs rates in Wisconsin in 2015 of $0.03 to $0.04 per kWh compared to retail rates of $0.11 to $0.14 per kWh). *See also* FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 769 (2016) (discussing price fluctuations in wholesale rates based on demand and fact that state regulators generally insulate retail customers from such rate fluctuations).

[86] LAZAR, *supra* note __, at 134-35 (discussing net metering in the states); Revesz & Unel, supra note __, at 47, 59-71 (discussing different state approaches to net metering and distributed energy compensation); Nat'l Conference of State Legislatures, *supra* note __; Database of State Incentives for Renewable Energy, Net Metering Policies—Customer Credits for Monthly Net Excess Generation (NEG) Under Net Metering, July 2016, http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/NEG-1.20161.pdf.

[87] *See infra* Part III.B.3.

[88] For comparison sake, 3 kW is common among residential systems and 10 MW is common among commercial and industrial systems, with lots of variation across both types of systems. Revesz & Unel, *supra* note __, at 62-63.

[89] Revesz & Unel, *supra* note __, at 63; Database of State Incentives for Renewable Energy, *supra* note __.

indefinitely) and whether the rate of compensation is uniform across all systems in the state or varies based on system size.

When solar panels were few and far between, net metering was fairly uncontroversial. However, as tax incentives, net metering, and a growing desire for renewable energy encouraged more electricity customers to install solar panels, utilities began to express concerns regarding lost revenues and sought regulatory relief from state public utility commissions and legislative reform from state legislatures. One of the central arguments utilities made in this context is that non-solar owners are subsidizing solar owners. Because the utility's fixed costs associated with maintaining the electric grid are primarily recovered from customers through volumetric rates, if solar owners are now purchasing 50-80% less electricity each year, but the utility still needs to maintain the same level of grid service for when the sun is not shining, the utility will need to raise rates since they are selling less power overall. When those rates, go up, the increase will be disproportionately born by non-solar owners. Thus, non-solar owners will now be shouldering a greater amount of those fixed costs, resulting in a "cross-subsidy" to solar owners and solar owners "free riding" on the grid.

It is important to note that cross-subsidies between different types of retail customers are ubiquitous in the utility world.[90] Customers who live in rural areas require more transmission infrastructure to connect to the electric grid, so urban customers who require less transmission infrastructure are arguably paying more than their "fair share" of transmission line costs. Low-income customers often receive rate discounts through state programs and industrial customers receive favorable rates from public utility commissions if those customers are successful in arguments that they need those lower rates to remain competitive. In each of those cases, there is a cross subsidy from one class of customers to the other. As a legal matter, however, the question is whether that cross subsidy is "unjust and unreasonable" or discriminatory under state law.[91]

Since approximately 2015, the "net metering wars" taking place in state public utility commissions and state legislatures across the country have resulted in many state commissions reducing the benefits associated with net metering by placing new fixed charges and "demand" charges on solar customers, compensating solar customers at something less than the retail rate, or imposing new aggregate capacity

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[90] *See* Rule, *supra* note __, at 131-34 (discussing common cross subsidies in utility rate design); Revesz & Unel, *supra* note __, at 76 (same); Peskoe, *supra* note __, at 121-29, 169-72 (explaining how cross-subsidies have always been embedded in the utility rate design).

[91] *See* Peskoe, *supra* note __, at 118-23 (discussing "just and reasonable" standard in utility ratemaking).

limits on solar installations.[92] In 2018, forty-five states and the District of Columbia took some action with regard to distributed solar, whether it be changes to net metering, fixed charges, minimum bill increases, or community solar policies.[93] In addition to efforts by utilities to reduce the financial benefits of rooftop solar in state commissions, utilities worked closely with the American Legislative Exchange Council ("ALEC") to introduce model legislation in states across the country to ban or severely limit net metering or to impose large fixed fees on owners of solar panels.[94]

In these proceedings, investor-owned electric utilities and ratepayer advocacy groups virtually always argue in favor of limiting or eliminating net metering for rooftop solar. They argue that rooftop reduces overall utility revenues (through lost electricity sales) without also lowering utility fixed costs and will thus lead to increased electricity rates for customers to cover those fixed costs. In turn, they argue, those higher rates will fall disproportionately on non-solar owners who tend to be less wealthy than solar owners. The players on the other side of the debate include (1) the rooftop solar industry—companies like Sunrun and SolarCity[95]—which benefit financially from the increased financial incentives net metering provides for rooftop solar installations and (2) environmental groups, which support the growth of rooftop solar because it increases the penetration of renewable, distributed energy into the electric grid, reduces reliance on fossil fuels, and reduces GHG emissions and other fossil-fuel related pollutants.[96]

In a 2017 article on distributed solar and net metering, Richard Revesz and Burcin Unel surveyed many of the public benefits and costs associated with distributed solar.[97] The benefits to the electric grid include reducing the utility

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[92] *See, e.g.,* Peskoe, *supra* note __, at 150 (noting that in arguments before public utility commissions, utilities "have launched a nationwide campaign against cross subsidies, in the name of consumer protection. They argue that rate structures that have allowed PV to gain traction are 'unfair,' 'misleading' to consumers, and 'regressive.' IOUs have also funded media campaigns that have painted PV adopters as thieves who steal their neighbors' money while out-of-state billionaires reap the profits.") (citing proceedings); Revesz & Unel, *supra* note __, at 64-71 (discussing challenges in numerous states to net metering); Welton, *supra* note __, at 592-97 (discussing contentious state utility commission proceedings over net metering and opponents' "nationwide assault on the policy").

[93] N.C. CLEAN ENERGY TECH. CTR., THE 50 STATES OF SOLAR Q3 2018 QUARTERLY REPORT, Executive Summary 5 (Oct. 2018).

[94] Revesz & Unel, *supra* note __, at 65.

[95] *See* Jacob Marsh, *Solar Power Companies in the U.S.: Which Should You Choose?*, ENERGYSAGE, June 28, 2018.

[96] *See generally* Revesz & Unel, *supra* note __, at 48-49 (discussing net metering battles); Peskoe, *supra* note __, at 154-55 (same).

[97] Revesz & Unel, *supra* note __, at 79-93.

system's peak demand; reduced fuel expenses; lower transmission line power losses because distributed energy is closer to the end-user; long-term costs savings to the system by enabling deferral or complete avoidance of the cost of new power plants; and resiliency benefits during storms and other power outages. The benefits to the public include climate change benefits and health benefits through the displacement of fossil fuels as well as more general environmental protection benefits associated with water quality and land use benefits.[98]

Because rooftop solar energy provides public goods, free riding debates are relevant, and the question is how to address free riding concerns. Here is where a comparison to the use of free riding in the energy efficiency context becomes helpful. Free riding concerns in energy efficiency programs have been present for many decades, and economists and other experts have developed various ways of addressing them. One can certainly question how accurate our ability to evaluate free riders is in the energy efficiency context, but experts have at least developed metrics to measure free riders and, even if they aren't perfect, they provide a platform for analysis and debate.

Regulators and experts are at a much earlier stage of data collection and analysis when it comes to free rider concerns in the rooftop solar context. The question then becomes how much to support rooftop solar as these metrics are being developed. Opponents of rooftop solar, including many investor-owned electric utilities, argue that states should eliminate net metering in favor of much lower payments for rooftop solar energy because the public goods provided are limited. Supporters argue that states should continue with net metering until we can more fully calculate the public goods provided by rooftop solar because we know they exist and should encourage development of this energy resource.

A review of proceedings in Arizona, Nevada, and Minnesota surrounding compensation for rooftop solar generation shows a range of approaches to this question. In Arizona, the lack of information on the public goods provided by rooftop solar caused regulators and utilities to downplay the benefits of rooftop solar and reduce net metering benefits. In Nevada, the utility commission first followed suit but then reconsidered its decision and used the lack of information as a reason to continue net metering until improved metrics could be developed. And in Minnesota, the state legislature required the state utility commission to adopt a "value of solar tariff" or VOST, to reduce the information asymmetry between the

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[98] *Id.* at 79-81. Costs to the grid include the costs of new meter installations grid interconnection, mismatches in power supply and demand that the utility cannot yet easily control, and responding to the variability of distributed resources that cannot be turned off and on with a switch on demand. *Id.* at 81-84.

electric utility and the public and to begin to develop the types of metrics that exist in the energy efficiency context.

1. Arizona

In Arizona, in 2013, the Arizona Public Service Commission became one of the first state utility commissions to revise a state net metering program to reduce the value of rooftop solar in response to a utility claim of an unfair cost shift between residential customers with solar panels and residential customers without solar panels. The utility, Arizona Public Service ("APS"), filed an "Application for Approval of Net Metering Cost Shift Solution" as "a solution to the cross-subsidization of customers with Net-Metering DG [distributed generation] systems by those customers without such systems."[99] Notably, in its filing, APS contended "that the issue is one of fairness for all customers and is not related to a loss of revenue by APS because of [net metering]."[100] Prior to its filing, APS hosted a technical conference to gather information and propose various solutions, which it presented to the Commission with its application.[101]

In its order ruling on the APS application, the Commission summarized the commission staff analysis of the issue, and found that "integral to the discussion of DG is the question of what *value* DG offers to APS's electric system and thereby to the customers served by that system."[102] Staff found two values inherent in DG systems: (1) objective value, which consist of "measurable" benefits such as avoided fuel costs to the utility, although it recognized that "[e]ven objective value can be difficult to predict in future time periods; and (2) subjective value, which "requires the subjective assignment of monetary values to anticipated future benefit that are not easily measurable" and can include "increased grid security and air quality improvements."[103] The Commission, based on the staff report, recognized that several studies existed that attempted to quantify both objective and subjective value of DG, that subjective value "is a public policy issue" that requires "a subjective assignment of values consistent with policy goals," and that both objective value and subjective value would need to be addressed in the next general rate case proceeding for the utility to quantify and value the costs and benefits of DG and then "allocate[] these costs and benefits equitably among customers [as] a matter of rate design."[104]

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[99] In re Arizona Public Service Company's Application for Approval of Net Metering Cost Shift Solution, Order at 2, ¶ 10 (Ariz. Pub. Serv. Co., Dec. 3, 2013) [hereinafter "APS Order"].

[100] APS Order at 2, ¶ 11.

[101] *Id.* at 2, ¶ 12.

[102] *Id.* at 5, ¶ 24 (emphasis in original).

[103] *Id.* at 5, ¶¶ 25-26.

[104] *Id.* at 6, ¶¶ 30-32.

As an interim measure, however, the Commission agreed with APS that some additional costs and fees on solar customers were appropriate. It did not place new fees on customers who already had installed solar panels but did place a $.70 per kW monthly interim charge on all DG customers with installations after December 31, 2013 to "ameliorate the impact of the cost shift on residential non DG customers."[105] This amount, which constituted the first approval of fixed charges on solar customers in the United States, was significantly lower than the $3.00 per kW per month amount it believed could be supported APS's data (equivalent to an additional $21 per month for a customer system of 7 kW) and the $70 per month APS said was warranted by the "cost shift issue" in a later proceeding on the same issue.[106]

Contentious battles over how to value and compensative rooftop solar generation continue in Arizona, with APS arguing that its customers "are bearing the brunt of the unfair cost shift" associated with continued net metering and arguing for higher fixed fees on solar customers.[107] What is important for purposes of analysis here, is the position of APS that there is an "unfair" cost shift between customers with solar panels and customers without solar panels despite the fact that all parties recognized in the proceeding that it was very difficult to value the benefits to the overall system associated with distributed solar. If that value is high, then any current cost shift may not be unfair to any customers and, in fact, may benefit all customers. This is particularly true if the "value" of distributed solar includes creating markets for developing solar technologies that can result in reduced carbon emissions, greater grid security through distributed generation, and financial value from reducing the need to build more fossil-fuel generation once energy storage technologies develop sufficiently to support distributed solar. APS and other utilities may not "value" those benefits because they may result in reduced revenues for the utility in the short term, but that does not necessarily mean they are an unfair cost shift on utility customers without solar panels or that customers with solar panels are free riding on the utility system.

2. Nevada

The analysis was somewhat different in Nevada a few years later in 2016. In early 2016, the Public Utilities Commission of Nevada issued a "Modified Final Order" that phased out net metering for residential customers in Nevada with existing solar

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[105] *Id.* at 21.

[106] *See id.* at 17, ¶ 84. *See also* In re Arizona Public Service Company's Application for Approval of Net Metering Cost Shift Solution, Docket No. E-01345A-13-0248, Order at ¶¶ 106, 162 (Ariz. Pub. Serv. Co., Aug. 31, 2015).

[107] *Id.* at ¶ 102.

systems and tripled the "fixed charges" for those customers over a period of years.[108] This decreased the amount the utility paid customers for rooftop solar from the 11 cents per kWh retail rate to a 2 cents per kWh wholesale rate. It also resulted in an increase in fixed monthly charges on solar customers from $12.75 per month to $38.50 per month.[109] This action resulted in SolarCity and other solar installation companies pulling their operations out of the state entirely with a commensurate loss of solar-related jobs in the state. According to the commission itself, the Modified Final Order "all but crushed the rooftop solar industry in Northern Nevada, reducing the booming industry from 983 applications by residential homeowners and small commercial businesses in Sierra Pacific Power service territory in 2015 to 41 applications in 2016."[110]

A significant driver of the Commission's Modified Final Order eliminating net metering was a 2015 statute enacted by the Nevada legislature, SB 374,[111] in which the legislature directed the commission to address solar cost shift issues. The relevant provisions of the statute provided that the commission may establish different rate classes for customers with distributed solar, may establish terms and conditions for participating in net metering, including limits on enrollment in net metering "to further the public interest," may allow a utility to "establish just and reasonable rates and charges to avoid, reduce, or eliminate *an unreasonable shifting of costs* from customer-generators to other customers of the utility," and shall not authorize rates or charges for net metering "that *unreasonably shift costs* from customer-generators to other customers of the utility."[112]

In its order revisiting its decision, the Commission evaluated the record before it with regard to the extent of any unfair cost shift from net metering customers to non-net metering customers.[113] It found the record "replete with conflicting evidence regarding the existence of a cost shift" with some studies showing the costs between customers classes will be "very nearly neutral" and total benefits of $36 million over the lifetime of an average rooftop solar system.[114] Other studies, however, showed exactly the opposite, with a significant cost shift based in large part

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[108] Pub. Util. Comm'n of Nevada, Modified Final Order, Docket Nos. 15-07041 and 15-07042 (Feb. 17, 2016).

[109] *See* Revesz & Unel, *supra* note __, at 66 (citing news reports).

[110] In re Application of Sierra Pacific Power Co., Docket No. 16-06006, 16-06007, 16-06008, 16-06009, Order at 27, 2016 WL 7635932 (Nev. PUC, Dec. 28, 2016).

[111] NV S.B. 374, *codified* at NRS 704.7735, *repealed*, NV A.B. 405

[112] Sierra Pacific Power, *supra* note __, Order at 28.

[113] *Id.* at 29.

[114] *Id.* at 31-32.

on the differential in price between utility scale solar and rooftop solar, with utility scale solar available at significantly lower rates.[115]

With this conflicting evidence before it, the Commission stated that what it found most significant about the evidence submitted was that "credible and well-educated" economists, engineers, attorneys, and businesses failed to agree on fundamental facts and methodologies relevant to the proceeding.[116] The Commission considered that this was "[p]erhaps due to Nevada being at a cross-roads where traditional thinking is colliding with new technology and disruptive business models—new ways of looking at old energy problems are emerging."[117] The Commission also considered that these divergent views may also "be because the facts regarding energy valuation, in many ways like the price of other commodities, change and continually evolve. What a cost prohibitive energy resource is today could very well be a fantastic value tomorrow."[118] The Commission continued:

> Jumping to a premature conclusion for the mere sake of having a resolution while the conversation and technology is evolving would not serve the public interest and Nevada. No certain answer at this time is better than the wrong one. More information, time, and analysis are necessary to find the appropriate balance for Nevada. The statement above is all-the-more true in the valuation of [net energy metering] NEM rooftop solar, as it impacts the overall cost-shift analysis.[119]

The Commission then stated that in its prior order eliminating net metering, it had recognized that the relevant factors for analyzing the positive and negative effects of net metering included avoided energy, avoided capacity, reduced energy losses/line losses, avoided CO_2 emissions, avoided criteria pollutant emissions, fuel hedging, utility integration and interconnected costs, and utility administration costs.[120] In that earlier order, according to the Commission, it had "bound those factors to only those things which are 'known and measurable' but, in doing so "failed to fully account for other facts and policies—even those difficult or impossible to objectively quantify—which should also be included in a comprehensive NEM valuation analysis."[121] Moreover:

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[115] *Id.*

[116] *Id.* at 32.

[117] *Id.*

[118] *Id.*

[119] *Id.* at 33.

[120] *Id.*

[121] *Id.*

> Until a universally-acceptable formula can be settled upon to determine an appropriate value for . . . rooftop solar generation in Nevada, questions regarding the existence of a cost-shift will remain unresolved. More than "known and measurable" costs need to be included in this analysis. However, how is monetary value to be placed on the prevention of climate change? Clean air? Encouraging job growth? Grid diversity? Energy choice and independence? Building a "New Nevada" for our children? . . .[122]

The Commission went on to find that even assuming the facts support a cost shift from non-solar customers to solar customers, the relevant statute only prohibited the Commission from approving an "unreasonable" cost shift.[123] It found that no unreasonable cost shift would occur because there would be no "discernable cost increase" on the average monthly bill for customers without distributed solar (approximately $0.26 per month) and that most customers would experience a net decrease in the average monthly bill.[124] The Commission also noted that its determination of reasonableness in this case was guided by the Nevada Legislature's stated policies supporting renewable energy, including solar energy as a "mainstream alternative for homes."[125] Notably, within a year after the Commission's order, the Nevada legislature ratified the order by repealing its earlier legislation—SB 374—and replacing it with provisions grandfathering in existing customers with full net metering and reducing the rate only slightly when certain installed capacity thresholds are met (e.g., 95% of the retail rate in the first 80 MW of installed capacity, with decreases for every additional 80 MW installed until it flattens at a 75% rate of compensation.[126]

As detailed in Part IV, what is notable about the Nevada Commission's order is its treatment of the present-day uncertainties regarding the valuation of costs and benefits of rooftop solar as compared with the Arizona Commission. In the face of the absence of "hard" data regarding present-day and long-term benefits of rooftop solar, the Arizona Commission accepted the utility's arguments and assumed an unreasonable cost shift while the Nevada Commission did exactly the opposite. The Nevada Commission presumed that benefits to all customers associated with increased solar generation may exist now and would likely increase in the future. It found no existing cost shift between customer classes that was unreasonable based on the evidence before it, and relied on state legislative policies supporting renewable

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[122] *Id.* at 34, 36.

[123] *Id.* at 36.

[124] *Id.* at 36-37.

[125] *Id.* at 38 (quoting NRS § 701B.190).

[126] *See* Nev. A.B. 405, June 4, 2017; Julia Pyper, *Nevada's New Solar Law is About Much More than Net Metering*, GREENTECH MEDIA, June 16, 2017.

energy to allow the market for rooftop solar to develop and thrive in the state. By contrast, in Arizona, the commission saw its role more narrowly—to address the utility's petition to address cost shifts taking place using the utility's existing rate design which recovers both fixed and variable costs through volumetric electricity sales. It did not use the proceedings as an opportunity to question the rate design or to support a growing market for a form of energy generation that posed a direct threat to the utility's existing business model.

3. Minnesota

Unlike Arizona and Nevada, where the commissions relied on more general statutory language regarding just and reasonable rates in the context of rooftop solar, in Minnesota the legislature directed the Commission to develop a new method to compensate distributed solar energy. Specifically, in 2013, in addition to using traditional net metering to compensate solar owners for systems between 40 kW and 1 MW, the legislature allowed utilities to compensate such customers based on "an alternative tariff that compensates customers through a bill credit mechanism for the value to the utility, its customers, and society for operating distributed solar photovoltaic resources interconnected to the utility system and operated by customers primarily for meeting their own energy needs."[127]

The legislature required that this alternative tariff, known as the "Value of Solar" tariff (also referred to as the "VOS rate" or "VOST") be developed by the Minnesota Department of Commerce no later than January 31, 2014 and be approved, rejected, or modified with the Department's consent by the Minnesota Public Utilities Commission within 60 days of submission.[128] In developing the VOST, the Department of Commerce was required to "consult stakeholders with experience and expertise in power systems, solar energy, and electric utility ratemaking regarding the proposed methodology, underlying assumptions, and preliminary data."[129] The VOST must "at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value." The Department of Commerce was also authorized, although not required, consider "known and measurable evidence of the cost or benefit of solar operation to the utility" and incorporate "other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors."[130]

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[127] MINN. STAT. § 216B.164, subd. 3a (net metering); Minn. Stat. § 216B.164, subd. 10(a) (alternative tariff).

[128] MINN. STAT. § 216B.164, subd. 10(e).

[129] MINN. STAT. § 216B.164, subd. 10(e).

[130] MINN. STAT. § 216B.164, subd. 10(f).

The legislature also required the state's largest utility, Xcel Energy, to create a program for "community solar gardens" defined as facilities that generate electricity "by means of a ground-mounted or roof-mounted solar photovoltaic device whereby subscribers receive a bill credit for the electricity generated in proportion to the size of their subscription."[131] The other two investor-owned utilities in the state are allowed, but not required to offer a solar garden program.[132] Solar gardens must be at a capacity of no more than 1 MW, and each subscription "shall be sized to represent at least 200 watts of the community solar garden's generating capacity and to supply, when combined with other distributed generation resources serving the premises, no more than 120 percent of the average annual consumption of electricity by each subscriber at the premises to which the subscription is attributed."[133] A solar garden must have at least five subscribers and no single subscriber may have more than a 40 percent interest in the garden.[134] Solar gardens may be owned by the utility or by a private solar development that contracts with the utility to sell the output of the solar garden.[135]

The purpose of the solar garden statute was to allow residential and commercial utility customers to receive the benefits of solar energy without the need for the up-front capital costs of purchasing solar panels and to encourage the development of a solar industry in Minnesota.[136] Eligible solar gardens must be located "in the service territory of the public utility filing the plan" and subscribers must be retail utility customers located in the same county as the solar garden or a contiguous county.[137] The utility must purchase all energy the community solar garden generates and the purchase shall be at the VOS rate or, until the commission approves the VOS rate, at the applicable retail rate.[138]

The Minnesota Public Utilities Commission reviewed and approved the VOST prepared by the Department of Commerce in April 2014.[139] In its order, the

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[131] MINN. STAT. § 216B.1641(a).

[132] *Id.*

[133] MINN. STAT. § 216B.1641(b).

[134] MINN. STAT. § 216B.1641(a).

[135] *Id.*

[136] *See* Bob Eleff, Legislative Analyst, Information Brief, *Xcel Energy's Minnesota Solar Garden Program* (Updated Oct. 2017), https://www.house.leg.state.mn.us/hrd/pubs/solargarden.pdf.

[137] MINN. STAT. § 216B.1641(c).

[138] MINN. STAT. § 216B.1641(d).

[139] In re Establishing a Distributed Solar Value Methodology Under Minn. Stat. § 216B.164, subd. 10(e) and (f), Order Approving Distributed Solar Value Methodology (Minn. P.U.C., Apr. 1, 2014) [hereinafter "MPUC Order"].

Commission began by stating that the Department of Commerce "intends for the methodology to avoid cross-subsidies and disincentives for conservation inherent in net metering."[140] The Department's methodology included eight relevant components, chosen because they were values "based on known and measureable evidence of the cost or benefit of solar operation to the utility": avoided fuel costs, avoided fixed plant operations and maintenance, avoided variable plant operations and maintenance, avoided generation capacity cost, avoided reserve capacity cost, avoided transmission capacity cost, avoided distribution capacity cost, and avoided environmental costs. According to the Commission, together, the components "account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value attributable to PV solar." The Department also included two "placeholder components" for future analysis—avoided voltage control cost and solar integration cost—on grounds that these costs and benefits will be "known and measurable in the future" and thus can be added to the calculation at that time. The Department declined to include as components the "compliance" value of Solar Renewable Energy Credits and the value of economic development on grounds that such values were not known or measurable at that time. The Department anticipated that additional value and cost components would be added in the future, "as more data and analysis becomes available about distributed solar and its costs and benefits."

The Commission approved the Department's methodologies with a few modifications relating to fuel price escalator factor, calculating avoided distribution capacity costs, and non-CO_2 avoided environmental costs values.[141] Pursuant to the statute, the VOST is calculated annually and the utility must use the VOST for community solar gardens but can elect to use VOST or net metering for other types of solar purchases, such as distributed solar, in the utility's territory. Since the first VOST was established, it has been a few cents less than the retail rate used in traditional net metering. For instance, the VOST in 2016 for Xcel Energy was just under $.10 per kWh while the retail rate for residential customers was $.12 per kWh. Under both net metering and VOST, Xcel must offer to purchase the renewable energy credits associated with the solar energy generated.

Despite the lower price of VOST, Xcel Energy has opted to continue to use net metering when it can, likely in part because it anticipates that the VOST will rise in value in the future. When the first community solar gardens came on line, the Commission directed Xcel to compensate subscribers using the retail rate with an optional renewable energy credit payment, in order to provide sufficient incentives to get the solar garden program started, and so stakeholders could gain more experience with the program. In 2016, the Commission directed Xcel Energy to transition its

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[140] MPUC Order at 1.

[141] MPUC Order, *supra* note __, at 15-16.

solar garden program to VOST because that is what the legislature directed; because VOST will "provide predicable yearly rate increases," thus improving the ability of solar gardens to obtain financing; and to "address concerns that nonparticipating ratepayers are subsidizing the program."[142] The Commission also required Xcel beginning with the 2018 VOST to use "location-specific avoided costs in calculating avoided distribution capacity" to ensure that the benefits of solar gardens located near load and the costs of solar gardens further from load are appropriately considered and factored into the benefits associated with reducing peak demand and deferring the need for distribution system upgrades.

Throughout the proceedings, the utilities, consumer advocacy groups, solar developers, and others have disagreed about appropriate inputs, assumptions, and other aspects of Minnesota's VOST.[143] Nevertheless, VOST provides a framework to address the cost shift and free riding arguments inherent in traditional net metering by creating identifiable inputs, cataloguing which inputs are known and unknown, and allowing for a yearly refinement of the methodology to determine the costs and benefits of solar on the utility's system as a whole. It also allows an alternative to trying to wedge distributed solar payments into the traditional utility ratemaking process, which was not designed for these types of energy inputs. VOST, of course, is not the only approach. Scholars have proposed numerous other alternatives that include greater use of time-of-use rates, feed-in tariffs, better valuation of environmental benefits associated with distributed energy, and the like. VOST, however, is the primary alternative to net metering that exists today, and thus provides one pathway to get beyond the free riding and cost shift arguments that will always be present in debates over net metering.

C. Electric Utility Investment in EV Charging Infrastructure

Utility investment in EV charging infrastructure provides a third illustration of the use of free riding arguments in state energy policy. The debates in this context are more recent than those involving energy efficiency, which have had decades to develop, as well as those involving rooftop solar, which have been in play since

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[142] In re Petition of Northern States Power Co., dba Xcel Energy, For Approval of its Proposed Community Solar Garden Program, Docket No. E-002/M-13-867, 2016 WL 4701453 (Minn. P.U.C., Sept. 6, 2016).

[143] *See, e.g.,* Laura Hannah, *Xcel Energy's Community Solar Program Hits Major Milestones in Year Three*, GREENTECH MEDIA, Dec. 21, 2017 (discussing program developments and debates); Comments of Prof. Gabriel Chan on Xcel Energy's 2019 VOS Calculation and Proposed 2019 Vintage Year Bill Credit Tariff Sheets, Docket No. M-13-867 (Nov. 27, 2018) (raising conceptual errors, conceptual extensions, and process reforms for yearly VOS proceeding); Eleff, *supra* note __ (discussing a range of disputed issues surrounding VOST and solar gardens since the enactment of the statutory provisions).

approximately 2013, and have reached virtually all states. The debates over utility investment in EV charging infrastructure existed in only a few states prior to 2016, at which time an increasing number of state commissions began to open dockets on the topic.[144]

1. EV Sales in the United States and the Role of EV Charging Infrastructure

As an initial matter, although EV sales in the United States have increased significantly in recent years, EVs remain less than 1% of total vehicle sales in the United States, albeit with higher percentages in some states, particularly California, where the percentage of EV sales for several months in 2018 approached 10% of all vehicles sold.[145] The growth of EVs has resulted from improved battery technology as well as mandates that auto companies sell a certain percentage of EVs in some U.S. states (led by California) as well as in the EU and China.[146] As of October 2018, there were 1 million EVs on U.S. roads and analysts project that there will be 18 million EVs in the United States by 2030.[147] As of 2018, the auto companies have embraced EVs and virtually every major auto company plans to invest heavily in the technology.[148]

Environmental groups, along with some U.S. states, strongly support widespread EV adoption because it provides an opportunity to reduce the use of oil and its related GHG emissions and other pollutants in the transportation sector, which, as of 2018, emits more GHG emissions than any other sector.[149] Moreover, although fossil fuels still made up nearly 63% of U.S. electricity generation in 2017, that percentage is far less in many states and is declining nationwide as a result of state

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[144] *See* Klass, *supra* note __, at Part IV (discussing state legislative and regulatory action).

[145] *EV Market Share By State*, EV ADOPTION, evadoption.com/ev-market-share/ev-market-share-state/.

[146] *See* Int'l Energy Agency, *Strong Policy and Falling Battery Costs Drive Another Record Year for Electric Cars*, May 30, 2018 (discussing EV sales in the EU and China, with 580,000 EVs sold in China in 2017, which was a 72% increase from the prior year).

[147] *See* Edison Elec. Inst., Press Release, *EEI Celebrates 1 Million Electric Vehicles on U.S. Roads*, Nov. 30, 2018. *See also* Jeffrey Ryser & Keiron Greenhalgh, *U.S. EV Sales Jump 72.5% on Year in 2018, Top 354,000*, S&P GLOBAL, Jan. 3, 2019 (reporting that 2018 was a "break-out year" for EVs "with sales of more than 354,000 vehicles, or 72.5% more than the 199,000 EVs sold in the US in 2017).

[148] *See, e.g.,* Mark Matousek, *32 Electric Cars You'll See on the Road by 2025*, BUS. INSIDER, Nov. 28, 2018 (discussing auto companies investments in new models of EVs); Dan Neil, *Think Electric Vehicles are Great Now? Just Wait . . .*, WALL ST. J., Dec. 26, 2018.

[149] *See* Energy & Climate Staff, Rhodium Group, *Preliminary US Emissions Estimates for 2018* (Jan. 18, 2018) ("The transportation sector held its title as the largest source of US [CO_2] emissions for the third year running, as robust growth in demand for diesel and jet fuel offset a modest decline in gasoline consumption.").

RPSs and declining costs of utility-scale and distributed renewable energy.[150] As a result electrifying transportation is an important component of efforts worldwide to reduce GHG emissions.

As part of its efforts to reduce statewide GHG emissions from the transportations sector, California has enacted a Zero Emission Vehicle ("ZEV") mandate that requires auto companies to sell a certain percentage of EVs in the state, and nine other states have adopted the ZEV mandate.[151] Most of these ZEV states have also enacted legislative policies to facilitate the development of widespread EV charging infrastructure to increase consumer demand for EVs and reduce "range anxiety."[152]

Because the fuel EVs require is electricity, utilities have the opportunity to play a central role in building out EV charging infrastructure. This infrastructure includes the distribution wires and related equipment necessary to power the charging stations, and the charging stations themselves. With regard to the charging stations, private charging companies such as ChargePoint, Greenlots, Blink, and EVGo have developed a range of business models to support home and business charging. In addition, the Volkswagen ("VW") emissions cheating scandal resulted in a $14.7 billion dollar settlement in 2016 that included requiring VW to create a new company, Electrify America, to spend $2 billion building charging networks on interstates and in cities across the country. The settlement also requires VW to

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[150] *See supra* note __ and accompanying text; U.S. Energy Info. Admin., *U.S. Electricity Generation By Source,* Oct. 29, 2018, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3; Nadja Popovich, *How Your State Make Electricity*, N.Y. TIMES, Dec. 31, 2018 (showing over half the electricity in California generated from renewable energy resources, even larger percentages in Idaho, Washington, and Vermont, and nearly 40% of electricity in Iowa generated from wind energy alone).

[151] *See* Center for Climate and Energy Solutions, *U.S. Clean Energy Policies*, https://www.c2es.org/document/zev-program/ (listing Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont as "ZEV states" and discussing California's ZEV program). During the Obama Administration, the U.S. EPA was also a strong supporter of EV adoption but now, under President Trump, the EPA has proposed to eliminate California's authority to set its own vehicle emissions standards, including its EV mandate, as well as the ability of other states to adopt the California standards. *See* U.S. EPA and Nat'l Highway Safety Admin., The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks, 83 Fed. Reg. 42986 (Aug. 24, 2018).

[152] *See* Camille von Kaenel, *Luring Electric Vehicle Buyers with Swift Charging, Roller-Skating*, GOVERNORS' WIND & SOLAR ENERGY COAL. (Jan. 17, 2018), http://governorswindenergycoalition.org/luring-electric-vehicle-buyers-with-swift-charging-roller-skating (discussing industry, state, and utility efforts to build out public EV charging stations to reduce range anxiety and support EV drivers).

provide $2.7 billion in funds for grants to states to support EV charging infrastructure.[153]

These provisions of the VW settlement are a recognition that in order for consumers to embrace EVs, sufficient EV charging infrastructure must be built through a combination of EV charging stations in homes, at business locations, on highway corridors, and in public places such as shopping centers, government buildings, and even gas stations.[154] It is well documented that the lack of EV infrastructure can present a "chicken and egg" or "market coordination" problem in which consumers will not want to purchase an EV due to perceived lack of support, while no company will invest in EV infrastructure because it doesn't see sufficient demand.[155]

Who should build this infrastructure and who should pay for it, however, have become hotly contested issues in state public utility regulatory proceedings and state legislatures in recent years. Private charging companies and state commissions were initially opposed to utility investment in EV charging infrastructure, fearing the utilities would stifle competition and overbuild infrastructure in pursuit of profits. That opposition has softened considerably, however, and led the California Public Utilities Commission to reverse its position on the issue when it realized that substantial private infrastructure investment would not emerge until regulated

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[153] INGRID MALMGREN & CASSIE POWERS, NAT'L ASS'N OF STATE ENERGY OFFICIALS, VOLKSWAGEN SETTLEMENT: BENEFICIARY MITIGATION PLAN TOOLKIT 4–5 (2017), https://www.naseo.org/Data/Sites/1/naseo-vw-beneficiary-mitigation-plan-toolkit-final.pdf; David Ferris, *7 Takeaways From a Wild Year for EVs*, ENERGYWIRE, Dec. 21, 2018 (discussing VW settlement).

[154] Although the major oil companies oppose transportation electrification because of its impact on market share, retail gas stations are beginning to see an opportunity for increased sales of convenience store items if they install EV charging stations because customers will be forced to spend more time at the stores while they wait for the cars to charge. *See, e.g.*, Ken Doyle & Erika Myers, *Why Aren't More Convenience Stores Installing Electric Vehicle Chargers?*, SMART ELECTRIC POWER ALLIANCE, Nov. 9, 2017 (discussing financial benefits of EV chargers for service stations and convenience stores); Tina Casey, *It's Over: Oil Giant Shell Doubles Down on EV Charging Stations*, CLEAN TECHNICA, Oct. 16, 2017 (reporting on oil company Royal Dutch Shell decision in install EV charging stations at its gas stations in the EU).

[155] *See, e.g.*, Initial Comments of Fresh Energy, Natural Resources Defense Council, the Sierra Club, and Minnesota Center for Environmental Advocacy, Docket No. E999/CI-17-879, Minn. Pub. Util. Comm'n. at 17 (July 27, 2018), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={80FFDC64-0000-CF18-AE69-6C936C279BF4}&documentTitle=20187-145282-01 [Hereinafter "CEO Initial Comments"]

utilities were permitted to enter the market.[156] Other state commissions, as well as state legislatures, have quickly followed suit.

2. State Regulatory Proceedings Governing Utility Investment in EV Charging

Regulators, scholars, auto manufacturers, environmental advocacy groups, and electric utilities nationwide are still struggling to determine best practices for cost-effective EV charging infrastructure investment. There appears to be broad consensus that EV adoption has substantial benefits, including "great potential to dramatically reduce local air pollution, greenhouse gas emissions and resulting climate change impacts, and oil use from the transport sector."[157] Widespread EV adoption could also lead to lower electricity rates, by better allocating grid load to more optimally use all power generated.[158] On the other hand, EV adoption is not without potential downsides, especially if EVs spike electricity demand at peak demand times.[159]

As noted above, utilities have been central actors in efforts to expand EV charging infrastructure. Many of the ZEV states have enacted legislation authorizing utilities to recover their costs and receive a rate of return on investments in EV charging infrastructure.[160] Indeed, state legislatures and regulatory commissions have

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(describing market coordination problem); Adele Peters, *Want Electric Vehicles to Scale? Add Chargers to Gas Stations*, FAST COMPANY, Oct. 8, 2018 (discussing "chicken and egg" problem in the context of EV charging and potential solutions).

[156] David Roberts, *Electric Vehicles Are Gaining Momentum, Despite Trump*, VOX, June 27, 2018; Klass, *supra* note __, at 584.

[157] DALE HALL & NIC LUTSEY, EMERGING BEST PRACTICES FOR ELECTRIC VEHICLE CHARGING INFRASTRUCTURE at iii (2017), https://www.theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf.

[158] Lisa Cohn, *Should All Utility Customers Pay for EV Infrastructure and Microgrids*, MICROGRID KNOWLEDGE (June 22, 2018), https://microgridknowledge.com/ev-infrastructure-rate-based-microgrids/.

[159] HALL & LUTSEY, *supra* note __, at 24. This could be particularly dangerous as solar power plays an increasingly large role in nationwide grids if EV owners opt to charge their EVs at home, after the sun sets. However, Hall and Lutsey hypothesize that improvements in technology may eliminate this issue. *Id.*

[160] *See* Klass, *supra* note __ at 584-89, 592-94. There are three primary regulatory models for utility investment in EV charging infrastructure: (1) the "make-ready model," where the utility owns the traditional utility infrastructure such as the transformers, utility services, meters, conduits, and wiring that supports the charging station but the "site host" such as a parking lot or shopping mall contracts with a private charging company like ChargePoint or Greenlots for the purchase and maintenance of the station itself; (2) the "end-to-end model," where the utility owns the charging station itself in addition to the utility

justified requiring all utility customers to pay for these investments based on evidence of the system-wide public benefits noted above, namely reduced GHG and other air pollutant emissions associated with transportation electrification as well as the potential for reduced electricity rates stemming from more efficient electric grid utilization.[161]

State public utility commissions approved major utility investments in EV charging infrastructure in 2018, including nearly $740 million in California, $20 million in Massachusetts, and $10 million in Ohio.[162] Other proposals are pending approval in New York, Maryland, and New Jersey, totaling nearly $700 million with total proposals filed in the states as of the end of 2018 for review and approval in 2019 totaling $1.5 billion in 18 states.[163] Each of these proposals would allow utilities to recover a rate of return on their investments, similar to traditional utility investments in electricity generation, transmission, and distribution assets.[164]

Although there are familiar free riding arguments in the EV charging infrastructure context, some of the key players in these debates have "switched sides" from the rooftop solar proceedings. Because of the anticipation of increased profits from EV charging infrastructure investments and increased electricity sales,[165] utilities generally favor policies encouraging EV adoption and utility-owned EV

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infrastructure required to support the station; and (3) a "hybrid model" where the utility has end-to-end ownership in underserved markets such as multi-family housing or low-income areas but only "make-ready" ownership in more competitive arenas such as workplace charging or public charging. *See* CEO Initial Comments, *infra* note __, at 13-16 (discussing models of utility investment in EV charging infrastructure).

[161] *See* HALL & LUTSEY, *supra* note __, at 24; *infra* notes __ - __ and accompanying text (discussing evidence in Illinois commission proceeding submitted by environmental groups showing efficiency benefits and lower electricity rates for all electricity customers resulting from transportation electrification).

[162] Ferris, *supra* note __.

[163] *Id. See also 2018 EV Recap: the Year of the Electric Vehicle and Tesla Prevails*, INSIDEEVS, Dec. 31, 2018 (summarizing state commission approval of utility investment in EV charging infrastructure); Gavin Bade, *10 Trends Shaping the Electric Power Sector in 2019*, UTILITY DIVE, Jan. 2, 2019 (noting that in the third quarter of 2018 alone, "32 states and D.C. took some action on electric vehicles, including the approval of utility EV charging programs in Massachusetts, Rhode Island, and earlier, in Nevada."); Additional Comments of the Signatory Parties in Further Support of the Petition for Implementation of a Statewide Electric Vehicle Portfolio, Case No. 9478, pp. 7-11 (Md. Pub. Serv. Comm'n, Aug. 30, 2018) (summarizing utility proposals nationwide for EV charging investments).

[164] Klass *supra* note __, at 569.

[165] Utilities only benefit from increased electricity sales due to EV or any other increased load in states that have not "decoupled" utility revenues from electricity sales. *See supra* notes __ - __ and accompanying text (discussing decoupling policies)

charging. Thus, utilities are aligned with environmental groups in these proceedings in arguing that such investments will not result in free riding and instead will provide system-wide benefits to all ratepayers, even those who do not currently own EVs. On the other side, many ratepayer advocacy groups oppose utility investment in EV charging infrastructure on grounds that it will result in free riding and unfair cross subsidies by providing financial benefits to EV owners that will be paid for disproportionately by non-EV owners who, like non-solar owners, tend to be lower income. But there are also new advocates making free riding arguments when it comes to EV charging—the oil companies.[166] Like the utilities in the rooftop solar debates, the oil companies are using free riding, cross subsidy, and "fairness" rhetoric to argue that utility customers will be hurt by these programs, and that such programs are not "just and reasonable" as required by state statutes governing utility rates.[167]

In the most recent of these proceedings, it is clear that proponents of utility investment in EV charging have learned from the contentious rooftop solar net metering disputes and have marshaled more sophisticated empirical evidence to support system-wide benefits of transportation electrification that requires EV charging programs. They also have the advantage of the utility supporting the program rather than opposing the program. For instance, in the net metering context, it is generally the utility that files a request with a state commission to eliminate net metering or impose fixed charges on solar customers, putting solar advocates in a defensive posture to justify the continuation of a net metering program. Moreover, supporters of net metering necessarily have more limited information on current costs and benefits of rooftop solar to the electric grid than the utilities possess. By contrast, when it comes to EV charging infrastructure, utilities are aligned with environmental groups and those groups, collectively, are making affirmative requests to state commissions to approve EV charging investment proposals, and providing evidence of public benefits to support the proposals.

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[166] *See* Jeffrey Tomich, *Big Oil Looks to Stop Utilities' Charging Investments*, ENERGYWIRE, Oct. 25, 2018; *2018 EV Recap*, *supra* note __ (discussing how 2018 was the year that the oil companies "stepped up their efforts" in Washington and in the states to oppose policies that support EVs). This recent activity is part of a larger campaign by U.S. oil companies to retain market share in the transportation sector. The New York Times reported in December 2018 that the major U.S. oil companies had worked behind the scenes since the beginning of the Trump Administration to encourage the administration to repeal the Obama Administration's signature vehicle fuel efficiency and vehicle emission standards, to discourage new states from adopting California's more stringent vehicle emission standards, and to work to revoke California's authority to set its own vehicle emission standards for GHG emissions, including the state's ZEV program. *See* Hiroko Tabuchi, *The Oil Industry's Covert Campaign to Rewrite American Car Emission Rules*, N.Y. TIMES, Dec. 13, 2018.

[167] *See infra* notes __ - __ and accompanying text.

The remainder of this section focuses on regulatory proceedings in Illinois, Missouri, and Maryland regarding utility investment in EV charging. These states show a range of arguments and analysis relating to free riding in very recent proceedings—with submission filed in 2018. This group of states also includes both ZEV and non-ZEV states which impacts whether free riding and cross subsidy arguments are used to oppose programs in their entirety or modify them to ensure that any program approved is cost-effective. As a general matter, in non-ZEV states, advocates cannot rely on a specific, state legislative or gubernatorial policy to support EV adoption or utility investment in EV charging infrastructure and instead must rely on more general state law governing "just and reasonable" rates.[168] This lack of legislative direction gives opponents of utility investment in EV charging stronger grounds to oppose such programs because there has not been a legislative recognition of the public benefits of EVs and EV charging like in California and other ZEV states.[169]

Finally, the proceedings in Illinois and Missouri highlight a recent development of oil companies and their trade associations beginning to react to the threat of EVs to their business interests, and responding by intervening in state regulatory proceedings and making free riding, fairness, and cross subsidy arguments in the name of utility customers to oppose these programs.[170] Thus, the oil companies have taken on the mantle of protecting the utility customers from programs allegedly rife with free riding, just as the utilities have done in the rooftop solar context.

a. Illinois

In September 2018, the Illinois Commerce Commission approved a Notice of Inquiry proceeding to gather "information and opinions from stakeholders on electric vehicles ('EVs') to help the Commission identify issues, potential challenges, and opportunities in EV deployment."[171] The Commission's goal was to use the

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[168] Some states have adopted California ZEV mandate through legislation while others have done so through gubernatorial action. Many ZEV states have also adopted specific legislation supporting EVs in general and utility investment in EV charging stations in particular. *See* Klass, *supra* note __, at 578, 583-90.

[169] For a discussion of state commission proceedings in ZEV states, see Klass, *supra* note __, at Part IV; David Ferris, *7 Takeaways From a Wild Year for EVs*, ENERGYWIRE, Dec. 21, 2018 (summarizing developments in the states).

[170] *See, e.g.*, Jeffrey Tomich, *Big Oil Looks to Stop Utilities' Charging Investments*, ENERGYWIRE, Oct. 25, 2018.

[171] Notice of Inquiry, Ill. Comm. Comm'n, Docket No. 18-NOI-01 (Sept. 24, 2018), https://www.icc.illinois.gov/downloads/public/ev/EV%20NOI.pdf; Electric Vehicles Notice of Inquiry, Ill. Comm. Comm'n,

proceeding "for studying and understanding the technical, financial, and policy implications of electric vehicles."[172] The Notice of Inquiry asked participants to respond to a range of issues including: (1) How EVs contribute to energy efficiency in Illinois by relying on electricity instead of fossil fuels and whether and how EV charging stations will affect overall energy efficiency in the state; (2) whether and how EVs will improve grid reliability and resilience and how best charging practices can impact efficient operation of the grid; (3) existing regulatory barriers to increased transportation electrification and possible solutions; (4) cost and environmental benefits associated with increased EV deployment in the state; (5) whether and how more EV charging stations should be developed in the state and whether utilities should own charging stations; and (6) whether utilities should charge time-of-use rates to incentivize EV penetration and whether charging infrastructure owned by utilities should be included in the utility's rate base.[173]

The Notice of Inquiry prompted a range of comments from the state's two investor-owned utilities, Ameren Illinois and Commonwealth Edison; environmental and energy efficiency groups; ratepayer advocates; the Illinois Attorney General's Office; industrial utility customers; an oil company trade association, Americans for Prosperity (a political advocacy group funded by the Koch brothers); EV charging companies; and others.[174]

Not surprisingly, the investor-owned utilities in the state—Ameren Illinois and Commonwealth Edison—both supported regulatory policies to encourage transportation electrification and utility investment in EV charging infrastructure, along with market approaches that included private EV charging companies.[175] The utilities also focused their comments in large part on how such programs would work in tandem with existing energy efficiency programs in the state to increase grid efficiencies and provide cost and environmental benefits for all utility customers.

Commonwealth Edison cited U.S. Department of Energy statistics showing that conventional vehicles convert only about 17% to 21% of the energy stored in

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https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx (describing notice of inquiry and providing links to all comments submitted in the proceeding and relevant news articles).

[172] Electric Vehicles Notice of Inquiry, *supra* note __.

[173] Notice of Inquiry, *supra* note __, at 4-7.

[174] *See* Electric Vehicles Notice of Inquiry, *supra* note __ (providing links to comments).

[175] Initial Comments of Commonwealth Edison Co., Docket No. 18-NOI-01 at p. 10 (Ill. Commerce Comm'n, Oct. 22, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx; Ameren Illinois Company's Initial Comments in Response to NOI Questions and Issues, Docket No. 18-NOI-01 at p. 17, (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

gasoline to vehicle power, while EV convert about 59% to 62% of electric energy from the grid to vehicle power.[176] It also cited potential energy efficiency opportunities of electric buses as compared to diesel buses.[177] The utility was careful to note that it was not using these statistics to argue that transportation electrification contributed to directly to the utility's energy efficiency program established under the 2016 Future Energy Jobs Act,[178] but did state that "additional EV charging stations could directly impact the Company's Energy Efficiency Program if the Program is able to incent and claim savings from energy efficient charging stations . . ."[179] The remainder of Commonwealth Edison's comments focused on how pricing signals through time of use rates would encourage EV users to charge at low peak times, resulting in better utilization of grid resources and put "downward pressure on per kWh rates."[180] Commonwealth Edison also cited studies showing the environmental benefits of wide scale EV adoption through reductions in GHG emissions, vehicle noise, and other aesthetic benefits.[181] It also stated that utility programs for EV charging could target "low-income communities not currently served by the competitive market" to increase EV adoption in those communities as well as make way for electric buses and trains in underserved neighborhoods.[182]

Ameren's comments were similar, focusing on "the economic benefits that can be socialized to all utility customers, most notably the potential downward rate pressure that can result from EV owners charging their vehicles."[183] Ameren also stressed the need to combine a sophisticated EV policy with "forward-thinking energy efficiency policy" in order to promote efficient use of electricity, reduce energy consumption on a per/BTU basis, and reduce air emissions which "would benefit Illinois customers under a variety of cost-benefit analyses.[184] Ameren argued for a program that would provide "a level of standardized savings, evaluation criteria, and costs associated with EV programs and design" that could include "modification of the existing Illinois energy efficiency [technical resource manual] to include EV-related measures, either of which could provide for a standard quantification of energy and environmental benefits—including novel categories of benefits related to bringing EV access to underserved areas, among other things."[185] To conclude on

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[176] Initial Comments of Commonwealth Edison Co., *supr*a note __, at 2.

[177] *Id.*

[178] *See supra* note __ and accompanying text (discussing energy efficiency provisions of Illinois Future Energy Jobs Act).

[179] Initial Comments of Commonwealth Edison Co., *supra* note __, at 3.

[180] *Id.* at 7.

[181] *Id.* at 7-8.

[182] *Id.* at 9-10.

[183] Initial Comments of Ameren Illinois, *supra* note __, at 1.

[184] *Id.* at 3-4.

[185] *Id.*

that issue, Ameren suggested that a "portfolio of EV programs that coordinates information with energy efficiency incentives and supportive public policy has the potential to reduce market barriers and the need for additional peak capacity investment. Such a result would provide benefits to the customers throughout Illinois."[186]

Environmental and energy nonprofit groups focused their comments on expert studies showing that EVs "provide the opportunity for broad-based cost savings for ratepayers" as well as "improved security from reduced dependence on imports of conventional fuels, improved local air quality, and reduced greenhouse gas emissions.[187] They also cited studies showing that increased EV adoption coupled with time of use rates and other "smart charging" program "can actually reduce costs for all ratepayers while benefiting the grid and providing a range of societal benefits."[188] The Sierra Club and Natural Resources Defense Council also stressed that transportation electrification is "not at odds with the utilities' statutorily-defined energy efficiency goals" and EVs themselves "are a form of energy efficiency because they reduce total energy consumption" as compared with conventional vehicles.[189] Other groups, including ratepayer advocacy groups, focused on the importance that electric load be managed cost-effectively through time of use rates to ensure that all ratepayers benefit from infrastructure costs.[190] They warned that any program for utility ownership of charging stations be designed in a way to not crowd out private investment and to avoid creating "a profit incentive for utilities to overbuild."[191]

ChargePoint's comments cited studies showing transportation electrification had the potential to "create value for all ratepayers" because "the expected long-term energy revenues from incremental EV load generally exceeds the costs for the grid to

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[186] *Id.* at 4.

[187] Comments of Advanced Energy Economy, Docket No. 18-NOI-01 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx. *See also* Comments of the Union of Concerned Scientists, Docket No. 18-NOI-01 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx; Comments of the Sierra Club and Natural Resources Defense Council, Docket No, 18-NOI-01 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[188] Comments of Advanced Energy Economy, *supra* note __.

[189] Comments of the Sierra Club and Natural Resources Defense Council, *supra* note __, at 2, 4.

[190] Initial Comments of Citizens Utility Board and Envtl. Defense Fund, Docket No. 18-NOI-01 at p. 4-5 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[191] *Id.* at 4.

support that load" which will "exert a downward pressure on unit energy costs that can benefit all utility customers regardless of EV ownership."[192] It warned, however, that this requires smart charging and other methods of avoiding "high cost 'peak' generation and/or distribution time periods."[193] ChargePoint cautiously supported ratepayer funding of utility investment in EV charging, citing specific criteria developed in other jurisdictions and highlighting the need to "maintain customer choice, encourage innovation, and stimulate competition."[194]

The strongest opposition to ratepayer funded utility investment in EV charging infrastructure came from Americans for Prosperity, a political advocacy group funded by David and Charles Koch of Koch Industries, a $110 billion private company with major investments in the oil refining and distribution industries.[195] It argued that the Commission must "carefully consider the rights and interests of all ratepayers" as it evaluates EV charging programs.[196] It stated it was submitting comments "in the interests of protecting ratepayers and consumers from program designs, rules, and regulations that promote unfair and regressive forms of cross-subsidization that have been enacted in other jurisdictions."[197] It warned the Commission that it was "required to prevent discriminatory practices where captive electric utility customers are forced to underwrite a distribution utility incursion into the EV charging infrastructure market" and that "[f]airness dictates that funding of non-public utility service needs to be done with shareholder funds, not through charges imposed on captive ratepayers with guaranteed cost recovery plus a guaranteed rate of return for the utility."[198] It contended that ratepayer-funded infrastructure is "unfair" because it will only "benefit the wealthiest ratepayers" who own EVs.[199] In closing, it cited the Commission's statutory mandate to ensure "just and reasonable" utility rates and charges and to prohibit and declare unlawful any "unjust and unreasonable" charges.[200]

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[192] Comments by ChargePoint, Docket No. 18-NOI-01 at p. 1-2 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[193] *Id.* at 2.

[194] *Id.* at 10-11.

[195] *See* Koch Industries, FORBES, https://www.forbes.com/companies/koch-industries/#732c6aa074ce.

[196] Americans for Prosperity Comments, Docket No. 18-NOI-01, at p. 1 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[197] *Id.*

[198] *Id.* (emphasis omitted).

[199] *Id.* at 3.

[200] *Id.*

The American Petroleum Institute-Illinois Petroleum Council expressed similar sentiments, stating that "[c]onsumers and taxpayers should not be forced to pay more in taxes, fees and/or electric utility rates so that someone else can purchase and operative an expensive electric vehicle."[201] It stated that EV charging "is currently only used by a small fraction of drivers, many of whom are wealthy enough to afford these more expensive vehicles" and that to allow utility investment in EV charging infrastructure and recover costs from all ratepayers "will result in an unfair shifting of costs onto those who have not opted for this technology."[202]

In reply comments, the Union for Concerned Scientists specifically singled out the comments of American for Prosperity, the Illinois Petroleum Council, and other commenters that opposed utility investment in EV charging.[203] In response to the stated concerns regarding wealth transfers from lower income to higher income ratepayers, the Union for Concerned Scientists acknowledged that "[r]egressive wealth transfer" is an important consideration in EV charging program design.[204] However, it warned that "categorically prohibiting utility investments due to the *possibility* of wealth transfer ignores the potential for programs to actively support equity and ensure benefits of transportation electrification to underserved markets."[205]

These comments show a range of opinions regarding the benefits of transportation electrification and utility investment in EV charging. Most commenters explicitly tied EV charging to energy efficiency, as the Commission had requested in its initial Notice of Inquiry order, and provided guidance on how EV charging could be made consistent with energy efficiency goals even though electricity use would likely increase through EV adoption. With utilities and environmental groups aligned, both groups could benefit from the superior information made available from the Illinois utilities' expertise with Illinois customer and grid data and the environmental groups' experience participating in numerous similar proceedings in other states. Whether to focus on current costs and benefits to ratepayers as opposed to future costs and benefits remained a constant theme in these proceedings, similar to the debate in the rooftop solar net metering context. And, once again, the party with the most to lose from the program—here, the oil

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[201] American Petroleum Institute-Illinois Petroleum Council Comments, Docket No. 18-NOI-01, at p. 1 (Ill. Commerce Comm'n, Oct. 22, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx (emphasis omitted).

[202] *Id.* at 2.

[203] Reply Comments of Union of Concerned Scientists (UCS), Docket No. 18-NOI-01 (Ill. Commerce Comm'n, Nov. 9, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[204] *Id.* at 3.

[205] *Id.* (emphasis in original).

companies—hid behind ratepayer fairness and cross subsidy arguments just as the utilities have done in the rooftop solar arena. Finally, it is important to note that the Illinois proceeding was a Notice of Inquiry soliciting responses to specific Commission questions, rather than an evaluation of a concrete utility proposal for investment. This means that the discuss was somewhat more general, allowing a broader discussion of potential benefits and concerns, and avoiding the need to delve too deeply into any of the data provided by proponents or opponents.

b. Missouri

Unlike the proceeding in Illinois, the Missouri proceeding involves a specific utility proposal for investment in EV charging infrastructure. In November 2017, Union Electric Company, d/b/a Ameren Missouri (Ameren), filed an "efficient electrification program" tariff case with the Missouri Public Service Commission.[206] Within this case was "[a] proposal to allow Ameren Missouri to provide incentives to encourage electric vehicle charging stations."[207] This "Charge Ahead—Electric Vehicles" program would "defray part or all of the cost of installing and operating electric vehicle ('EV') charging stations," and would include workplace, public space, multi-family dwelling, and interstate/highway corridor chargers.[208] The program would cost $11 million.[209] Ameren claimed that the program, along with a related program to provide financial incentives for adoption of electric forklifts and other business equipment (called the "Business Solutions Program") would "(a) provide benefits to both Ameren Missouri and its customers, both from the standpoint of lower overall rates, more efficient utilization of the electric grid, and reduced emissions in the areas where those customers work and live; and (b) not negatively affect[] either the Company's customers who are not participants in the program or regulated alternative fuel suppliers competing in the Company's service territory."[210]

Notably, in explaining why the program would benefit all utility customers, Ameren's written testimony made an analogy to the metrics used in evaluating the

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[206] Notice of Case Filing, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 15, 2017), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018006603.

[207] *Id.*

[208] Application, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 3 (Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018012294.

[209] *See* The Associated Press, *Ameren Plans $11 Million Program to Add Charging Stations*, US NEWS & WORLD REPORT, Feb. 22, 2018.

[210] *Id.* at 4-5.

cost-effectiveness of energy efficiency programs in discussing distribution line extension to support the new EV chargers. According to the testimony, such line extensions would generally decrease consumer costs while only putting a nominal (17 cent/month) burden on nonresidential customers, with the result being that the benefits of electrification would exceed those minimal costs.[211] In its Statement of Position supporting the program, Ameren stated that:

> The Rate Impact Measure ('RIM') test, a common cost effectiveness test that looks at the impact of a program on customer rates, indicates that the cost of the program will be more than fully offset by the benefits arising from the EVs using the program. The amount above program costs is a contribution to recovery of the fixed costs of the electric system which results in lower rates for all Ameren Missouri customers. Beyond the results of any of the cost effectiveness tests, this program also provides significant environmental benefits.[212]

In making this argument, it is notable that Ameren expressly relied on experience with evaluations of the cost-effectiveness of energy efficiency programs and set out a pathway to integrate investments in EV charging into those existing cost-effectiveness models.[213]

However, the Commission's Staff recommended the rejection of the EV program as proposed, and urged the Commission to "order modification of the Workplace, Multifamily, and Public Area subprograms to minimize free ridership and maximize public policy benefits."[214] While Staff conceded that all customers

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[211] Direct Testimony of Michael W. Harding, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 9–11 (Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018012299; Direct Testimony of Steven M. Wills, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 16 (Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018012295..

[212] Ameren Missouri's Statement of Position, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 2 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007500.

[213] For a discussion of the various tests used for determining cost effectiveness of energy efficiency programs, including the Ratepayer Impact Measure ("RIM"), see *supra* note __, and accompanying text.

[214] Staff Position Statements, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018),

would in fact pay lower rates if Ameren could incentivize sufficient EV adoption such that additional revenues would exceed the costs of grid expansion, subsidies, and program costs, it found that Ameren had not provided sufficient evidence that such adoption would occur.[215]

Staff claimed it was unable to analyze free riding directly because Ameren failed to adequately connect the tariffed program to the proposed budget.[216] Indeed, Staff warned that, "as designed, these programs are rife with opportunities for free ridership and fail to include provisions to maximize public policy related benefits."[217] As an alternative approach, Staff recommended that the Commission order Ameren to "enter into a stakeholder process to develop and file a 'Make Ready' tariff to facilitate installation of customer-owned electric vehicle charging stations."[218] Then, any subsidies "would be limited to the line extension costs [associated with EV charging] otherwise payable by the entity seeking to install the charger."[219] Based on the current proposal, however, Staff found "Ameren Missouri has made no clear connection between this program and its estimate of an additional 7,500 electric vehicles in the Ameren Missouri service territory for parties to begin to determine what level of adoption is naturally occurring and what would be attributable to the $11 million ratepayer subsidy."[220]

The Office of the Public Counsel ("OPC")[221] was also critical of Ameren's proposal, but ultimately recommended approval of the program while imposing a performance-based recovery mechanism linking Ameren's recovery to EV adoption rates in its service territory.[222] It argued that Ameren had failed to show a need for its

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https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007510.

[215] *Id.* at 3.

[216] *Id.* at 5.

[217] *Id.* at 6.

[218] *Id.* at 9–10. For a discussion of the "make-ready" model of utility investment in EV charging, see *supra* note __, and accompanying text.

[219] *Id.* at 10.

[220] *Id.* at 1-2.

[221] The Missouri legislature created the Office of Public Counsel in 1975 to represent the interests of utility customers in proceedings before the Missouri Public Service Commission. The Office of Public Counsel has its own staff and budget and is independent from the Commission. *See* Missouri Office of Public Counsel, Who We Are, https://opc.mo.gov/who-we-are.html.

[222] Position Statement of the Office of the Public Counsel, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007507.

program, and that private companies could resolve EV demand without utility action.[223] Notably, OPC claimed there was no evidence that further EV infrastructure investment was required to spur EV adoption.[224] It agreed with Staff that Ameren had not shown its program to be cost effective, and essentially offered the performance-based mechanism as a concession to tie the fate of Ameren to the actual efficacy of its program without fully recommending outright rejection.[225]

On the other hand, the Sierra Club and Natural Resources Defense Council recommended approval of the program with only minor modifications.[226] They claimed that Ameren had actually been conservative in its estimate of public benefits of EV adoption, and that it should be allowed full recovery of prudently incurred costs.[227] The environmental groups' position focused on the claim that the public benefits of EVs actually are quite large, and are sufficient to mitigate any cost shift. The Missouri Division of Energy also supported the proposal, but recommended that 10% of the budget be allocated to support EV charging station development in "underserved and low-income communities" as a way to combat cost shifting.[228] The Division claimed that this would "promote more equitable access to electric vehicle charging and the associated benefits of cost savings resulting from electric vehicle use . . . ."[229] ChargePoint echoed these calls for approval, claiming that Ameren's "program design reduces risks to ratepayers, lowers the cost barrier to [EV charging infrastructure] deployment, allows the charging station site host to determine which equipment and services best meet their needs, and builds a sustainable EV charging marketplace to help accelerate EV adoption."[230]

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[223] *Id.* at 1–2.

[224] *Id.* at 2.

[225] *Id.* at 3–7.

[226] Position Statement of Sierra Club and Natural Resources Defense Council, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007488.

[227] *Id.* at 2.

[228] Missouri Division of Energy Statement of Positions, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007494.

[229] *Id.*

[230] Chargepoint, Inc.'s Statement of Position on the Issues, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 2 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007499.

Notably, after all interested parties had filed their opening testimony, response testimony, and position statements, the Missouri Petroleum Marketers and Convenience Store Association ("MPCA") sought leave to file an Amicus Curiae Brief in the proceeding.[231] It argued that "Because Ameren Missouri seeks to compete with MPCA's members in the motor fuel market, MPCA is in a unique position to provide a legal perspective and background information to the Commission for its consideration of whether Ameren Missouri has provided sufficient evidence to show the Charge Ahead – [Electric Vehicle and Business Solutions] Programs are needed and cost effective; what, if any, cost recovery mechanisms may be appropriate for these Programs; and whether the Commission should impose any conditions on these Programs."[232] The Commission granted the request in December 2018.[233]

The Missouri proceeding, which is still pending before the Commission, showcases many of the same arguments made in the Illinois proceeding, but in the context of a concrete utility proposal for EV charging investment. Although the $11 million requested for the program is significantly more modest than other programs approved in California, Massachusetts, and other states in 2018, the Missouri Commission will need to act without the benefit of legislative or executive branch direction declaring the public benefits of transportation electrification or utility investment in EV charging. Instead, the parties supporting the program must rely on general statutory language regarding just and reasonable rates as well as fit the program within the cost-effectiveness regime that exists for utility-funded energy efficiency programs, which is a potentially a helpful model for other similarly situated states.

3. Maryland

In Maryland, in 2018, a coalition of charging companies, environmental groups, four Maryland investor-owned utilities, and other interested parties (referred to as the "Signatory Parties" filed a joint "Proposal to Implement a Statewide Electric Vehicle Portfolio" that included utility investments in EV charging totaling over

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[231] Petition of Missouri Petroleum Marketers & Convenience Store Association for Leave to File Amicus Curiae Brief and Request for Expedited Ruling, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n (Nov. 30, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007741.

[232] *Id.* at 2.

[233] Order Granting Leave to File Amicus Curiae Brief, Docket No. ET-2018-0132 (Mo. Pub. Serv. Comm'n, Dec. 11, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019008382.

$100 million.[234] Program components included rebates for residential and commercial EV chargers, utility-owned public charging networks, as well as funding for customer outreach, innovation, and technological development, and implementation of time of use rates to support "smart charging."[235] Most of the rebates for private charging included dollar caps or percentage caps on the cost of the charger. In support of the program, the Signatory Parties cited to state policies supporting EVs and EV charging infrastructure, including "the State's Greenhouse Gas Reduction Act, the eight-state Zero-Emission Vehicle Memorandum of Understanding, Maryland's role in the Transportation Climate Initiative, the legislatively-created Electric Vehicle Infrastructure Council, and the Maryland EV Recharging Equipment Rebate Program.[236]

Early in the Proposal, the Signatory Parties state "it is not the responsibility of ratepayers to foot the bill for the entirety of the remaining charging infrastructure needed to fill the gap between what exists today and the projected infrastructure build-out necessary to support the State's ZEV MOU goal of 300,000 electric vehicles on the road by 2025."[237] Instead, they wish to make the case through the Proposal that "that a targeted ratepayer investment facilitated by the Utilities and made in conjunction with private market participants will seed the burgeoning Maryland EV landscape in a manner that will promote a healthy, competitive, and lasting private market moving forward."[238] In support of the Proposal, the Signatory Parties discuss a range of Maryland-specific expert cost-benefit studies to establish the cost-effectiveness of the Proposal and make the case why all utility customers will benefit from the investment. They also propose an "evaluation, measurement, and verification" strategy similar to the approaches used in the energy efficiency context.[239]

Numerous participants in the regulatory proceeding raised free riding and cost shift arguments targeted primarily at the rebates for residential and commercial EV chargers. It is this part of the program that most closely resembles energy efficiency programs, in that is it important to determine the extent to which utility customers would have purchased the EV chargers even in the absence of the subsidy. In energy

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[234] Signatory Parties Proposal to Implement a Statewide Electric Vehicle Portfolio, Case No. 9478 pp. 27-31, 56-60 (Jan. 19, 2018). The docket with links to all filings in the proceeding is at https://www.psc.state.md.us/search-results/?keyword=9478&x.x=16&x.y=13&search=all&search=case.

[235] *Id.*

[236] Proposal to Implement a Statewide Electric Vehicle Portfolio, *supra* note __, at 3-9.

[237] *Id.* at 9.

[238] *Id.* at 9.

[239] *Id.* at 36-39.

efficiency parlance, those customers are free riders and their actions should not be included as program benefits.

For instance, the Maryland Office of People's Counsel expressed concern that the utility programs would replace or subsidize private investment in EV charging, resulting in excessive costs for ratepayers and stifling the private market. It found deficiencies in the proposed cost-benefit analyses and suggested that "similar to the evaluation of energy-efficiency programs, an evaluation of the EV Proposal could also include deriving metrics like freeridership and net-to-gross."[240] In later comments, the Office of People's Counsel again stressed free riding concerns, stating that the utilities should use the metrics and data on free riding from their own energy efficiency programs, and finding that the rebates proposed for EV charger were at a much higher percentage than those used in the past for water heaters and other appliances. It warned that "[i]f rebates are set at a level that is higher than what is optimal, then less customers will be able to participate in the program and free ridership will increase."[241] Despite these criticisms, it expressed support that program modifications, along with a full evidentiary hearing, could "bring significant benefits to Maryland's ratepayers."[242]

Likewise, the Maryland Energy Administration requested a full evidentiary hearing due to the size and scope of the proposal, and found the proposal did not sufficiently make the case why the investment would lead to the increase in EVs needed to meet program goals and achieve system-wide benefits.[243] While it supported the time of use rate programs and pilot programs to assess managed charging, it opposed any subsidies or other utility investments in EV charging in areas that were not publically accessible, which would mean eliminating most of the residential and commercial rebates for EV chargers.[244] It cited to regulatory decisions in California, Georgia, and Kentucky where utility investment in EV charging was limited to public locations, workplaces, and multifamily units.[245] In later comments, the Administration again warned against allowing subsidies for private EV charging: "Meaningful portions of total program costs . . . represent large transfers to individual households, . . . This, in effect, means that lower-income households

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[240] Comments of the Maryland Office of People's Counsel, Case No. 9478 (Md. Pub. Serv. Comm'n, Mar. 27, 2018).

[241] Comments of the Maryland Office of People's Counsel, Case No. 9478, p. 6-7 (Md. Pub. Serv. Comm'n, Aug. 30, 2018).

[242] *Id.* at 15.

[243] Md. Energy Admin. Comments, Case No. 9478, p. 2-4 (Md. Pub. Serv. Comm'n, Mar. 29, 2018).

[244] *Id.* at 5-11.

[245] *Id.*

could be subsidizing upper-income households without receiving direct benefits, which presents a serious issue of equity for Maryland ratepayers."[246]

Finally, the Commission Staff filed comments that included free rider concerns associating with EV charger rebates. It suggested limiting rebates to EV owners who purchased EVs after the start of the program, on the theory that utility customers with EVs before the start of the program would be more likely to purchase an EV charger even without the program subsidy.[247] It also urged that the Commission reduce the subsidy amount in order to limit cross subsidization and to forbid utilities from owning public chargers, on the grounds that the private charging market could serve that role and also because of rate design challenges.[248] Commission Staff also urged the Commission to require the utilities to file yearly reports of costs and charger usage so it could monitor progress.

Maryland, by contrast, provides an example of state commission proceeding regarding utility investment EV charging where cost-effectiveness tests are used to refine a utility EV charging program, rather than oppose it completely. This is in large part because Maryland is a ZEV state, and has explicit legislative policies supporting transportation electrification and EV charging. Thus, it is far less difficult for opponents to argue that free riding and cross subsidy concerns should result in rejecting a utility program outright. Instead, those arguments are used to refine the program, more similar to how they are used in the energy efficiency context.

IV. MOVING BEYOND FREE RIDING AND CROSS SUBSIDY ARGUMENTS IN ENERGY POLICY

This Part builds on the previous discussion and suggests approaches for regulators in evaluating free riding, cross subsidy, and fairness arguments in energy ratemaking proceedings addressing "energy transition" issues such as promoting distributed solar or transportation electrification. First, it explains why regulators should pay close attention to the nature of free riding arguments and the financial interests of the parties who argue free riding should result in rejection of a particular program. Second, it proposes a long-term view of both costs and benefits for new programs that builds on precautionary principles. More specifically, in the context of

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[246] Md. Energy Admin. Comments, Case No. 9478, p. 4-5 (Md. Pub. Serv. Comm'n, Aug. 31, 2018).

[247] Comments of the Staff of the Md. Pub. Serv. Comm'n, Case No. 9478 (Md. Pub. Serv. Comm'n, Mar. 27, 2018); Comments of the Staff of the Md. Pub. Serv. Comm'n, Case No. 9478 (Md. Pub. Serv. Comm'n, Aug. 31, 2018); Comments of the Staff of the Md. Pub. Serv. Comm'n, Case No. 9478 (Md. Pub. Serv. Comm'n, Sept. 28, 2018).

[248] *Id.*

distributed solar and EV charging policies, it suggests that regulators adopt principles developed in the energy efficiency context and modify them for current programs.

A. Exercising Caution with Free Riding, Fairness, and Cross Subsidy Arguments

First, regulators should be skeptical of free riding and cross subsidy arguments coming from parties that risk losing market share from the regulatory policy in question. This point may seem fairly obvious but is worth stating expressly because it can become lost in a large regulatory docket where free riding arguments are embedded in other arguments and data regarding current and future costs and benefits of regulatory programs. This is true when it comes to electric utility arguments in the rooftop solar context and oil company arguments in the EV charging context. In each case the party making the free riding or cross subsidy argument is not the party that will actually pay "more than their fair share" of costs, but instead is the party that wants to maintain or increase their market share of a product that will be paid for by all utility customers.[249] Thus, the party making the free riding argument is concerned more about their overall share of the market rather than the distributional effects of the policy.

In the rooftop solar context, utilities are concerned that increased distributed solar generation will reduce the need for utility-scale electricity generation and, in the long term, transmission investments, resulting in reduced utility profits. In the EV charging context, more EV charging will lead to more EV adoptions, causing consumer to purchase less gasoline. Both the electric utilities and the oil companies have fiduciary duties to their shareholders to increase profitability. They do not have the same obligation to one class of utility customer or other.

This is not to say that regulators should ignore what utilities have to say in rooftop solar proceedings or even what oil companies have to say in EV charging proceedings. In the rooftop solar context, the utility has superior information regarding overall costs, customer bills, and virtually every other aspect of the utility system as a result of its role in running the system. But regulators should evaluate that data keeping in mind the utility's fiduciary duty to shareholders, ask hard

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[249] While this is more obvious in the case of the oil companies, the same is true for investor-owned electric utilities, which is why state public utility commissions exist to heavily regulate them. *See, e.g.*, MINN. STAT. § 216B.01 ("It is hereby declared to be in the public interest that public utilities be regulated as hereinafter provided in order to provide the retail consumers of natural gas and electric service in this state with adequate and reliable services at reasonable rates, consistent with the financial and economic requirements of public utilities and their need to construct facilities to provide such services or to otherwise obtain energy supplies, . . ."); Peskoe, *supra* note __, at 118-29 (discussing state regulatory commission oversight of utilities and citing state statutes).

questions, and consider competing data on costs and benefits that is developing rapidly in multiple sectors due to the growth of rooftop solar as well as legislation like the Minnesota VOST, which requires the development of new metrics to determine the costs and benefits of distributed solar.

In the EV charging context, the oil companies possess far less helpful information regarding costs and benefits associated with EV charging policies than utilities do in the rooftop solar context. Nevertheless, it is a fair point that state public utility commissions with jurisdiction over the state's energy system as a whole should consider any impacts EV charging may have on the gasoline market and the impact of that market on the state's consumers. But regulators should certainly pause before giving credence to arguments by groups like Americans for Prosperity purporting to represent the interests of low-income electric utility customers in a particular state.[250]

Arguments by ratepayer advocacy groups like the Citizens Utility Board in Illinois or the Office of Public Counsel in Missouri and Maryland are a different matter. In some states they are created by statute while in others they are nonprofit organizations. In either case, their mission is to advocate on behalf of state utility customers, particularly residential, small business, or low-income customers, to ensure rates are not excessive and that particular classes of customers are not unduly burdened by rate increases. Thus, such groups have an obligation to make cross subsidy and free riding arguments on behalf of the interests they represent.[251] But such arguments necessarily focus fairly narrowly on current costs and current benefits of any new policies as the concern is primarily about the impacts of increased electricity costs at a time when the benefits of increased rooftop solar penetration or increased EV adoption is difficult to value. Thus, in evaluating free riding and cross subsidy arguments in this context, regulators should develop metrics to incorporate the longer-term benefits of these new policies before deciding that current costs, or the distribution of those current costs, do not justify the policy. How do to develop these metrics is explored in more detail below.

B. Recognizing Information Gaps and Developing Appropriate Cost-Effectiveness Measures: Applying Energy Efficiency Models to the Rooftop Solar and EV Charging Debates

As discussed in Part III, regulators have decades of experience evaluating utility-funded energy efficiency programs, as well as the system-wide benefits of those

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[250] *See supra* notes __ - __ and accompanying text.

[251] The same can be said for state Attorney General offices and, in many cases state public utility commission staff, which must consider the distributional impacts of electricity rate increases in their evaluation of net metering, EV charging, energy efficiency, or other state policy developments.

programs on a long-term basis. The metrics are far from perfect, as evidenced by continuing debates over the role of energy efficiency programs in reducing energy use,[252] but there is at least a general consensus that energy efficiency can have significant present and future benefits to all utility customers, even if the full extend of free riders, spillovers, and other factors remains in dispute. The same cannot be said for the long-term benefits of distributed solar and EV charging. From a regulatory perspective, these programs are in their infancy. As a result, state public utility commissions are reviewing dockets, sometimes with and sometimes without the benefit of specific legislative direction, and making decisions that will impact technological developments, utility experience, and utility customer choices.

In many ways, there are important parallels between these current regulatory challenges and the longstanding debates pitting cost-benefit analysis against the precautionary principle in developing environmental, health, and safety regulations. Cost-benefit analysis "is a well-established, if fallible, methodology for ensuring that regulations enhance, rather than detract from, overall social welfare."[253] It does so by attempting to prevent inefficient regulations by comparing the costs and benefits of a particular regulatory action.[254] Many scholars criticize cost benefit analysis because its evaluation of costs and benefits are inherently imprecise and subjective.[255] This is particularly true because it is very difficult to place a monetary value on many of the benefits of environmental, health, sand safety regulations, such as clean air, clean water, human life and health, scenic and aesthetic values, and plant and animal health.[256]

Environmental law scholars have long pointed to the "precautionary principle" as a potential alternative approach. The precautionary principle calls for a higher level of regulation—or precaution—when significant but uncertain risks, such as climate change or harm from toxic chemicals, exist. One articulation of the precautionary principle from the 1992 Rio Declaration on Environment and Development states that "[w]hen there are threats of serious or irreversible damage,

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[252] *See supra* notes __ - __ and accompanying text.

[253] *See* Daniel H. Cole, *Reconciling Cost-Benefit Analysis with the Precautionary Principle*, The REGULATORY REVIEW (Mar. 5, 2012).

[254] *Id. See also* David M. Driesen, *Cost-Benefit Analysis and the Precautionary Principle: Can They Be Reconciled?*, 2013 MICH. ST. L. REV. 771, 776-77 (2013); Daniel A. Farber, *Coping with Uncertainty: Cost-Benefit Analysis, the Precautionary Principle, and Climate Change*, 90 WASH. L. REV. 1659,

[255] Cole, *supra* note __.

[256] *See, e.g.*, Center for Progressive Reform, *Cost-Benefit Analysis: Bad Numbers, Bad Decisions,* www.progressivereform.org/costBenefit.cfm (collecting scholarship critical of cost-benefit analysis); Daniel A. Farber, *Rethinking the Role of Cost-Benefit Analysis*, 76 U. CHI. L. REV. 1355 (2009) (discussing extensive literature on cost benefit analysis and precautionary principle).

lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[257] Thus, the precautionary principle generally places the burden of proof on those who would limit regulation with the potential to enhance public welfare, particularly environmental health and safety benefits, in the face of uncertainty. By contrast, cost-benefit analysis places the burden of proof on proponents of regulation; if benefits of regulation or risks of harm in the absence of regulation are uncertain or difficult to value, regulation is likely to be deemed inefficient under a cost-benefit test.

The literature supporting and criticizing cost-benefit analysis and the ability to manipulate its inputs is extensive and beyond the scope of this Article. The same is true for scholarly and regulatory debate on the role of the precautionary principle, both as an alternative to cost-benefit analysis or as a principle to integrate into cost-benefit analysis.[258] These debates, however, are similar to the concerns raised repeatedly in the regulatory proceedings over how to value the costs and benefits of distributed solar compensation and EV charging investments. In both instances, questions arise over how to weigh current and future costs to non-solar customers and non-EV drivers against system-wide benefits that may not accrue to all utility customers until far into the future, if at all. Should the precautionary principle be applied to these regulatory analyses to support higher compensation for distributed solar and rapid EV charging investment? Or should a narrower form of cost-benefit analysis be applied? Does the precautionary principle justify borrowing one of the broader cost-effectiveness tests from the energy efficiency context like the Societal Impact Test in evaluating these programs or should regulators use a more conservative test like the Ratepayer Impact Test?[259] The remainder of this Part provides an evaluation of these issues.

1. Distributed Solar

The regulatory proceedings in Arizona and Nevada illustrate state regulatory commissions struggling to deal with uncertainties over how to monetize, calculate, and weigh future costs and benefits associated with creating incentives for rooftop solar through net metering policies. Both commissions were faced with a similar problem, namely, the absence of reliable data regarding the costs and benefits of a utility subsidy program—net metering—that may provide more obvious benefits for

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[257] Cole, *supra* note __ (citing and quoting 1992 Rio Declaration on Environment and Development). *See also* Farber, *supra* note __, at 1671-78 (discussing precautionary principle and scholarly criticisms of same).

[258] *See supra* notes __ - __.

[259] *See supra* notes __ - __ and accompanying test (explaining different cost-effectiveness tests).

one group of customers now, but may provide overall benefits to all customers both now and in the future, including reduced electricity bills and improved public welfare through reduced GHG emissions and other air pollutants. In both cases, the utility raised free riding, fairness, and cross subsidy arguments and, because of its role in managing the grid and customers, was at an information advantage as compared to solar proponents. One commission, Arizona, was receptive to the utility's arguments regarding fairness while the other commission, Nevada, looked beyond those arguments to the bigger picture of the overall benefits that rooftop solar could provide to the entire utility system and the state.

In the Arizona proceeding, the Commission found a lack of measurable "objective" and "subjective" values distributed solar provided to the utility system.[260] In the absence of hard data showing those values were equitably distributed across all customers, the Commission felt compelled to place at least some additional charges on solar customers.[261] Even thought the fixed charges the Commission imposed were far less than those requested by the utility, the order assumes there is at least some cross subsidy that must be addressed to ensure just and reasonable rates.

By contrast, in Nevada, the Commission focused on whether there was an "unreasonable" cost shift between customer classes rather than any cost shift at all, based on the applicable statute.[262] In finding no unreasonable cost shift, the Commission recognized that the evidence was in conflict, that present and future costs and benefits could not be measured accurately, and stated its intent to "avoid jumping to a premature conclusion for the mere sake of having a resolution while the conversation and technology is evolving . . ."[263] The Commission was concerned that a "wrong answer" was worse than an "uncertain" answer, particularly when the benefits associated with distributed solar were real but "hard to quantify."[264] This analysis has many hallmarks of the application of the precautionary principle, even if the Commission did not use that term. In the face of uncertainty, it chose a policy that would potentially provide environmental and system-wide economic benefits to all utility customers in the future as well as public benefits to the entire state, even if there may be some shifting of costs to certain utility customers in the short term.

Moreover, although neither commission expressly referred to the cost-effectiveness tests from the energy efficiency realm, the debate over whether to use a narrow test looking at current, distributional fairness or a broader test that considers future, societal impacts, could be seen just barely below the surface of the

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[260] *See* APS Order, *supra* note __, at ¶¶ 25-26.

[261] *See supra* note __, and accompanying text.

[262] Sierra Pacific Power Co., *supra* note __, at 36.

[263] *Id.* at 33.

[264] *Id.* at 34.

proceedings. Both commissions recognized they were working with incomplete information on costs, benefits, and distributional implications of the policies under consideration. The Arizona Commission appeared to apply a more traditional cost-benefit analysis that heavily weighed the inputs the utility provided while the Nevada Commission took a different approach that more resembled application of the precautionary principle. Both commissions recognized that their results were crude at best and would need to be modified in the future.[265]

Most experts in the field recognize that solar net metering is a fairly crude approach to compensating a growing energy resource across the country, particularly when the costs of net metering on a kWh basis far exceed those of utility-scale solar and other utility-scale renewable energy resources in wholesale markets.[266] By the same token, paying distributed solar customers a rate that is based on wholesale prices for utility-scale wind and solar energy is also not appropriate, as such pricing fails to compensate distributed solar customers for the value of distributed energy, which, if widely adopted, may lead to new markets, technology and investment in micro-grids, battery storage, and the like.

In considering new approaches, however, public utility commissions should be cautious of free riding arguments articulated by utilities in a regulatory forum that cannot fully value the present and future costs and benefits of distributed solar energy on the electric grid.[267] More states are beginning to enact legislation and regulations to replace net metering, similar to Minnesota, to avoid the net metering disputes on display in the Arizona and Nevada proceedings.[268] Scholars have also suggested an "avoided cost plus social benefit" approach that resembles some of the

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[265] *See* APS Order, *supra* note __, at ¶¶ 30-32 (stating the need to quantify both the costs and benefits of distributed solar and then "allocate[] these costs and benefits equitably among customers [as] a matter of rate design."

[266] *See supra* note __ and accompanying text (discussing markets for wholesale electricity sales that value energy based on demand and resource).

[267] *See, e.g.*, Welton, *supra* note __, at 595 ("Frustratingly for regulators, empirical evidence does not provide conclusive answers to this debate. Most studies show that average retail rates—at which net-metered customers are credited—approximate the value of solar to the grid, with about half of the studies finding that solar is underpaid and the other half finding that solar is overpaid. These divergent results point to a deeper challenge in framing this equity debate as an empirical question.").

[268] *See, e.g.*, Julia Pyper, *Maine Proposes to Replace Net Metering with a Market Alternative*, GTM, Feb. 26, 2016; New York State, *Value of Distributed Energy Resources*, https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources (discussing new regulations for valuing solar in New York State as a replacement to net metering); NYSDERA, *Summary of Value of Distributed Energy Resources,* Oct. 13, 2017 (explaining same).

broader energy efficiency tests discussed in Part III.A in that it expressly values social benefits of distributed solar.[269]

In the interim, there is value in recognizing that in most areas of the country, penetration levels of distributed solar energy are still extremely small. Regulators have time to develop metrics to evaluate the costs and benefits of distributed solar now and worry about the effects of larger penetration and ultimate rate design later, when more is known about the scale at which solar penetration will have a measurable positive or negative impact on rates, utility costs, and other factors. Using a precautionary approach will allows regulators to put the burden on utilities and others to show that rooftop solar is a problem for system maintenance or that cross subsidies are significant. To assume that is the case now in addressing concerns over net metering risks stifling expansion of an important energy resource with the potential for significant public benefits. This is particularly true because improved metrics will be developed within a regulatory system where cross subsidies have always existed and will continue to exist, often without objection by participants and regulators. To single out one type of cross subsidy without recognizing the context in which it exists is short sighted.[270]

2. Utility Investment in EV Charging

In the EV charging context, proponents are approaching state regulatory commissions with increasingly sophisticated analyses of future program benefits, and this time it is the opponents of such programs who are at a relative information disadvantage. This is because in the EV charging context, utilities are aligned, for the most part, with private charging companies and environmental nonprofit groups, reducing some of the information asymmetries on display in the rooftop solar context. Nevertheless, there is still an information deficit because there are many unknowns regarding the extent of climate change damage associated with continuing to drive conventional vehicles, the pace of EV adoption, and the impact of EVs, both positive and negative, on the electric grid. This information will not exist until electric utilities, drivers, car companies, and others can evaluate the impacts of broad-based transportation electrification.

Nevertheless, state regulatory commissions are responding to utility proposals for EV charging investments and participants in these proceedings are making much more explicit use of energy efficiency cost-effectiveness tests than they are in the

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[269] *See* Revesz & Unel, *supra* note __, at 84-95, 99-101.

[270] *See, e.g.*, Revesz & Unel, *supra* note __, at 102 ("Cost-recovery and cost-shifting problems are unintended consequences of the current, inefficient retail rate designs, and should not be blamed on net metering policies); Rule *supra* note __ (discussing cost shifts inherent in the utility ratemaking process).

distributed solar context. This is in part because the parallels between utility investment in energy efficiency programs and utility investment in EV charging are much more obvious, at least in the context of utility rebates for EV chargers, which are a component of many utility proposals. In the energy efficiency context, a major goal of regulatory design is to identify free riders—utility customers who would have purchased a new furnace, energy efficient lighting, new insulation, or the like even in the absence of the utility subsidy. The same should be true for EV chargers in that a utility program to incentivize the purchase of EV chargers is not cost-effective if significant ratepayer funds are being used to subsidize customer purchases of EV chargers that would have occurred even absent the subsidy program.[271]

For instance in the Illinois Notice of Inquiry proceeding described above, the Commission specifically asked participants to discuss how EVs would contribute to energy efficiency in Illinois through fuel switching and how EV charging stations would affect utility energy efficiency programs.[272] Because the Illinois Commission was not considering a specific utility proposal, the participants did not evaluate any cost-effectiveness tests but instead provided general information on how EVs and EV charging would impact utility energy efficiency programs in the state.

In Missouri, by contrast, there was significant testimony regarding whether Ameren's EV charging proposal would meet the RIM Test, with Ameren contending that it would meet the test as well as "provide significant environmental benefits."[273] In response, Commission Staff recommended rejection of the EV program because there was insufficient evidence that the program would spur sufficient EV adoption to result in utility revenues at a level that would exceed the costs of the grid expansion, subsidies, and program costs.[274] Moreover, Commission Staff found Ameren did not provide sufficient evidence that the subsidy proposed for EV chargers would avoid significant free riding.[275] Comments from the Office of Public Counsel were similar, arguing that Ameren had failed to show a need for the

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[271] Indeed, the National Efficiency Screening Project, a stakeholder organization with a mission to improve cost-effectiveness evaluation of energy efficiency resources, has stated that its metrics designed for energy efficiency programs "can be used to assess the cost-effectiveness of supply-side resources or distributed energy resources (DERs)—including EE, demand response, distributed generation, distributed storage, electric vehicles, and strategic electrification technologies. National Efficiency Screening Project, https://nationalefficiencyscreening.org/.

[272] *See supra* note __ and accompanying text.

[273] *See supra* note __ and accompanying text.

[274] *See supra* note __ and accompanying text.

[275] *See supra* note __ and accompanying text.

program at all and that it had failed to meet its burden of showing was cost-effective.[276]

Notably, in their comments, opponents of Ameren's proposal use energy efficiency metrics to oppose the program in its entirety rather than to urge revisions to the program, as would be the case in the energy efficiency context. This is not surprising. Nothing in any of the Missouri filings cites to any legislation or regulation in the state that exists to promote EVs or EV charging, whereas utility-funded energy efficiency program are creatures of state statute. As a result, free riding arguments in non ZEV states can be used in a way that is similar how they have been used are used in the rooftop solar context, which is quite different from how they are used in the energy efficiency context, where they provide an evaluative purpose to refine and improve programs rather than eliminate them. This stands in contrast to Maryland, where free riding arguments were used to attempt to modify the program and to encourage the development of metrics to ensure cost-effectiveness.[277]

V. CONCLUSION

There is no doubt a role for free riding and cross subsidy concerns in both the distributed solar EV charging contexts. But it is also clear that opponents of regulatory programs to incentivize distributed solar and EV adoption have used and will continue to use free riding and cross subsidy arguments to block programs that may hurt them financially. Commissions should look beyond these arguments and consider free riding and cross subsidy concerns for purposes of requiring program advocates to develop appropriate metrics to optimize the programs at issue, rather than to impede them before they can provide system-wide benefits. In order to do so, state utility commissions can apply a precautionary approach with regard to evaluating present and future costs and benefits, and urge participants in regulatory proceedings to look to existing energy efficiency metrics as a starting point for analysis and modify these metrics to meet the needs of developing programs.

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[276] *See supra* note __ and accompanying text.

[277] *See supra* notes __ - __ and accompanying text.

Article Draft -- Regulating the Energy "Free Riders"

From:	Alexandra Klass <aklass@umn.edu>
To:	Andrew Twite <twite@fresh-energy.org>
Sent:	January 9, 2019 11:28:03 AM CST
Attachments:	Regulating the Free Riders Draft 1 8 2019.docx

Dear Andrew -- Happy new year! I hope all is well. I was hoping you might have time to read an early draft of a new article that discusses free riding arguments in state public utility commission proceedings involving energy efficiency, distributed solar, and EV charging. It is very rough, and I would love your comments/suggestions to make it better!

Best,

Alex

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REGULATING THE ENERGY "FREE RIDERS"

Alexandra B. Klass*

This Article explores "free rider" arguments in energy policy. It focuses on how state public utility commissions have addressed free rider arguments in three different types of contemporary ratemaking proceedings: ratepayer funded energy efficiency programs; utility compensation for customer-generated rooftop solar energy; and utility investments in electric vehicle ("EV") charging infrastructure. In doing so, this Article evaluates the merits of the free riding arguments in each of these contexts, considers the impacts of the "free riding" label on policymaking in each area, and considers the weight policymakers should give to free rider concerns.

This Article claims that regulators should be cautious in evaluating free riding arguments and, in particular, consider the broader financial motivations of the parties making the free riding arguments. This is particularly true if free riding arguments are being made in opposition to the program in question rather than to evaluate the cost-effectiveness of the program. For instance, in the energy efficiency context, identifying free riders is a well-established metric in determining the cost-effectiveness of a particular energy efficiency program rather than an argument used to oppose energy efficiency programs in general. By contrast, in the rooftop solar and EV charging contexts, free riding and related arguments of fairness and cross subsidies are used strategically to oppose these programs when they are contrary to particular financial interests. Moreover, with regard to all free riding claims, it is important for regulators to consider both the present and future benefits of the program in question. In other words, if a goal of the program is to build infrastructure for a long-term policy goal, such as shifting to cleaner energy resources or reducing overall energy demand, program evaluators should consider future program beneficiaries in addition to current program beneficiaries. Moreover, regulators should use a range of tools to develop appropriate metrics to determine cost-effectiveness of programs supporting both distributed solar energy and EV charging investments, building on work done over the past decades in the energy efficiency context.

I. INTRODUCTION

As state regulators, electric utilities, and other interested parties attempt to develop programs to encourage a range of beneficial consumer behavior with regard to energy use, critics often are quick to argue that the beneficiaries of these programs are "free riders."[1] In its simplest terms, free riding is the receipt of a public good

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* Distinguished McKnight University Professor, University of Minnesota Law School. Scott Dewey, Connie Lenz, and Hudson Peters provided excellent research assistance.

[1] *See, e.g.*, Charles E. Bayless, *Piggybacking on the Grid*, PUB. UTILS. FORT. (July 2015), https://perma.cc/SH9U-KJTD (comparing rooftop solar to "Piggyback Air," a mythical

without paying for its associated costs.[2] This Article will examine the use of free riding arguments in contemporary energy regulation. In particular, it will examine how state public utility commissions address arguments regarding free riding in three specific contexts: ratepayer funded energy efficiency programs; electric utility compensation for customer generated rooftop solar energy (also referred to as "net metering"); and electric utility investments in electric vehicle ("EV") charging infrastructure.

This Article claims that regulators should exercise caution in evaluating free riding arguments. In particular, regulators should always consider which parties are making free riding arguments, what their motivations might be, and consider a full range of costs and benefits associated with the policy under consideration before reaching a conclusion that free riding is occurring, that an unreasonable shift of costs between customer classes is taking place, or that the policy fails to meet a statutory requirement that it be "just and reasonable."[3]

Equally important, regulators need to be cognizant of the information asymmetries that permeate the utility regulatory proceedings involving claims of free riding. In many of the proceedings, "hard" data on program costs and benefits either is not available or is developed by the electric utility in question, at least at the start of the program. In the face of incomplete information, who should bear the burden of proving that a program such as energy efficiency, rooftop solar, or EV charging provides system-wide benefits and extent of those benefits? What if present-day benefits are modest but long-term benefits have the potential to be significant and measurable? These are important questions regulatory commissions are forced to answer in the early stages of customer-funded utility programs and labels of free

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airline that works by attaching its engineless planes to the roofs of its competitors' aircraft); Prosper Org, *Ice Cream for Fairness*, YOUTUBE (Oct. 21, 2013), https://www.youtube.com/watch?reload=9&v=zJ8tToIeQ_U (electric utility-funded television advertisement suggesting that utility net metering programs are akin to a man bringing his own ice cream to an ice cream truck to take advantage of the free toppings provided with the ice cream sold at the truck, thus causing the owner to raise prices on ice cream for everyone else); Herman K. Trabish, *NV Energy CEO: Solar has Gotten a 'Free Ride' on the Grid*, GTM, (Aug. 19, 2013).

[2] Garrett Cullity, *Moral Free Riding*, 24 PHIL. & PUB. AFF., 3, 7 (1995) ("a free rider is someone whose failure to pay for nonrival goods . . . makes her conduct unfair.").

[3] Most state statutes governing public utilities require that utility rates and charges be "just and reasonable" and that state public utility commissions ensure that rates are just and reasonable through the rate regulation process. *See* JIM LAZAR, ELECTRICITY REGULATION IN THE US: A GUIDE 49-61 (2d ed. 2016); Ari Peskoe, *Unjust, Unreasonable, and Unduly Discriminatory: Electric Utility Rates and the Campaign Against Rooftop Solar*, 11 Tex. J. Oil, Gas & Energy L. 101 & n.77 (2016) (citing state statutes).

riding or cross subsidies can limit or stall programs with potentially significant future system-wide benefits if the burden of providing information is misplaced.

The regulatory applications explored in this Article—energy efficiency programs, utility compensation for customer-generated rooftop solar energy, and utility investment in EV charging infrastructure—were chosen for two primary reasons. First each application involves the development of a state policy governing electric utilities within a regulated monopoly system.[4] This means that for each policy, the state public utility commission requires the electric utility to implement a program that will be paid for by all utility customers (also known as "ratepayers") but that may not provide identical benefits to all customers. This understandably leads to arguments by the utilities, various customer classes, or other interested parties that one group of customers is "free riding" off of the program to the detriment of other groups of customers or that there is a "cross-subsidy"—the idea that one group of customers (e.g., EV drivers, rooftop solar owners) is being subsidized by another group of customers and such a result is "unfair" or is not "just and reasonable."[5]

Second, these applications provide helpful case studies because electric utilities as a group have taken different positions with regard to their support or opposition to the program in question. With regard to energy efficiency, in the early stages of these programs in the 1980s, utilities often opposed such programs because they would reduce utility revenues due to lost electricity sales. However, as state legislatures and public utility commissions developed programs to "decouple" utility revenues from energy sales, and to otherwise compensate utilities for implementing energy efficiency programs, utility opposition declined and free riding concerns became more a function of measuring the cost-effectiveness of particular program designs rather than opposition to energy efficiency programs in general.[6]

As for rooftop solar, utilities have attempted to impose significant limits on state "net metering" programs that require utilities to compensate electricity customers for

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[4] For a discussion of how the states regulate electric and gas utilities as regulated monopolies through the state public utility ratemaking process, see, e.g. LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY Ch. 4 (West Academic Publishing 2d ed. 2018); Alexandra B. Klass, *Public Utilities and Transportation Electrification*, 104 IOWA L. REV. 545, 567-69 (2019) (discussing basic of electric utility ratemaking); Melissa Whited, The Ratemaking Process (Synapse Energy Economics, July 2017), http://www.synapse-energy.com/sites/default/files/Ratemaking-Fundamentals-FactSheet.pdf (summarizing the fundamentals of utility ratemaking and rate design).

[5] *See infra* note __ and accompanying text (discussing electric utility laws and ratemaking procedures).

[6] *See infra* notes __ - __ and accompanying text.

the energy their solar panels produce at retail electricity rates.[7] Such required purchases reduce utility revenues by reducing the amount of electric energy net metering customers purchase from the utility. In opposing net metering policies, utilities often raise free riding arguments—namely, that customers with solar panels are paying less than their "fair share" of the costs to support the electric grid. Because solar panel owners pay less for electricity each month but still use the electric grid when the sun is not shining, utilities argue that the costs of supporting the grid are unfairly shifted to non-solar customers, who are often less affluent. The extent of this "cross-subsidy" is a matter of significant controversy in state legislatures and state public utility commissions.

With regard to utility investment in EV charging infrastructure, utilities generally support these policies as they create an investment opportunity to build new infrastructure for which they can recover not only their costs but also a rate of return. As a result, in this context it is the oil companies, not electric utilities, who stand to lose from program adoption and have raised free riding arguments in regulatory proceedings.[8] They content that requiring all utility customers to pay for such utility investments to support transportation electrification is an unfair "cross subsidy" between EV owners and non-EV owners, despite a growing body of evidence that greater use of EVs will, at least in the future, benefit all utility customers through overall reductions in electricity rates due to more efficient use of electric grid resources.[9]

Notably, environmental groups generally support all three types of policies as they all potentially lead to reduced reliance on fossil fuels to generate electricity. Likewise, consumer advocacy groups often oppose all three policies because they can lead to higher (or at least disproportionate) costs on lower income customers in the short term. Thus, utilities in some cases invoke free riding and cross subsidy arguments on behalf of certain customer classes and in some cases do not, mostly depending on whether the utility itself stands to benefit financially from the policy.

These differences in the free riding and cross subsidy arguments in each of applications allows for greater insights into the evaluation of free riding arguments. They also provide a window into the motivations of the regulated utilities and third parties making the free riding and cross-subsidy arguments in the first place.

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[7] *See infra* notes __ - __ and accompanying text.

[8] *See infra* notes __ - __ and accompanying text.

[9] *Id.*

Part II sets forth various definitions of free riding from multiple academic disciplines. It then surveys some common free riding arguments in both legal scholarship and case law outside the energy policy field. This review shows that both scholars and courts use the concept free riding to encompass two different concerns to be addressed through law and regulation: (1) the inefficiency and ineffectiveness of policies that would subsidize desired conduct that would have occurred even without the subsidy and (2) the "unfairness" of certain groups receiving a greater benefit from programs and investments paid for by everyone.

Part III turns to regulatory and judicial treatment of free riding arguments in energy law and policy. After exploring how federal regulators and courts have responded to free rider concerns in energy policy in the past, this Part evaluates more closely the use of free riding, fairness, and cross subsidy arguments in the three contemporary state public utility ratemaking challenges described above: (1) ratepayer funded energy efficiency programs; (2) utility compensation for customer-generated rooftop solar energy; and (3) utility investment in EV charging infrastructure. In each case, state public utility regulators must evaluate free riding arguments and determine how much weight to give them in setting policies to govern these programs. In each situation, regulator decision-making is complicated by rapid technological developments, uncertainties regarding program impacts, concerns associated with future environmental harms such as climate change, and limited ability to assess program effectiveness now for benefits that may not accrue until years into the future.

Part IV makes the claim that regulators should be cautious in accepting free riding arguments and that any conclusions regarding free riding or cross subsidies should be informed by the broader financial motivations of the party making the free riding or cross-subsidy argument.[10] This is particularly true if free riding arguments

[10] Scholars have raised a similar concern in recent years in the context of utility arguments regarding "fairness" and cross subsidies in the context of rooftop solar compensation. *See, e.g.*, Shelley Welton, *Clean Electrification*, 88 U. COLO. L. REV. 571, 605 (2017) ("The fact that utilities so frequently filter their protectionist concerns through discussions of equity . . . serves to underscore its importance in electricity law; utilities make these arguments because they are aware that regulators care about the equities of clean energy policies."); Ari Peskoe, *Unjust, Unreasonable, and Unduly Discriminatory: Electric Utility Rates and the Campaign Against Rooftop Solar*, 11 TEX. J. OIL, GAS & ENERGY L. 101, 108-09 (2016) (contending that the utility "focus on supposed cost shifts among individual ratepayers is self-serving, and that [public utility commissions] have routinely allowed or ignored potential cross-subsidization among individual ratepayers, particularly when subsidies benefit the utility system."); Troy Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. CLIMATE & ENERGY L. 115 (2014-15) (cataloguing different fairness and cross-subsidy arguments utilities make in the context of rooftop solar compensation).

are being made in opposition to the program in question rather than to evaluate the cost-effectiveness of the program. For instance, in the energy efficiency context, identifying free riders is a well-established metric in determining the cost-effectiveness of a particular energy efficiency program rather than an argument used to oppose energy efficiency in general. By contrast, in the rooftop solar and EV charging contexts, free riding and related arguments of fairness and cross subsidies are used strategically to oppose these programs when they are contrary to particular financial interests.

Moreover, with regard to all free riding claims, it is important for regulators to consider both the present and future benefits of the program in question. In other words, if a goal of the program is to build infrastructure for a long-term policy goal, such as a shift to cleaner energy resources or reducing overall energy demand, program evaluators should consider future program beneficiaries in addition to current program beneficiaries. This has already been recognized to some extent for energy efficiency policies, where utilities and regulators realize that reduced energy demand means that utilities need not invest in new energy generation plants, including fossil fuel plants, in order to meet customer demand in the future. With a few exceptions,[11] the debate in the energy efficiency realm has shifted away from whether utilities should implement energy efficiency programs at all and instead focuses on developing appropriate evaluation, measurement, and verification metrics to design programs that are cost-effective and incentivize behavior that would not occur in the absence of the program.

This shift has not yet occurred in the context of utility compensation for rooftop solar or utility investment in EV charging infrastructure. In both cases, opponents of those programs—electric utilities in the case of rooftop solar and oil companies in the case of EV charging—are relying on free riding and cross subsidy arguments to question the very existence of the policy in question and focusing on alleged unfair cost shifts with regard to different classes of current customers. Supporters of both types of programs are marshaling evidence to rebut arguments that an unreasonable cost shift among customer classes will occur, with mixed success.

In the face of incomplete information that exists at the start of a new program with the potential for significant public benefits, regulators should be cautious in concluding that free riding or cross subsidy concerns should defeat the project in question. Instead, in those circumstances, it may be more reasonable to use free riding concerns to place limits on subsidies for particularly investments, such as

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[11] For exceptions to this general statement, *see infra* notes __ - __ and accompanying text (discussing legislative rollbacks of energy efficiency programs).

rebates for residential or commercial EV charging stations, but to allow investments in longer term grid improvements that may benefit all utility customers in the long run. Moreover, such an approach allows regulators and electric utilities to develop similar metrics already used in the energy efficiency context and apply them to developing programs in the rooftop solar and EV charging infrastructure contexts.

II. FREE RIDING DEFINITIONS AND APPLICATIONS

The concept of free riding originates in moral philosophy, and arguably dates back to Plato's Republic.[12] In moral philosophy, free riding hinges on the unfairness of the receipt of a benefit without paying its associated costs.[13] In defining "fairness," John Rawls states:

> a person is [morally] required to do his part as defined by the rules of an institution when two conditions are met: first, the institution is just (or fair), that is, it satisfies the two principles of justice; and second, one has voluntarily accepted the benefits of the arrangement or taken advantage of the opportunities it offers to further one's interests.[14]

In economics, free riding is a broadly defined principle that concerns the receipt of unpaid-for benefits.[15] Concerns over free riding generally focus on "public goods." In other words, markets and regulation should be designed to prevent a party (the "free rider") from receiving the benefit of a public good without

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[12] *The Free Rider Problem*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY (May 21, 2003), https://plato.stanford.edu/entries/free-rider/ (citing PLATO, THE REPUBLIC bk. 2, 360b–c (C.D.C. Reeve. trans., Hackett, 2004)) (noting Glaucon's argument to disobey the law when one cannot be caught). *See also* Hossein Haeri & M. Sawi Kawaja, *The Trouble With Free Riders*, PUB. UTIL. FORTNIGHTLY 34 (Mar. 2012) (discussing origins of the concept of free riding dating back to Plato's Republic; 18th and 19th century political philosophers, including Hume and Mill; and later Paul Samuelson and Mancur Olson in the 1950s and 1960s).

[13] Garrett Cullity, *Moral Free Riding*, 24 PHIL. & PUB. AFF., 3, 7 (1995) ("a free rider is someone whose failure to pay for nonrival goods under conditions C makes her conduct unfair.").

[14] JOHN RAWLS, A THEORY OF JUSTICE 111–12 (1971). Rawls' two principles of justice mandate (1) equal access to universal basic liberties and (2) social and economic inequalities are arranged to the benefit of the least well-off. *Id.* at 26.

[15] DONALD RUTHERFORD, *Free Rider*, *in* ROUTLEDGE DICTIONARY OF ECON. 233 (1995) ("An individual who does not pay for the goods or services he or she consumes."). *See also* JAMES R. KEARL, PRINCIPLES OF ECONOMICS 441 (1993) ("Free riding occurs when a person benefits from or uses a valuable good or service without having to pay for it.").

contributing to its cost.[16] Definitions of a "public good" vary, but in general a public good is defined as one that is available to everyone if anyone has access (jointness in supply), no one can be excluded from its use without excessive cost (nonexcludability), use by one person doesn't diminish the amount available for consumption by others (jointness in consumption), enjoyment by one person of the good does not diminish the benefits available to others (nonrivalness), no one can avoid using the good if anyone does (compulsoriness), everyone receives the same amount of the good (equality), and each user of the good consumes its total output (indivisibility).[17] Classic public goods include national defense, street lighting, and environmental protection.[18] Economists and regulators attempt to design markets and regulations to avoid free riding to ensure sufficient investment in public goods and avoid overconsumption of public goods.

Free riding arguments appear across a broad range of contexts, from the auto industry, to voting, to international trade negotiations, or to any area where someone contends that unpaid-for benefits have been accrued.[19] In his classic 1965 work *The Logic of Collective Action: Public Goods and the Theory of Groups*, Mancur Olson Jr. brought the economic theory of free riding into the public policy realm, with his application of the concept to the social science issue of collective action.[20] Though he didn't explicitly refer to free riding, Olson described the collective action problem that individuals are more likely to free ride as group size increases.[21] Because individuals are able to derive most, if not all, of the benefits of a public good regardless of their individual contributions, and because the comparative value of any individual

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[16] *See* Cullity, *supra* note 13, at 2; *see also* William Nordhaus, *Climate Clubs: Overcoming Free-riding in International Climate Policy*, 105 AM. ECON. REV. 1339, 1339 (2015).

[17] Cullity, *supra* note 13, at 3–4; R. HARDIN, COLLECTIVE ACTION 17 (1982); D. MUELLER, PUBLIC CHOICE 14 (1954); Paul A. Samuleson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. & STATISTICS 387 (1954).

[18] Thomas W. Merrill, *The Economics of Public Use*, 72 CORNELL L. REV. 61, 73, n.45 (2006).

[19] *Compare* Ellen Sewell & Charles Bodkin, *The Internet's Impact on Competition, Free Riding and the Future of Sales Service in Retail Automobile Markets*, 35 EASTERN ECON. J. 96, (2009) (discussing ability of online car dealers to free ride on physical services of brick-and-mortar dealers), *with* Rodney D. Ludema & Anna Maria Mayda, *Do Countries Free Ride on MFN?*, 77 J. INT'L ECON. 137 (2009) (discussing ability of countries to free ride on efforts of other countries' negotiations in international trade deals); Björn Tyrefors Hinnerich, *Do Merging Local Governments Free Ride on Their Counterparts When Facing Boundary Reform?*, 93 J. Pub. Econ. 721 (2009) (applying economic free riding analysis to politics).

[20] MANCUR OLSON JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS 14 (1965).

[21] Olson, *supra* note 20, at 35; *see also* Vincent Anesi, *Moral Hazard and Free Riding in Collective Action*, 32 SOC. CHOICE & WELFARE 197, 197–98 (2009).

contribution decreases as group size increases, it is rational for individuals to free ride off the contributions of other group members.

Equally important for social science scholarship of free riding was Anthony Downs' 1957 book *An Economic Theory of Democracy*, which applied free riding concepts to democratic voting habits.[22] Downs found that once voting has at least some costs associated with it, it is individually rational for some people to not vote because they can still derive the benefits of their preferred policies being implemented without incurring those voting costs. Thus, social science tends to rely on a game theoretical approach, and recontextualizes free riding from the perspective of the free rider.[23]

Considerations of free riding in the environmental protection context can be traced back to Garrett Hardin's 1968 article *The Tragedy of the Commons*.[24] Hardin's work stems from the social science model of free riding, as it focuses on the selfish following of one's own interests to inefficient results. In categorizing the environment as a public good, he observed that it is individually rational for environmental polluters to not incur the costs of preventing pollution because they are greater than any damage suffered as an individual user of the environment. Other scholars have built on Hardin's work to suggest either allocating property rights in resources, enacting regulations prohibiting resource destruction, or a combination of both approaches as a solution to this dilemma.[25] At the same time, however, the traditional articulation of free riding—obtaining a public good without sharing the costs—is also a focus of evaluating environmental policies such as waste reduction programs and climate policy.[26] As a result, both of these articulations of free riding can be found in the environmental policy context.

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[22] ANTHONY DOWNS, AN ECONOMIC THEORY OF DEMOCRACY 260–74 (1957). Downs described why there is individual incentive not to vote despite the presumed benefits. Downs' book predates the game theoretical analysis of free riding, and instead uses an economic-style definition.

[23] Cullity, *supra* note 13, at 4.

[24] Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243 (1968) (considering the collective action problem of joint public use of the environment and concluding that there is incentive for each individual to exploit it because the amount of benefit received outweighs the aggregate cost incurred).

[25] *See, e.g.*, William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1 (2003) (discussing scholarship in the area); Carol Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1 (1991) (same).

[26] *See, e.g.*, Magali Delmas & Arturo Keller, *Free Riding in Voluntary Environmental Programs: The Case of the U.S. EPA WasteWise Program*, 38 POL. SCI. 91, 91 (2005) ("Free riding occurs when one firm benefits from the actions of another without sharing the costs."); Nordhaus,

Notably, questions of "fairness" often arise in conjunction with free riding arguments. In the legal academy, what role "fairness" should play in developing legal policy remains highly contested, as illustrated by the work of Professors Steven Shavell, Louis Kaplow, and other scholars.[27] The merits of this debate are beyond the scope of this Article but serve as an important backdrop to the discussion that follows, namely, how advocates in energy utility proceedings use both free riding and fairness arguments to promote their interests and particularly how advocates use free riding arguments as a proxy for fairness arguments, and vice versa.

III. FREE RIDING DEBATES IN CONTEMPORARY ENERGY POLICY

Free riding arguments are often raised in the context of energy law and policy proceedings, where regulators routinely determine who will bear the costs and benefits of energy investments, rates, and charges. This occurs in "ratemaking" proceedings before the Federal Energy Regulatory Commission ("FERC") and state public utility commissions as well as in court proceedings reviewing federal and state regulatory decisions.[28] These decisions use free riding arguments in the various forms discussed in Part II. They include the situation where advocates in a proceeding involving a utility subsidy program argue that participants in the program are being paid for actions or conduct they would have engaged in anyway without the subsidy, thus rendering the program inefficient or "unjust and unreasonable" under governing law. They also include arguments over cross-subsidies—that a group of industry actors or customer classes are obtaining excess benefits from costs shared

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supra note 16, at 1339 ("Free-riding occurs when a party receives the benefits of a public good without contributing to the costs.").

[27] *See, e.g.* LOUIS KAPLOW & STEVEN SHAVELL, FAIRNESS VERSUS WELFARE (Harv. U. Press 2002) (arguing that "notions of fairness like corrective justice should receive no independent weight in the assessment of legal rules" and that, instead, a "welfare-based normative approach" should be used exclusively instead); Louis Kaplow & Steven Shavell, *Fairness v. Welfare*, 114 HARV. L. REV. 961 (2001) (same); FAIRNESS IN LAW AND ECONOMICS (Lee Anne Fennell & Richard H. McAdams, eds., Edward Elgar Pub. 2013); Troy A. Rule, *Solar Energy, Utilities, and Fairness*, 6 SAN DIEGO J. OF CLIMATE & ENERGY L. 115 (2014-15) (relying on Kaplow and Shavell to argue that claims of "fairness" to oppose compensation for rooftop solar energy should be viewed with skepticism and discussing the role of fairness in legal policy more broadly).

[28] *See, e.g.*, Melissa Whited, The Ratemaking Process (Synapse Energy Economics, July 2017), http://www.synapse-energy.com/sites/default/files/Ratemaking-Fundamentals-FactSheet.pdf (summarizing the fundamentals of utility ratemaking and rate design); LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY, Ch. 4 (West Academic Publishing, 2d ed. 2018) (discussing federal and state ratemaking processes and judicial review of same).

by all industry actors or customer classes and correspondingly, some industry actors or customer classes are overpaying or underpaying for the benefits they receive.

For instance, in the context of FERC proceedings, parties—often investor-owned electric utilities—argue for or against a change in FERC policy on the grounds that it permits or even encourage free riding. As an example, in 2011, in Order 1000, FERC imposed new regional transmission planning requirements and cost allocation rules on utilities.[29] In response, some utilities argued that other utilities and their customers were free riding by not paying a proportional amount of the associated costs associated with new electric transmission lines covered by the Order and that the new lines would be benefit some utility customers more than others.[30] Those utilities criticizing the rule argued that FERC must follow the "cost-causation principle," a requirement derived from the Federal Power Act's mandate that rates be "just and reasonable." The utilities argued that the cost-causation principle requires that FERC can only approve rates that charge consumers roughly proportionally to the benefits they receive.[31]

As one federal court put it, the "cost causation principle targets something called the 'free rider problem,' which FERC acknowledged that it sought to 'address through its cost allocation reforms' in Order No. 1000."[32] Although the facial challenges to FERC Order 1000 were not successful, both the Order itself, in which FERC referenced free riding issues, as well as the court decisions evaluating Order

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[29] Order No. 1000-A, ¶ 578, 77 Fed. Reg. at 32,274 (defining "free riders" as "entities who are being subsidized by those who pay the costs of the benefits that free riders receive for nothing" and that in the electric transmission line context, free riders "do not bear cost responsibility for benefits that they receive in their use of the transmission grid. . . ." *Id.* at ¶ 576, 77 Fed. Reg. at 32,273; El Paso Elec. Co. v. FERC, 832 F.3d 495, 499 (5th Cir. 2016). *See also* Herman K. Trabish, *Has FERC's Landmark Transmission Planning Effort Made Transmission Harder to Build?*, UTILITY DIVE, July 17, 2018 (discussing Order 1000).

[30] *See* Order No. 1000–A, 139 FERC 61,132, ¶ 498, 77 Fed. Reg. at 32,274 (May 17, 2012).

[31] *See* Ill. Commerce Comm'n v. F.E.R.C., 576 F.3d 470, 476 (7th Cir. 2009) (quoting KN Energy, Inc. v. FERC, 968 F.2d 1295, 1300 (D.C.Cir.1992)) ("FERC is not authorized to approve a pricing scheme that requires a group of utilities to pay for facilities from which its members derive no benefits, or benefits that are trivial in relation to the costs sought to be shifted to its members. '[A]ll approved rates [must] reflect to some degree the costs actually caused by the customer who must pay them.'").

[32] El Paso Elec. Co. v. FERC, 832 F.3d 495 (5th Cir. 2016) (quoting Order No. 1000–A ¶ 562, 77 Fed. Reg. at 32,271).

1000, recognized the potential for free riding in federal transmission planning and cost allocation.[33]

At the state level, public utility commissions and public service commissions frequently address free riding arguments in the context of commissions setting rates for electric, gas, and telecommunications utilities. For example, in the early 2000s, telecommunications companies in Illinois and Michigan argued that their competitors were free riding on their phone infrastructure when the competitors used that infrastructure to offer local call pricing for longer distance calls.[34] For electric and gas utilities, most state statutes direct utility commission to ensure that utility rates, charges, and programs are "just and reasonable."[35] Thus, free riding arguments associated with one class of ratepayers cross subsidizing another class of ratepayers is an argument that a particular rate, program, or charge is unjust and unreasonable or, in a broader sense "unfair."[36]

When it comes to utility-funded energy efficiency programs, the question is often whether utilities or government actors are subsidizing conduct, such as residential or commercial customer energy efficiency investments (e.g., weatherproofing, energy efficient light bulbs, energy efficient boilers), that would have been undertaken even absent the subsidy.[37] The idea is that if conduct that would have otherwise occurred

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[33] *See, e.g.,* South Carolina Pub. Serv. Auth. v. FERC, 762 F.3d 41 (D.C. Cir. 2014) (upholding challenges to FERC Order 1000); *supra* note __ (discussing Order 1000 and references to free riding).

[34] In Re Focal Comm. Corp., 00-0027, 2001 WL 902639 (Ill. C.C.) (May 8, 2001); In Re Coast to Coast Telecom., Inc., U-12382, 2000 WL 1409759 (Mich. P.S.C.) (Aug. 17, 2000).

[35] *See supra* note __, and accompanying text (discussing state statutes).

[36] *See, e.g.*, Peskoe, *supra* note __ at 123 (discussing state court decisions reviewing public utility commission rate design issues surrounding cost shifts between customer classes and concluding that most courts defer to commissions so long as such allocation in rate design is reasonable).

[37] *See, e.g.*, Marie-Laure Nauleau, *Free-Riding on Tax Credits for Home Insulation in France: An Econometric Assessment Using Panel Data*, 46 ENERGY ECON. 78, 79 (2014) ("free-ridership, which is defined as behavior occurring when the agents targeted by the policy take the incentives but would have made the investment anyway.") (internal quotations omitted); Nicholas Rivers & Leslie Shiell, *Free Riding on Energy Efficiency Subsidies: The Case for Natural Gas Furnaces in Canada* Abstract (Univ. of Ottowa, Working Paper No. 1404E, 2015) ("We assess the extent to which subsidies for home energy efficiency improvements in Canada have been paid to households that would have undertaken the improvements anyway—the so-called free rider rate"); Kenneth E. Train, *Estimation of Net Savings From Energy-Conservation Programs*, 19 ENERGY 423, 424 (1994) ("The customers who implemented measures under a program even though they would have installed the measures without the program (for example, customers who received rebates for measures that they would have installed anyway) are called "free riders.").

is being subsidized, the program causes an unreasonable cost shift among different customer classes. This is because all utility customers pay the utility for administering the program (at a rate determined by the state utility commission), those customers who would have invested in energy efficiency even absent the program are receiving a subsidy paid for by others, and thus those investments shouldn't "count" as program benefits because they would have occurred anyway. Because of these concerns, which most energy efficiency experts characterize as free riding, government regulators, utilities, and industry experts have created a range of metrics and conducted empirical studies to evaluate the cost-effectiveness of these programs and determine the level of free riding.[38]

In other energy-related contexts, such as utility compensation for customer-generated rooftop solar and utility investments in EV charging infrastructure, free riding is described somewhat differently. In these cases, rather than labeling behavior that would have occurred even in the absence of a program subsidy as free riding, the claim centers more directly on a certain class of utility customers paying "less than their fair share" of a public benefit provided by the utility. For instance, rooftop solar owners are labeled as free riders because they pay less in utility bills than customers without rooftop solar—because solar owners receive bill credits for the solar energy they generate—but solar owners still use the electric grid when the sun is not shining. Likewise, if all utility customers pay for the utility to install EV charging stations within the utility's service territory, but only some customers own EVs and benefit from the charging station, then non-EV owners are subsidizing EV owners and EV owners are free riders. These alleged cost shifts between customer classes are often targeted as unfair and, as a legal matter, "unjust and unreasonable."

Of course, in all three instances, if the public benefits to all utility customers associated with the energy efficiency upgrades, rooftop solar energy generation, or use of EVs is above some determined threshold, the claims of free riding are neutralized. The difficulty, though is determining the nature and amount of the benefits these programs provide on both a near-term basis and a long-term basis. How interested parties, experts, and state utility commissions evaluate these issues is topic of the remainder of this Article.

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[38] *See* Matthew Collins & John Curtis, *Willingness-to-Pay and Free-Riding in a National Energy Efficiency Retrofit Grand Scheme: A Revealed Preference Approach* 7 (ESRI, Working Paper No. 551, 2016), http://www.esri.ie/pubs/WP551.pdf (using empirical definition of "comparison of the total cost of the completed retrofit, the cost to the household of the retrofit following the award of grant aid, and the total willingness-to-pay of each household for that retrofit."); Peter Grösche & Colin Vance, *Willingness-to-Pay for Energy Conservation and Free-Ridership on Subsidization: Evidence from Germany*, 30 ENERGY J. 135 (2009); Nauleau, *supra* note __; Rivers & Shiell, *supra* note __.

A. Energy Efficiency Programs

Energy efficiency is a means of reducing energy consumption by using less energy to attain the same output.[39] Energy efficiency is divided into three broad categories—(1) buildings (reducing electricity and space heating needs in buildings through new technologies, increased insulation, and the like); (2) transportation (increasing the efficiency of vehicles and vehicle fuels); and (3) industrial energy use. In the United States, energy use has become significantly more efficient over the past few decades, allowing energy consumption to remain flat even in the face of economic growth.[40] Programs to improve energy efficiency include vehicle fuel economy standards and appliance efficiency standards at the federal level, as well as a range of local and state policies to promote energy efficiency in buildings and appliances through mandates and tax incentives.[41]

Energy efficiency in residential and commercial buildings is particularly significant as it represents a low cost opportunity to reduce U.S. energy usage as well as the associated greenhouse gas ("GHG") emissions. In 2017, the electric power sector consumed 38% of total U.S. energy, the residential and commercial sector consumed 11%, the transportation sector consumed 29%, and the industrial sector consumed 22%.[42] With regard to greenhouse gas ("GHG") emissions, in 2016, the transportation sector and electric power sector both represented 28% of U.S. emissions, with the commercial/residential sector representing 11%, industry 22%, and agriculture 9%.[43] Notably, in 2017, residential and commercial buildings, which require energy for electricity and for space heating, consumed approximately 40% of U.S. energy and represented approximately the same percentage of U.S. CO_2 emissions.[44] In large urban centers such as New York City and Chicago, buildings constitute over 70% of energy use.[45]

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[39] Although "energy efficiency" is often used interchangeably with "energy conservation," they are different concepts. Energy efficiency involves "accomplishing an objective—such as heating a room to a certain temperature—while using less energy" while energy conservation involves changing behavior to use less energy such as turning down the thermostat in the winter. NAT'L ACADEMY OF SCIENCES, ET AL., REAL PROSPECTS FOR ENERGY EFFICIENCY IN THE UNITED STATES 21 n.1 (Nat'l Academies Press 2010).

[40] LINCOLN L. DAVIES ET AL., ENERGY LAW AND POLICY 137-38 (West Academic Press, 2d ed. 2018).

[41] *Id.*

[42] U.S. Energy Info. Admin., U.S. Energy Facts, Explained, https://www.eia.gov/energyexplained/?page=us_energy_home.

[43] U.S. EPA, Source of Greenhouse Gas Emissions, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

[44] U.S. Energy Info. Admin., How Much Energy is Consumed in U.S. Residential and Commercial Buildings? (last updated May 3, 2018),

Thus, to the extent the United States can reduce energy use in residential and commercial buildings through energy efficiency, there will be significant cost savings and environmental benefits.[46] Indeed, experts show that, when treated as an energy resource (i.e., as an equivalent to generating power), energy efficiency is the third largest U.S. energy resources (behind coal and natural gas and in front of nuclear energy) and is also the lowest cost resource.[47] As a result of these potential savings and other benefits, there has been a significant emphasis on policymaking at the state level to support energy efficiency programs in general and utility funded energy efficiency programs in particular.

1. Utility-funded energy efficiency programs

Since the 1980s, utilities have offered energy efficiency programs to customers either voluntarily or as a result of state mandates. Today, such programs exist one form or another in all 50 states and the District of Columbia and include "financial incentives, such as rebates and loans; technical services, such as audits, retrofits, and training for architects, engineers, and building owners; behavioral strategies; and educational campaigns about the benefits of energy efficiency improvements."[48] States spent nearly $8 billion on energy efficiency programs in the utility sector in

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https://www.eia.gov/tools/faqs/faq.php?id=86&t=1; Alliance to Save Energy, *Overview*, https://www.ase.org/initiatives/buildings ("Buildings—offices, homes, and stores—use 40% of our energy and 70% of our electricity. Buildings also emit over one-third of U.S. greenhouse gas emissions, which is more than any other sector of the economy."). *See also* U.S. Green Building Council, Benefits of Green Buildings (updated May 2018), https://www.usgbc.org/articles/green-building-facts (U.S. buildings account for 40% of U.S. CO_2 emissions, more than the transportation and industrial sectors).

[45] Iain Campbell & Coben Calhoun, *Old Buildings are U.S. Cities' Biggest Sustainability Challenge*, HARV. BUS. REVIEW (Jan. 21, 2016).

[46] *See, e.g.*, Alexandra B. Klass & Elizabeth J. Wilson, *Remaking Energy: The Critical Role of Energy Consumption Data*, 104 CAL. L. REV. 1095, 1098-99 (2016) (citing statistics form McKinsey & Co. estimating that "investing $520 billion in nontransportation energy efficiency by 2020 could generate energy savings worth $1.2 trillion, reduce end-use energy demand by 23 percent compared to current projection, and eliminate over 1.1 gigatons of greenhouse gas emissions annually.") (citing MCKINSEY & CO., UNLOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY iii (July 2009)).

[47] AMERICAN COUNCIL FOR AN ENERGY-EFFICIENCY ECONOMY, THE GREATEST ENERGY STORY YOU HAVEN'T HEARD: HOW INVESTING IN ENERGY EFFICIENCY CHANGED THE US POWER SECTOR AND GAVE US A TOOL TO TACKLE CLIMATE CHANGE 5-6 (Oct. 2016),

2017, paid for by utility customers through their monthly electric and gas bills.[49] According to the American Council for an Energy-Efficiency Economy ("ACEEE"), these programs resulted in over 27 million megawatt hours of electricity saved in 2017.

The U.S. EPA describes the benefits of energy efficiency in the context of electric and gas utility programs as including environmental benefits, such as lowering GHG emissions and decreasing water use; economic benefits associated with reduced energy costs and boosting the local economy; utility system benefits by lowering baseload and peak energy demand and reducing the need for new generation plants and transmission lines; and risk management through diversifying utility resource portfolios.[50]

As Michael Vandenbergh and Jim Rossi have noted, the utility is a critical player in efforts to reduce electricity demand through energy efficiency measures:

> [T]he distribution utility serves as an intermediary and gatekeeper between the consumer and the electric grid. A utility that has incentives to reduce household or other demand for electricity can play its information, service, and access roles in ways that will induce widespread uptake of efficiency and conservation measures. A utility that does not can discourage widespread uptake of these measures and can do so in a variety of nontransparent ways, whether by

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https://aceee.org/sites/default/files/publications/researchreports/u1604.pdf; Annie Gilleo, *New Data, Same Results—Saving Energy is Still Cheaper than Making Energy*, ACEEE, Dec. 1, 2017, https://aceee.org/blog/2017/12/new-data-same-results-saving-energy (showing cost comparisons of energy efficiency with other energy resources).

[48] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD vi (Oct. 2018). *See also* Joseph Eto, THE PAST, PRESENT, AND FUTURE OF U.S. UTILITY DEMAND-SIDE MANAGEMENT PROGRAMS 2 (Lawrence Berkeley Nat'l Lab., Dec. 1996) (detailing different types of utility-funded energy efficiency programs, such as: "(1) general information to increase customer awareness of energy use and of opportunities to save energy; (2) technical information, including energy audits, which identify specific recommendations for improvements in energy use; (3) financial assistance in the form of loans or direct payments to lower the first cost of energy-efficient technologies; (4) direct or free installation of energy-efficient technologies; (5) performance contracting, in which a third party contracts with both the utility and a customer and guarantees energy performance").

[49] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD vi (Oct. 2018).

[50] U.S. EPA, Energy Resources for State and Local Governments, https://www.epa.gov/statelocalenergy/state-energy-efficiency-benefits-and-opportunities.

> increasing consumers' transaction costs (e.g., by requiring numerous or slow approvals for household solar photovoltaic installation, by understaffing key positions necessary for promotion of efficiency and conservation programs, and by imposing stringent requirements on grid access), or by limiting the extent or efficacy of information provided to consumers (e.g., by not making prompt, in-home energy use feedback easily available).[51]

For decades, policymakers have attempted to design programs to align the interests of electric utilities with the goals of energy efficiency. Because utility revenues were historically tied to volumetric sales of electricity, energy efficiency programs resulted in reduced utility revenues.[52] Not surprisingly then, in the early days of energy efficiency programs, utilities argued against such programs on grounds they led to free riding and unfair cross subsidies among customer classes.[53] State legislatures and public utility commissions have put in place a variety of mechanisms to minimize or eliminate the adverse financial impact on utilities from energy efficiency programs. The most common mechanisms are: (1) allowing the utility to recover from ratepayers the direct costs of energy efficiency programs; (2)

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[51] Michael P. Vandenbergh & Jim Rossi, *Good for You, Bad for Us: The Financial Disincentive for Net Demand Reduction*, 65 VAND. L. REV. 1527, 1544-45 (2012).

[52] American Council for an Energy Efficient Economy, *Incentivizing Utility-Led Energy Efficiency Programs*, https://aceee.org/sector/state-policy/toolkit/utility-programs ("it is widely recognized that spending on energy efficiency programs has a detrimental effect on utility revenues, by reducing sales of the utility's core product, electricity or gas. The reasoning is straightforward: while a utility's variable costs change in proportion to sales volume, fixed costs associated with distribution and customer service do not. Therefore, a reduction in sales due to efficiency improvements leads to a reduction in revenue that is larger than the costs avoided. This net lost revenue affects the utility's balance sheet, reducing the return to its investors and providing a strong incentive for utilities not to invest in programs that help their customers use energy more efficiently."). *See also* Vandenbergh & Rossi, *supra* note __, at 1546 ("To the extent the dominant approach to utility rate structures favors volumetric rates, utilities are encouraged to offer low per-unit rates while increasing their total sales. This allows them to recoup the business costs associated with their capital investments in base load power and transmission, and to increase net revenues over the long term."); Will Nissen & Samantha Williams, *The Link Between Decoupling and Success in Utility-Led Energy Efficiency*, 29 ELECTRICITY J. 59, 62 (2016) (discussing benefits of decoupling and noting that as of January 2016, 15 states had implemented electricity decoupling with proposals pending in eight additional states).

[53] *See, e.g.*, Peskoe, *supra* note __, at 181 ("In the 1970s and 1980s, it was the [utilities] that raised concerns about intra-class subsidization. The 'paradox of conservation' was that ratepayer-subsidized programs to reduce consumption — in contrast to earlier subsidies designed to increase [utility] sales—could harm non-participating consumers by raising overall rates.").

lost margin recovery or "decoupling" programs that ensure that "[a]ctual utility earnings are . . . brought in line with earnings authorized by the governing body, removing—or at least mitigating—the utility's disincentive to invest in energy efficiency programs due to reduced sales"; and (3) performance incentives that allow the utility to earn a return on investments in energy efficiency, similar to the return on investment it earns for earned for building a power plant or transmission infrastructure.[54]

In general, these programs have succeeded in reducing utility opposition to energy efficiency programs, leaving arguments about free riding, evaluation of program performance metrics, and the like to a range of economists and other experts.[55] That does not mean free riding arguments are absent from energy efficiency policy debates. On the contrary, they are front and center. The difference, however, is that it is not generally the utility making the free riding argument.[56]

2. Free riding as a metric for determining cost effectiveness of energy efficiency programs

According to the U.S. Department of Energy, "[f]ree-ridership issues are by no means peculiar to energy efficiency; they arise in many policy areas, whenever economic agents are paid an incentive to do what they might have done anyway."[57]

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[54] American Council for an Energy-Efficient Economy, *supra* note __. *See also* American Council for an Energy-Efficient Economy, *Lost Margin Recovery*, https://aceee.org/sector/state-policy/toolkit/utility-programs/lost-margin-recovery.

[55] *See infra* note __ and accompanying text. *See also* Martin Kushler, et al., *Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives*, Report No. U061 (ACEEE, Oct. 2006) (concluding that state regulatory approaches to overcoming utility disincentives to promote energy efficiency such as decoupling and performance incentives are effective in the states in which they are used); Eto, *supra* note __, at 10 (These new ratemaking procedures were instrumental in stimulating aggressive utility pursuit of DSM energy-efficiency programs. The success of these new regulatory approaches has often been cited as a key factor in changing utilities' perception of their role, from providing an energy commodity to one of providing energy services.").

[56] This is not to say that utilities have become strong supporters of energy efficiency programs. Indeed, as Professors Vandenbergh and Rossi have stated, "so long as volumetric pricing and guaranteed cost recovery through regulated rates leads utilities to view efficiency and conservation as revenue erosion, they will have incentives to create an appearance of demand reduction (e.g., to maintain reputation, satisfy regulators' demands, etc.), but under the existing approach neither utilities nor customers can be expected to be firmly committed to reducing the aggregate usage of electricity." Vandenbergh & Rossi, *supra* note __, at 1548. *See also* Peskoe, *supra* note __, at 153 (detailing arguments of the Edison Electric Institute, the trade association for investor-owned utilities, that decoupling efforts remain insufficient

The reason free-ridership is important in this context is to ensure that the utility makes "prudent use of energy efficiency dollars."[58] In other words:

> If program dollars are spent on people who would have taken the actions anyway, without program support, then those people are free riders, and those dollars were perhaps misspent. Evaluators are tasked with studying how much of a program's resources were spent on free riders, and what the program savings were, net of free riders. . . .[59]

Energy efficiency experts have developed specific tests to evaluate the cost-effectiveness of utility-funded energy efficiency programs. The most common ones are: (1) Total Resource Cost Test, ("TRC") which compares benefits to society as a whole (avoided supply-side cost benefits, additional resource savings benefits) with cost to participants of installing the measure plus cost of program administration; (2) Societal Cost Test ("SCT"), which is similar to the TRC except that it "explicitly quantifies externality benefits such as pollutant emissions not represented in market prices and other non-energy benefits (e.g., improved health/productivity)"; (3) Program Administrator Cost Test ("PACT") (also known as the Utility Cost Test ("UCT"), which compares the utility's avoided costs benefits with program expenditures (both the incentives and the administrative costs); (4) Participant Cost Test ("PCT"), which compares "participant benefits (incentives plus bill savings with participant costs (incremental or capital cost, installation O&M, etc.)"; and (5) Ratepayer Impact Measure Test ("RIM"), which "compares the utility's avoided cost

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to address the "transformative threats" to the utility industry model and that energy efficiency programs continue to act as "cross subsidies" between those customers who directly benefit from energy efficiency programs and those who do not).

[57] U.S. DEP'T OF ENERGY, SEE ACTION, ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE, CH. 5, DETERMINING NET ENERGY SAVINGS 5-8 (Dec. 2012), https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf.

[58] *Id.*

[59] *Id. See also* CARL BLUMSTEIN, CENTER FOR STUDY OF ENERGY MARKETS, PROGRAM EVALUATION AND INCENTIVES FOR ADMINISTRATORS OF ENERGY-EFFICIENCY PROGRAMS: CAN EVALUATION SOLVE THE PRINCIPAL/AGENT PROBLEM? 5 (Oct. 2010) ("It is not desirable to reward IOUs for the energy savings of free riders for two reasons: (1) the payments are unearned and (2) payments for free-rider savings would bias IOU programs in favor of programs in which consumers already had a strong predilection to participate."); U.S. EPA, MODEL ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE 5-1-5-3 (Nov. 2007) (defining free ridership, spillover effects, and other factors to consider to differentiate gross savings and net savings from energy efficiency programs).

benefits with the cost of administering energy efficiency programs plus lost revenue from reductions in customer energy consumption."[60]

According to the U.S. EPA, "there is no single best test for evaluating the cost-effectiveness of energy-efficiency."[61] Many states use multiple tests to evaluate cost-effectiveness of energy efficiency programs for a more comprehensive approach as each test "provides different information about the impacts of energy efficiency programs from distinct vantage points in the energy system." The EPA states:

> The most common primary measurement of energy efficiency cost-effectiveness is the TRC, followed closely by the SCT. A positive TRC result indicates that the program will produce a net reduction in energy costs in the utility service territory over the lifetime of the program. The distributional tests (PCT, PACT, and RIM) are then used to indicate how different stakeholders are affected. Historically, reliance on the RIM test has limited energy efficiency investment, as it is the most restrictive of the five cost-effectiveness tests.[62]

Many states require utilities to collect data and provide analysis from more than one test to determine cost effectiveness of energy efficiency programs.[63]

Across all these tests, energy efficiency programs are generally evaluated for cost-effectiveness to account for both free riders and "spillovers," with spillovers defined as "additional reductions in energy consumption or demand that are due to program

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[60] ENERGY EFFICIENCY GUIDEBOOK FOR PUBLIC POWER COMMUNITIES 30 (Oct. 2009), https://www.seventhwave.org/sites/default/files/guidebook.pdf.

[61] U.S. EPA, UNDERSTANDING COST-EFFECTIVENESS OF ENERGY EFFICIENCY PROGRAMS, BEST PRACTICES, TECHNICAL METHODS, AND EMERGING ISSUES FOR POLICYMAKERS, ES-1-2 (Nov. 2008).

[62] *Id. See also* ENERGY EFFICIENCY GUIDEBOOK FOR PUBLIC POWER COMMUNITIES, *supra* note __, at 30; Elizabeth Daykin, et al., The Cadmus Group, *Whose Perspective? The Impact of the Utility Cost Test*, Association of Energy Services National Conference (2012) (discussing different cost-effectiveness tests); NATIONAL EFFICIENCY SCREENING PROJECT, NAT'L STANDARD PRACTICE MANUAL, FOR ASSESSING COST-EFFECTIVENESS OF ENERGY EFFICIENCY RESOURCES, Edition 1, Executive Summary (Spring 2017), https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_Exec_Summary_5-17-17.pdf (explaining cost-effectiveness tests).

[63] *See* Nat'l Standard Practice Manual, Database of State Efficiency Screening Practices, https://nationalefficiencyscreening.org/state-database-dsesp/ (showing tests used in all 50 states).

influences beyond those directly associated with program participation."[64] According to the U.S. Environmental Protection Agency ("EPA") this is done through evaluating the "net-to-gross ratio" ("NTG ratio") across all program tests, which "deducts energy savings that would have been achieved without the efficiency program (e.g., 'free-riders') and increases savings for any 'spillover' effect that occurs as an indirect result of the program."[65]

In its evaluation of cost-effectiveness metrics, the National Renewable Energy Laboratory recognizes three different types of free riders in the context of energy efficiency programs: (1) total free riders (who would invested in the program measure or practice even in the absence of the program); (2) partial free riders (who would have implemented a lesser amount or lower level of efficiency than that provided by the program); and (3) deferred free riders (who would have implemented the measure or practice sometime after the program timeframe).[66] Likewise, with regard to spillovers, there are different types of spillovers that result in benefits that should not be attributed to the program under review, including additional program-induced actions at the project site, energy efficiency measures program participants take at project sites not enrolled in the program, and energy efficiency actions taken by non-program participants that were influenced by the program.[67] Of course, identifying the impact of both free riders and spillovers is extremely difficult, and there is a large body of literature discussing various methods

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[64] Nat'l Renewable Energy Lab., Estimating Net Savings: Common Practices, Ch. 17, at 3 (Sept. 2014), https://www.energy.gov/sites/prod/files/2015/01/f19/UMPChapter17-Estimating-Net-Savings.pdf. Experts also attempt to evaluate the "rebound effect" associated with energy efficiency programs, which refers to changes in consumer behavior to increase the use of energy such as raising the thermostat in the winter, using more air conditioning in the summer, driving more often or longer distances because of technical improvements in energy efficiency that result in lower energy costs to consumers. Although experts agree that the direct rebound effect is real, there are significant debates over its magnitude. *See, e.g.*, HOWARD GELLER & SOPHIE ATTALI, THE EXPERIENCE WITH ENERGY EFFICIENCY POLICIES AND PROGRAMMES IN IEA COUNTRIES: LEARNING FROM THE CRITICS 5 (Int'l Energy Agency Aug. 2005) (explaining rebound effect in energy efficiency and summarizing studies); U.S. EPA, MODEL ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE 5-2 (Nov. 2007) ("Rebound is a change in energy-using behavior that increases the level of service and results from an energy efficient action.").

[65] U.S. EPA, *supra* note __, AT ES-3. *See also* AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD 18 (Oct. 2018) ("Net savings are those attributable to the program, typically estimated by subtracting savings from free riders (program participants who would have implemented or installed the measures without the incentive, or with a lesser incentive), and adding in estimates of savings from free riders (nonparticipants who implemented or installed the measure due to the program.").

to obtain this information through surveys and other data collection methods that is beyond the scope of this Article.[68]

3. Criticisms of energy efficiency programs and state legislative action

As stated above, virtually all evaluations of utility-funded energy efficiency programs attempt to evaluate the role of free riders and spillovers in determining the cost-effectiveness of the program. Debates over the cost-effectiveness of energy efficiency programs will undoubtedly continue and experts will continue to refine the methodological approaches to evaluating free riders. Moreover, in recent years, some state legislatures have increased utility funded energy efficiency programs while others have scaled them back.

For instance in Illinois, in 2016, the legislature enacted the Future Energy Jobs Act which contained, among other provisions, significant additional funding for utility-sponsored energy efficiency programs, including the ability of utilities to earn a rate of return on investments in energy efficiency programs.[69] Other states have also strengthened utility funded energy efficiency programs, with total spending in those programs approaching $8 billion in 2017 nationwide, up from approximately $4 billion in 2010.[70] According to the American Council for an Energy-Efficient Economy ("ACEEE"), "[e]nergy efficiency remains the nation's third-largest

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[66] Nat'l Renewable Energy Lab., *supra* note __ at 3. *See also* William P. Saxonis, *Free Ridership and Spillover: A Regulatory Dilemma*, 2007 Energy Program Evaluation Conference, Chicago at p. 533 (2007) (reviewing studies and literature on evaluating free ridership and spillovers and reviewing data in New York on same).

[67] *Id.* at 4. *See also* CARL BLUMSTEIN, CENTER FOR STUDY OF ENERGY MARKETS, PROGRAM EVALUATION AND INCENTIVES FOR ADMINISTRATORS OF ENERGY-EFFICIENCY PROGRAMS: CAN EVALUATION SOLVE THE PRINCIPAL/AGENT PROBLEM? 5 (Oct. 2010) ("'Spillover' is the other side of the free rider issue. Spillover occurs when the effects of an energy-efficiency program spill over to affect other behavior. Examples of spillover would be a consumer taking action as the result of an energy-efficiency program but not receiving any of the incentives offered by the program (non-participant spillover) or a program participant stimulated to pursue additional energy saving actions that are not subsidized by the program (participant spillover).").

[68] *See, e.g.*, PWP, INC., CURRENT METHODS IN FREE RIDERSHIP AND SPILLOVER POLICY AND ESTIMATION (Feb. 2017), https://www.energytrust.org/wp-content/uploads/2017/07/FR_Spillover_170206.pdf; SEE ACTION, SEE ACTION GUIDE FOR THE STATES: EVALUATION, MEASUREMENT, AND VERIFICATION FRAMEWORKS—GUIDANCE FOR ENERGY EFFICIENCY PORTFOLIOS FUNDED BY UTILITY CUSTOMERS (Jan. 2018), https://www4.eere.energy.gov/seeaction/system/files/documents/EMV-Framework_Jan2018.pdf; Berkeley Lab, Electricity, Policy, and Markets Group, Utility Customer-Funded Programs https://emp.lbl.gov/projects/utility-customer-funded ("The

electricity resource, employing 2.25 million Americans and typically providing the lowest-cost way to meet customers' energy needs."[71]

Other states, however, have used free riding concerns to scale back existing energy efficiency programs. For instance, in 2018, the Iowa legislature significantly scaled back what had been a long-term and robust energy efficiency program, primarily on grounds that it was too expensive and resulted in unfair cost shifts. As detailed by ACEEE, the law imposed a new spending cap on efficiency programs; removed efficiency program requirements on municipal utilities and electric cooperatives; and allowed customers "to opt-out of paying for efficiency programs that fail to satisfy the ratepayer impact [measurement] ("RIM") test, a cost-effectiveness measure rejected by most states as inequitable."[72] During the legislative debates over the law, one senator criticized the fact that customers pay for these programs but the amounts aren't shown as a separate line item on utility bills and that "if you don't take advantage of the program, guess what, you're paying in and somebody else gets it."[73] The law passed despite opponents of the bill who focused their arguments on the total savings to all customers and citing "$400 million a year in net savings to customers" associated with energy efficiency programs.[74]

In addition to legislative program cutbacks, scholars continue to question the scale of overall benefits of utility-sponsored energy efficiency programs. As early as

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EMP Group tracks and analyzes trends in utility ratepayer-funded energy efficiency programs and enabling policies, and provides technical and policy support to regional authorities, state regulatory commissions, and program administrators by analyzing current practices and projected future spending and savings for efficiency programs."); American Council for an Energy-Efficient Economy ("ACEEE"), Energy Efficiency Programs, https://aceee.org/portal/programs (discussing founding of ACEEE in 1980, during the early period of energy efficiency programs, to provide research and policy development for utility energy efficiency); U.S. Dep't of Energy, Office of Energy Efficiency and Renewable Energy, https://www.energy.gov/eere/slsc/evaluation-measurement-and-verification-energy-data (discussing the importance of evaluation, measurement, and verification (EM&V) data to "inform recommendations for improvements in [energy efficiency] program performance."); U.S. DEP'T OF ENERGY, SEE ACTION, *supra* note __, Ch. 5 (defining free riding, spillovers, net savings in context of determining cost-effectiveness of utility-funded energy efficiency programs).

[69] *See* Commonwealth Edison Press Release, *New Energy Efficiency Benefits Coming to Illinois Consumers*, June 28, 2017; Future Energy Jobs Act, *About*, https://www.futureenergyjobsact.com/about; Kari Lyderson, *Q&A: Going Beyond Decoupling to Drive Utility Investments in Energy Efficiency*, MIDWEST ENERGY NEWS, Sept. 18, 2017, (discussing ability of utility to place energy efficiency investments in rate base and earn rate of return in Illinois as well as several other states, including Maryland and Utah).

[70] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD 24 (Oct. 2018).

the 1990s, Professors Paul Joskow and Donald Marron argued that data from utility companies did not bear out the grand claims of overall cost savings from utility-funded energy efficiency programs because of the failure to account for free riding.[75] These criticisms led to significant changes in the measurement and evaluation of the effectiveness of energy efficiency programs to address these and other concerns and to ensure the cost-effectiveness of such programs.[76] More recently, in 2016, Professor Arik Levinson has argued that despite forty years of experience with energy efficiency programs, program benefits continue to be overstated, particularly in the context of state energy building codes.[77]

Nevertheless, because of decades with experience with energy efficiency programs, and a general recognition that energy efficiency programs can provide benefits for all ratepayers when designed properly, the debate has shifted toward how to identify free riders to improve the cost-effectiveness of programs rather than using free riding concerns as a reason to not have a program in the first place.

The same cannot be said for solar net metering programs and utility investment in EV charging infrastructure. Utility subsidies for these programs are subject to

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[71] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD vi (Oct. 2018); AM. COUNCIL FOR AN ENERGY-EFFICIENCY ECONOMY, THE GREATEST ENERGY STORY YOU HAVEN'T HEARD, *supra* note __, at 5-6.

[72] AM. COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY, THE 2018 ENERGY EFFICIENCY SCORECARD x, 15, 44 (Oct. 2018).

[73] Testimony of Iowa Sen. Breitbach, Senate Proceedings of March 6, 2018, timestamp 9:15:30–9:18:00, http://www.legis.state.ia.us/dashboard?view=video&chamber=S&clip=s20180306203727440&dt=2018-03-06.

[74] Testimony of Iowa Sen. Bolkcom, Senate Proceedings of March 6, 2018, timestamp 9:18:00–9:21:00, http://www.legis.state.ia.us/dashboard?view=video&chamber=S&clip=s20180306203727440&dt=2018-03-06.

[75] Paul L. Joskow & Donald B. Marron, *What Does a Negawatt Really Cost? Evidence form Utility Conservation Programs*, 13 ENERGY J. 41 (1992); Paul L. Joskow & Donald B. Marron, *What Does a Negawatt Really Cost?, Further Thoughts and Evidence*, 6 ELECTRICITY J. 14 (1993) (responding to criticisms of earlier paper). *But see* Eto, *supra* note __, at 11-12 (finding more savings attributable to energy efficiency programs that reported by Joskow & Marron but acknowledging not all utilities were effective at running such programs).

[76] *See, e.g.*, Geller & Attali, *supra* note __ at 18-19 (discussing program design to account for free rider and spillover effects as a result of criticisms by Joskow, Marron, and others).

[77] Arik Levinson, *How Much do Energy Building Codes Save? Evidence from California Houses*, 106 AM. ECON. REV. 2867 (2016); Arik Levinson, *Energy Efficiency Standards are More Regressive Than Energy Taxes: Theory and Evidence*, Georgetown University and NBER (May 8, 2018), http://faculty.georgetown.edu/aml6/pdfs&zips/RegressiveMandates.pdf. *See also* David S.

significant debate, with the role of free riders, "fairness" and cross subsidies at the center of arguments over whether these programs should exist at all. The next Sections turn to these issues.

B. Net Metering: Utility Compensation for Customer-Generated Rooftop Solar Energy

One of the most frequent, contemporary uses of free riding arguments in energy policy involves utility compensation for customer-generated rooftop solar energy, also referred to as "distributed generation," "distributed energy," or "distributed solar."[78] Beginning as early as the 1980s, states adopted policies requiring electric utilities to compensate rooftop solar panel owners for the electricity generated by the solar panels that is sent back to the grid in order to incentivize the adoption of rooftop solar.[79] Such polices are often referred to as "net metering" or "net energy metering" because the electricity meter on the home or commercial building now runs two ways: it meters electric energy flowing to the customer when the solar panels are not providing all the necessary electricity to the building and also meters the electricity flowing back to the utility and the electric grid when the solar panels are producing more electricity than the building requires.[80] Over a monthly or yearly billing period, the customer pays the "net" of the electricity the building uses and produces, resulting in significantly lower electricity bills for the customer, and in some cases, a net profit for the customer.[81]

In the Energy Policy Act of 2005, Congress provided additional support for state net metering policies by encouraging states to adopt them and also to provide tax

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Loughran & Jonathan Kulick, *Demand Side Management and Energy Efficiency in the United States*, 25 ENERGY L.J. 19 (2004) (reviewing data and finding that actual electricity savings resulting from energy efficiency program were less than that reported by utilities).

[78] *See* Richard L. Revesz & Burcin Unel, *Managing the Future of the Electric Grid: Distributed Generation and Net Metering*, 41 HARV. ENVTL. L. REV. 43, 44 (2017) ("'Distributed generation' is a term used to describe electricity that is produced at our near the location where it is used. Distributed generation systems, also known as 'distributed energy resources,' can rely on a variety of energy sources, such as solar, wind, fuel cells, and combined heat and power. Distributed solar energy is produced by photovoltaic cells, popularly referred to as solar panels, which can be placed on rooftops or mounted on the ground.").

[79] Revesz & Unel, *supra* note __, at 59-64 (describing history of net metering programs).

[80] JIM LAZAR, ELECTRICITY REGULATION IN THE US: A GUIDE 78-79 (2d ed. 2016); ALEXANDRA B. KLASS & HANNAH J. WISEMAN, ENERGY LAW 153-54 (Foundation Press 2017).

[81] KLASS & WISEMAN, *supra* note __, at 153-54. For a more detailed description of various types of net metering, along with diagrams, see Minn. Pub. Utils. Comm'n, Net Metering & Compensation, https://mn.gov/puc/energy/distributed-energy/net-metering/.

benefits to customers installing solar generation.[82] Although one can argue that a sale of electric energy by a utility customer to the utility is a wholesale sale of electricity subject to Federal Energy Regulatory Commission ("FERC") jurisdiction under the Federal Power Act, both the Energy Policy Act of 2005 and numerous FERC decisions have disclaimed federal jurisdiction over net metering and instead have encouraged states to regulate the practice as a matter of state jurisdiction over retail sales.[83]

As of 2017, thirty-eight states and Washington, D.C. offer some form of net metering and utilities in some of the remaining states have adopted net metering programs on a voluntary basis.[84] "Conventional" net metering compensates customers with solar panels at the retail electricity rate—the price the customers pays to buy electricity from the utility.[85] A few other states have compensation rules that are not considered to be "net metering" because they compensate customers at something other than the retail rate, such as a lower, wholesale rate, or they have a so-called "buy all, sell all" program where there is one meter for the customer's purchases of electricity and another meter for the customer's sale of electricity to the

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[82] Revesz & Unel, *supra* note __, at 59-60; U.S. Dep't of Energy, Residential Renewable Energy Tax Credit, ENERGY.GOV, https://www.energy.gov/savings/residential-renewable-energy-tax-credit.

[83] *See* Revesz, *supra* note __, at 59-60; David Raskin, *The Regulatory Challenge of Distributed Generation*, 4 HARV. BUS. L. REV. 38, 42-45 (2013) (criticizing net metering as an unfair subsidy and arguing for federal jurisdiction over net metering); State Power Project, *Net Metering and Federal State Jurisdiction*, https://statepowerproject.files.wordpress.com/2015/05/net-metering-policymaker-summary1.pdf; Jim Rossi, *Federalism and the Net Metering Alternative*, 29 ELEC. J. 13 (January-February 2016) (disagreeing with Raskin and arguing for continued state jurisdiction over net metering).

[84] National Council of State Legislatures, State Net Metering Policies, Nov. 2017; DSIRE, Net Metering Map, Nov. 2017, http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2017/11/DSIRE_Net_Metering_November2017.pdf.

[85] Retail electricity rates—the price end use customers pay to the utility—are always higher than wholesale electricity rates—the price at which the utility buys or sells electricity

utility.[86] As discussed in more detail below,[87] Minnesota has adopted a "Value of Solar Tariff" for designated utility purchases of certain types of distributed solar generation that attempts to value the full costs and benefits of solar energy on the grid, and to avoid the bluntness of compensating customer-generated solar energy based on a retail or wholesale electricity rate.

Beyond the rate of compensation, states vary considerably with regard to other aspects of net metering programs. Many states have capacity limits on individual customer solar systems, such as a 20 kilowatt (kW), 1 megawatt (MW), or 10 MW size limit on the system, with twenty-three jurisdictions imposing a size limit below 100 kW.[88] Other states place limits on capacity based on the customer's total electricity load, such as Arizona's limit of 125% of the customer's total load. States also have imposed limits on aggregate installed solar capacity within a utility's service territory or within a state. For instance, Georgia limits solar installations to .2% of a utility's peak demand, California has a cap of 5% of the utility's peak demand, Vermont has an aggregate capacity of limit of 15% of the state's peak demand, and Utah's limit is 20% of state peak demand.[89] States also vary in how long customers can maintain bill credits (e.g., next monthly billing period, 12-month period,

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to or from another wholesale provider of electricity such as a neighboring utility, a utility-scale wind farm, a natural gas generator, etc. Wholesale electricity rates vary significantly based on supply and demand and also based on the type of resource producing the electricity—natural gas, coal, nuclear, wind, or solar energy. By contrast, retail electricity rates are set by state public utility commissions and generally do not vary based on scarcity or resources, with some exceptions such as when a customer enrolls in a "time of use" program that ties retail rates to low and high peak demand times of day. In most states, the "avoided cost rate" (the cost of the utility to purchase energy as wholesale or generate the energy itself) are much lower that retail electricity rates. *See* Revesz & Unel, *supr*a note __, at 60-61 (comparing avoided costs rates in Wisconsin in 2015 of $0.03 to $0.04 per kWh compared to retail rates of $0.11 to $0.14 per kWh). *See also* FERC v. Elec. Power Supply Ass'n, 136 S. Ct. 760, 769 (2016) (discussing price fluctuations in wholesale rates based on demand and fact that state regulators generally insulate retail customers from such rate fluctuations).

[86] LAZAR, *supra* note __, at 134-35 (discussing net metering in the states); Revesz & Unel, supra note __, at 47, 59-71 (discussing different state approaches to net metering and distributed energy compensation); Nat'l Conference of State Legislatures, *supra* note __; Database of State Incentives for Renewable Energy, Net Metering Policies—Customer Credits for Monthly Net Excess Generation (NEG) Under Net Metering, July 2016, http://ncsolarcen-prod.s3.amazonaws.com/wp-content/uploads/2014/11/NEG-1.20161.pdf.

[87] *See infra* Part III.B.3.

[88] For comparison sake, 3 kW is common among residential systems and 10 MW is common among commercial and industrial systems, with lots of variation across both types of systems. Revesz & Unel, *supra* note __, at 62-63.

[89] Revesz & Unel, *supra* note __, at 63; Database of State Incentives for Renewable Energy, *supra* note __.

indefinitely) and whether the rate of compensation is uniform across all systems in the state or varies based on system size.

When solar panels were few and far between, net metering was fairly uncontroversial. However, as tax incentives, net metering, and a growing desire for renewable energy encouraged more electricity customers to install solar panels, utilities began to express concerns regarding lost revenues and sought regulatory relief from state public utility commissions and legislative reform from state legislatures. One of the central arguments utilities made in this context is that non-solar owners are subsidizing solar owners. Because the utility's fixed costs associated with maintaining the electric grid are primarily recovered from customers through volumetric rates, if solar owners are now purchasing 50-80% less electricity each year, but the utility still needs to maintain the same level of grid service for when the sun is not shining, the utility will need to raise rates since they are selling less power overall. When those rates, go up, the increase will be disproportionately born by non-solar owners. Thus, non-solar owners will now be shouldering a greater amount of those fixed costs, resulting in a "cross-subsidy" to solar owners and solar owners "free riding" on the grid.

It is important to note that cross-subsidies between different types of retail customers are ubiquitous in the utility world.[90] Customers who live in rural areas require more transmission infrastructure to connect to the electric grid, so urban customers who require less transmission infrastructure are arguably paying more than their "fair share" of transmission line costs. Low-income customers often receive rate discounts through state programs and industrial customers receive favorable rates from public utility commissions if those customers are successful in arguments that they need those lower rates to remain competitive. In each of those cases, there is a cross subsidy from one class of customers to the other. As a legal matter, however, the question is whether that cross subsidy is "unjust and unreasonable" or discriminatory under state law.[91]

Since approximately 2015, the "net metering wars" taking place in state public utility commissions and state legislatures across the country have resulted in many state commissions reducing the benefits associated with net metering by placing new fixed charges and "demand" charges on solar customers, compensating solar customers at something less than the retail rate, or imposing new aggregate capacity

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[90] *See* Rule, *supra* note __, at 131-34 (discussing common cross subsidies in utility rate design); Revesz & Unel, *supra* note __, at 76 (same); Peskoe, *supra* note __, at 121-29, 169-72 (explaining how cross-subsidies have always been embedded in the utility rate design).

[91] *See* Peskoe, *supra* note __, at 118-23 (discussing "just and reasonable" standard in utility ratemaking).

limits on solar installations.[92] In 2018, forty-five states and the District of Columbia took some action with regard to distributed solar, whether it be changes to net metering, fixed charges, minimum bill increases, or community solar policies.[93] In addition to efforts by utilities to reduce the financial benefits of rooftop solar in state commissions, utilities worked closely with the American Legislative Exchange Council ("ALEC") to introduce model legislation in states across the country to ban or severely limit net metering or to impose large fixed fees on owners of solar panels.[94]

In these proceedings, investor-owned electric utilities and ratepayer advocacy groups virtually always argue in favor of limiting or eliminating net metering for rooftop solar. They argue that rooftop reduces overall utility revenues (through lost electricity sales) without also lowering utility fixed costs and will thus lead to increased electricity rates for customers to cover those fixed costs. In turn, they argue, those higher rates will fall disproportionately on non-solar owners who tend to be less wealthy than solar owners. The players on the other side of the debate include (1) the rooftop solar industry—companies like Sunrun and SolarCity[95]—which benefit financially from the increased financial incentives net metering provides for rooftop solar installations and (2) environmental groups, which support the growth of rooftop solar because it increases the penetration of renewable, distributed energy into the electric grid, reduces reliance on fossil fuels, and reduces GHG emissions and other fossil-fuel related pollutants.[96]

In a 2017 article on distributed solar and net metering, Richard Revesz and Burcin Unel surveyed many of the public benefits and costs associated with distributed solar.[97] The benefits to the electric grid include reducing the utility

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[92] *See, e.g.,* Peskoe, *supra* note __, at 150 (noting that in arguments before public utility commissions, utilities "have launched a nationwide campaign against cross subsidies, in the name of consumer protection. They argue that rate structures that have allowed PV to gain traction are 'unfair,' 'misleading' to consumers, and 'regressive.' IOUs have also funded media campaigns that have painted PV adopters as thieves who steal their neighbors' money while out-of-state billionaires reap the profits.") (citing proceedings); Revesz & Unel, *supra* note __, at 64-71 (discussing challenges in numerous states to net metering); Welton, *supra* note __, at 592-97 (discussing contentious state utility commission proceedings over net metering and opponents' "nationwide assault on the policy").

[93] N.C. CLEAN ENERGY TECH. CTR., THE 50 STATES OF SOLAR Q3 2018 QUARTERLY REPORT, Executive Summary 5 (Oct. 2018).

[94] Revesz & Unel, *supra* note __, at 65.

[95] *See* Jacob Marsh, *Solar Power Companies in the U.S.: Which Should You Choose?*, ENERGYSAGE, June 28, 2018.

[96] *See generally* Revesz & Unel, *supra* note __, at 48-49 (discussing net metering battles); Peskoe, *supra* note __, at 154-55 (same).

[97] Revesz & Unel, *supra* note __, at 79-93.

system's peak demand; reduced fuel expenses; lower transmission line power losses because distributed energy is closer to the end-user; long-term costs savings to the system by enabling deferral or complete avoidance of the cost of new power plants; and resiliency benefits during storms and other power outages. The benefits to the public include climate change benefits and health benefits through the displacement of fossil fuels as well as more general environmental protection benefits associated with water quality and land use benefits.[98]

Because rooftop solar energy provides public goods, free riding debates are relevant, and the question is how to address free riding concerns. Here is where a comparison to the use of free riding in the energy efficiency context becomes helpful. Free riding concerns in energy efficiency programs have been present for many decades, and economists and other experts have developed various ways of addressing them. One can certainly question how accurate our ability to evaluate free riders is in the energy efficiency context, but experts have at least developed metrics to measure free riders and, even if they aren't perfect, they provide a platform for analysis and debate.

Regulators and experts are at a much earlier stage of data collection and analysis when it comes to free rider concerns in the rooftop solar context. The question then becomes how much to support rooftop solar as these metrics are being developed. Opponents of rooftop solar, including many investor-owned electric utilities, argue that states should eliminate net metering in favor of much lower payments for rooftop solar energy because the public goods provided are limited. Supporters argue that states should continue with net metering until we can more fully calculate the public goods provided by rooftop solar because we know they exist and should encourage development of this energy resource.

A review of proceedings in Arizona, Nevada, and Minnesota surrounding compensation for rooftop solar generation shows a range of approaches to this question. In Arizona, the lack of information on the public goods provided by rooftop solar caused regulators and utilities to downplay the benefits of rooftop solar and reduce net metering benefits. In Nevada, the utility commission first followed suit but then reconsidered its decision and used the lack of information as a reason to continue net metering until improved metrics could be developed. And in Minnesota, the state legislature required the state utility commission to adopt a "value of solar tariff" or VOST, to reduce the information asymmetry between the

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[98] *Id.* at 79-81. Costs to the grid include the costs of new meter installations grid interconnection, mismatches in power supply and demand that the utility cannot yet easily control, and responding to the variability of distributed resources that cannot be turned off and on with a switch on demand. *Id.* at 81-84.

electric utility and the public and to begin to develop the types of metrics that exist in the energy efficiency context.

1. Arizona

In Arizona, in 2013, the Arizona Public Service Commission became one of the first state utility commissions to revise a state net metering program to reduce the value of rooftop solar in response to a utility claim of an unfair cost shift between residential customers with solar panels and residential customers without solar panels. The utility, Arizona Public Service ("APS"), filed an "Application for Approval of Net Metering Cost Shift Solution" as "a solution to the cross-subsidization of customers with Net-Metering DG [distributed generation] systems by those customers without such systems."[99] Notably, in its filing, APS contended "that the issue is one of fairness for all customers and is not related to a loss of revenue by APS because of [net metering]."[100] Prior to its filing, APS hosted a technical conference to gather information and propose various solutions, which it presented to the Commission with its application.[101]

In its order ruling on the APS application, the Commission summarized the commission staff analysis of the issue, and found that "integral to the discussion of DG is the question of what *value* DG offers to APS's electric system and thereby to the customers served by that system."[102] Staff found two values inherent in DG systems: (1) objective value, which consist of "measurable" benefits such as avoided fuel costs to the utility, although it recognized that "[e]ven objective value can be difficult to predict in future time periods; and (2) subjective value, which "requires the subjective assignment of monetary values to anticipated future benefit that are not easily measurable" and can include "increased grid security and air quality improvements."[103] The Commission, based on the staff report, recognized that several studies existed that attempted to quantify both objective and subjective value of DG, that subjective value "is a public policy issue" that requires "a subjective assignment of values consistent with policy goals," and that both objective value and subjective value would need to be addressed in the next general rate case proceeding for the utility to quantify and value the costs and benefits of DG and then "allocate[] these costs and benefits equitably among customers [as] a matter of rate design."[104]

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[99] In re Arizona Public Service Company's Application for Approval of Net Metering Cost Shift Solution, Order at 2, ¶ 10 (Ariz. Pub. Serv. Co., Dec. 3, 2013) [hereinafter "APS Order"].

[100] APS Order at 2, ¶ 11.

[101] *Id.* at 2, ¶ 12.

[102] *Id.* at 5, ¶ 24 (emphasis in original).

[103] *Id.* at 5, ¶¶ 25-26.

[104] *Id.* at 6, ¶¶ 30-32.

As an interim measure, however, the Commission agreed with APS that some additional costs and fees on solar customers were appropriate. It did not place new fees on customers who already had installed solar panels but did place a $.70 per kW monthly interim charge on all DG customers with installations after December 31, 2013 to "ameliorate the impact of the cost shift on residential non DG customers."[105] This amount, which constituted the first approval of fixed charges on solar customers in the United States, was significantly lower than the $3.00 per kW per month amount it believed could be supported APS's data (equivalent to an additional $21 per month for a customer system of 7 kW) and the $70 per month APS said was warranted by the "cost shift issue" in a later proceeding on the same issue.[106]

Contentious battles over how to value and compensative rooftop solar generation continue in Arizona, with APS arguing that its customers "are bearing the brunt of the unfair cost shift" associated with continued net metering and arguing for higher fixed fees on solar customers.[107] What is important for purposes of analysis here, is the position of APS that there is an "unfair" cost shift between customers with solar panels and customers without solar panels despite the fact that all parties recognized in the proceeding that it was very difficult to value the benefits to the overall system associated with distributed solar. If that value is high, then any current cost shift may not be unfair to any customers and, in fact, may benefit all customers. This is particularly true if the "value" of distributed solar includes creating markets for developing solar technologies that can result in reduced carbon emissions, greater grid security through distributed generation, and financial value from reducing the need to build more fossil-fuel generation once energy storage technologies develop sufficiently to support distributed solar. APS and other utilities may not "value" those benefits because they may result in reduced revenues for the utility in the short term, but that does not necessarily mean they are an unfair cost shift on utility customers without solar panels or that customers with solar panels are free riding on the utility system.

2. Nevada

The analysis was somewhat different in Nevada a few years later in 2016. In early 2016, the Public Utilities Commission of Nevada issued a "Modified Final Order" that phased out net metering for residential customers in Nevada with existing solar

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[105] *Id.* at 21.

[106] *See id.* at 17, ¶ 84. *See also* In re Arizona Public Service Company's Application for Approval of Net Metering Cost Shift Solution, Docket No. E-01345A-13-0248, Order at ¶¶ 106, 162 (Ariz. Pub. Serv. Co., Aug. 31, 2015).

[107] *Id.* at ¶ 102.

systems and tripled the "fixed charges" for those customers over a period of years.[108] This decreased the amount the utility paid customers for rooftop solar from the 11 cents per kWh retail rate to a 2 cents per kWh wholesale rate. It also resulted in an increase in fixed monthly charges on solar customers from $12.75 per month to $38.50 per month.[109] This action resulted in SolarCity and other solar installation companies pulling their operations out of the state entirely with a commensurate loss of solar-related jobs in the state. According to the commission itself, the Modified Final Order "all but crushed the rooftop solar industry in Northern Nevada, reducing the booming industry from 983 applications by residential homeowners and small commercial businesses in Sierra Pacific Power service territory in 2015 to 41 applications in 2016."[110]

A significant driver of the Commission's Modified Final Order eliminating net metering was a 2015 statute enacted by the Nevada legislature, SB 374,[111] in which the legislature directed the commission to address solar cost shift issues. The relevant provisions of the statute provided that the commission may establish different rate classes for customers with distributed solar, may establish terms and conditions for participating in net metering, including limits on enrollment in net metering "to further the public interest," may allow a utility to "establish just and reasonable rates and charges to avoid, reduce, or eliminate *an unreasonable shifting of costs* from customer-generators to other customers of the utility," and shall not authorize rates or charges for net metering "that *unreasonably shift costs* from customer-generators to other customers of the utility."[112]

In its order revisiting its decision, the Commission evaluated the record before it with regard to the extent of any unfair cost shift from net metering customers to non-net metering customers.[113] It found the record "replete with conflicting evidence regarding the existence of a cost shift" with some studies showing the costs between customers classes will be "very nearly neutral" and total benefits of $36 million over the lifetime of an average rooftop solar system.[114] Other studies, however, showed exactly the opposite, with a significant cost shift based in large part

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[108] Pub. Util. Comm'n of Nevada, Modified Final Order, Docket Nos. 15-07041 and 15-07042 (Feb. 17, 2016).

[109] *See* Revesz & Unel, *supra* note __, at 66 (citing news reports).

[110] In re Application of Sierra Pacific Power Co., Docket No. 16-06006, 16-06007, 16-06008, 16-06009, Order at 27, 2016 WL 7635932 (Nev. PUC, Dec. 28, 2016).

[111] NV S.B. 374, *codified* at NRS 704.7735, *repealed*, NV A.B. 405

[112] Sierra Pacific Power, *supra* note __, Order at 28.

[113] *Id.* at 29.

[114] *Id.* at 31-32.

on the differential in price between utility scale solar and rooftop solar, with utility scale solar available at significantly lower rates.[115]

With this conflicting evidence before it, the Commission stated that what it found most significant about the evidence submitted was that "credible and well-educated" economists, engineers, attorneys, and businesses failed to agree on fundamental facts and methodologies relevant to the proceeding.[116] The Commission considered that this was "[p]erhaps due to Nevada being at a cross-roads where traditional thinking is colliding with new technology and disruptive business models—new ways of looking at old energy problems are emerging."[117] The Commission also considered that these divergent views may also "be because the facts regarding energy valuation, in many ways like the price of other commodities, change and continually evolve. What a cost prohibitive energy resource is today could very well be a fantastic value tomorrow."[118] The Commission continued:

> Jumping to a premature conclusion for the mere sake of having a resolution while the conversation and technology is evolving would not serve the public interest and Nevada. No certain answer at this time is better than the wrong one. More information, time, and analysis are necessary to find the appropriate balance for Nevada. The statement above is all-the-more true in the valuation of [net energy metering] NEM rooftop solar, as it impacts the overall cost-shift analysis.[119]

The Commission then stated that in its prior order eliminating net metering, it had recognized that the relevant factors for analyzing the positive and negative effects of net metering included avoided energy, avoided capacity, reduced energy losses/line losses, avoided CO_2 emissions, avoided criteria pollutant emissions, fuel hedging, utility integration and interconnected costs, and utility administration costs.[120] In that earlier order, according to the Commission, it had "bound those factors to only those things which are 'known and measurable' but, in doing so "failed to fully account for other facts and policies—even those difficult or impossible to objectively quantify—which should also be included in a comprehensive NEM valuation analysis."[121] Moreover:

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[115] *Id.*

[116] *Id.* at 32.

[117] *Id.*

[118] *Id.*

[119] *Id.* at 33.

[120] *Id.*

[121] *Id.*

> Until a universally-acceptable formula can be settled upon to determine an appropriate value for . . . rooftop solar generation in Nevada, questions regarding the existence of a cost-shift will remain unresolved. More than "known and measurable" costs need to be included in this analysis. However, how is monetary value to be placed on the prevention of climate change? Clean air? Encouraging job growth? Grid diversity? Energy choice and independence? Building a "New Nevada" for our children? . . .[122]

The Commission went on to find that even assuming the facts support a cost shift from non-solar customers to solar customers, the relevant statute only prohibited the Commission from approving an "unreasonable" cost shift.[123] It found that no unreasonable cost shift would occur because there would be no "discernable cost increase" on the average monthly bill for customers without distributed solar (approximately $0.26 per month) and that most customers would experience a net decrease in the average monthly bill.[124] The Commission also noted that its determination of reasonableness in this case was guided by the Nevada Legislature's stated policies supporting renewable energy, including solar energy as a "mainstream alternative for homes."[125] Notably, within a year after the Commission's order, the Nevada legislature ratified the order by repealing its earlier legislation—SB 374—and replacing it with provisions grandfathering in existing customers with full net metering and reducing the rate only slightly when certain installed capacity thresholds are met (e.g., 95% of the retail rate in the first 80 MW of installed capacity, with decreases for every additional 80 MW installed until it flattens at a 75% rate of compensation.[126]

As detailed in Part IV, what is notable about the Nevada Commission's order is its treatment of the present-day uncertainties regarding the valuation of costs and benefits of rooftop solar as compared with the Arizona Commission. In the face of the absence of "hard" data regarding present-day and long-term benefits of rooftop solar, the Arizona Commission accepted the utility's arguments and assumed an unreasonable cost shift while the Nevada Commission did exactly the opposite. The Nevada Commission presumed that benefits to all customers associated with increased solar generation may exist now and would likely increase in the future. It found no existing cost shift between customer classes that was unreasonable based on the evidence before it, and relied on state legislative policies supporting renewable

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[122] *Id.* at 34, 36.

[123] *Id.* at 36.

[124] *Id.* at 36-37.

[125] *Id.* at 38 (quoting NRS § 701B.190).

[126] *See* Nev. A.B. 405, June 4, 2017; Julia Pyper, *Nevada's New Solar Law is About Much More than Net Metering*, GREENTECH MEDIA, June 16, 2017.

energy to allow the market for rooftop solar to develop and thrive in the state. By contrast, in Arizona, the commission saw its role more narrowly—to address the utility's petition to address cost shifts taking place using the utility's existing rate design which recovers both fixed and variable costs through volumetric electricity sales. It did not use the proceedings as an opportunity to question the rate design or to support a growing market for a form of energy generation that posed a direct threat to the utility's existing business model.

3. Minnesota

Unlike Arizona and Nevada, where the commissions relied on more general statutory language regarding just and reasonable rates in the context of rooftop solar, in Minnesota the legislature directed the Commission to develop a new method to compensate distributed solar energy. Specifically, in 2013, in addition to using traditional net metering to compensate solar owners for systems between 40 kW and 1 MW, the legislature allowed utilities to compensate such customers based on "an alternative tariff that compensates customers through a bill credit mechanism for the value to the utility, its customers, and society for operating distributed solar photovoltaic resources interconnected to the utility system and operated by customers primarily for meeting their own energy needs."[127]

The legislature required that this alternative tariff, known as the "Value of Solar" tariff (also referred to as the "VOS rate" or "VOST") be developed by the Minnesota Department of Commerce no later than January 31, 2014 and be approved, rejected, or modified with the Department's consent by the Minnesota Public Utilities Commission within 60 days of submission.[128] In developing the VOST, the Department of Commerce was required to "consult stakeholders with experience and expertise in power systems, solar energy, and electric utility ratemaking regarding the proposed methodology, underlying assumptions, and preliminary data."[129] The VOST must "at a minimum, account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value." The Department of Commerce was also authorized, although not required, consider "known and measurable evidence of the cost or benefit of solar operation to the utility" and incorporate "other values into the methodology, including credit for locally manufactured or assembled energy systems, systems installed at high-value locations on the distribution grid, or other factors."[130]

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[127] MINN. STAT. § 216B.164, subd. 3a (net metering); Minn. Stat. § 216B.164, subd. 10(a) (alternative tariff).

[128] MINN. STAT. § 216B.164, subd. 10(e).

[129] MINN. STAT. § 216B.164, subd. 10(e).

[130] MINN. STAT. § 216B.164, subd. 10(f).

The legislature also required the state's largest utility, Xcel Energy, to create a program for "community solar gardens" defined as facilities that generate electricity "by means of a ground-mounted or roof-mounted solar photovoltaic device whereby subscribers receive a bill credit for the electricity generated in proportion to the size of their subscription."[131] The other two investor-owned utilities in the state are allowed, but not required to offer a solar garden program.[132] Solar gardens must be at a capacity of no more than 1 MW, and each subscription "shall be sized to represent at least 200 watts of the community solar garden's generating capacity and to supply, when combined with other distributed generation resources serving the premises, no more than 120 percent of the average annual consumption of electricity by each subscriber at the premises to which the subscription is attributed."[133] A solar garden must have at least five subscribers and no single subscriber may have more than a 40 percent interest in the garden.[134] Solar gardens may be owned by the utility or by a private solar development that contracts with the utility to sell the output of the solar garden.[135]

The purpose of the solar garden statute was to allow residential and commercial utility customers to receive the benefits of solar energy without the need for the up-front capital costs of purchasing solar panels and to encourage the development of a solar industry in Minnesota.[136] Eligible solar gardens must be located "in the service territory of the public utility filing the plan" and subscribers must be retail utility customers located in the same county as the solar garden or a contiguous county.[137] The utility must purchase all energy the community solar garden generates and the purchase shall be at the VOS rate or, until the commission approves the VOS rate, at the applicable retail rate.[138]

The Minnesota Public Utilities Commission reviewed and approved the VOST prepared by the Department of Commerce in April 2014.[139] In its order, the

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[131] MINN. STAT. § 216B.1641(a).

[132] *Id.*

[133] MINN. STAT. § 216B.1641(b).

[134] MINN. STAT. § 216B.1641(a).

[135] *Id.*

[136] *See* Bob Eleff, Legislative Analyst, Information Brief, *Xcel Energy's Minnesota Solar Garden Program* (Updated Oct. 2017), https://www.house.leg.state.mn.us/hrd/pubs/solargarden.pdf.

[137] MINN. STAT. § 216B.1641(c).

[138] MINN. STAT. § 216B.1641(d).

[139] In re Establishing a Distributed Solar Value Methodology Under Minn. Stat. § 216B.164, subd. 10(e) and (f), Order Approving Distributed Solar Value Methodology (Minn. P.U.C., Apr. 1, 2014) [hereinafter "MPUC Order"].

Commission began by stating that the Department of Commerce "intends for the methodology to avoid cross-subsidies and disincentives for conservation inherent in net metering."[140] The Department's methodology included eight relevant components, chosen because they were values "based on known and measureable evidence of the cost or benefit of solar operation to the utility": avoided fuel costs, avoided fixed plant operations and maintenance, avoided variable plant operations and maintenance, avoided generation capacity cost, avoided reserve capacity cost, avoided transmission capacity cost, avoided distribution capacity cost, and avoided environmental costs. According to the Commission, together, the components "account for the value of energy and its delivery, generation capacity, transmission capacity, transmission and distribution line losses, and environmental value attributable to PV solar." The Department also included two "placeholder components" for future analysis—avoided voltage control cost and solar integration cost—on grounds that these costs and benefits will be "known and measurable in the future" and thus can be added to the calculation at that time. The Department declined to include as components the "compliance" value of Solar Renewable Energy Credits and the value of economic development on grounds that such values were not known or measurable at that time. The Department anticipated that additional value and cost components would be added in the future, "as more data and analysis becomes available about distributed solar and its costs and benefits."

The Commission approved the Department's methodologies with a few modifications relating to fuel price escalator factor, calculating avoided distribution capacity costs, and non-CO_2 avoided environmental costs values.[141] Pursuant to the statute, the VOST is calculated annually and the utility must use the VOST for community solar gardens but can elect to use VOST or net metering for other types of solar purchases, such as distributed solar, in the utility's territory. Since the first VOST was established, it has been a few cents less than the retail rate used in traditional net metering. For instance, the VOST in 2016 for Xcel Energy was just under $.10 per kWh while the retail rate for residential customers was $.12 per kWh. Under both net metering and VOST, Xcel must offer to purchase the renewable energy credits associated with the solar energy generated.

Despite the lower price of VOST, Xcel Energy has opted to continue to use net metering when it can, likely in part because it anticipates that the VOST will rise in value in the future. When the first community solar gardens came on line, the Commission directed Xcel to compensate subscribers using the retail rate with an optional renewable energy credit payment, in order to provide sufficient incentives to get the solar garden program started, and so stakeholders could gain more experience with the program. In 2016, the Commission directed Xcel Energy to transition its

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[140] MPUC Order at 1.

[141] MPUC Order, *supra* note __, at 15-16.

solar garden program to VOST because that is what the legislature directed; because VOST will "provide predicable yearly rate increases," thus improving the ability of solar gardens to obtain financing; and to "address concerns that nonparticipating ratepayers are subsidizing the program."[142] The Commission also required Xcel beginning with the 2018 VOST to use "location-specific avoided costs in calculating avoided distribution capacity" to ensure that the benefits of solar gardens located near load and the costs of solar gardens further from load are appropriately considered and factored into the benefits associated with reducing peak demand and deferring the need for distribution system upgrades.

Throughout the proceedings, the utilities, consumer advocacy groups, solar developers, and others have disagreed about appropriate inputs, assumptions, and other aspects of Minnesota's VOST.[143] Nevertheless, VOST provides a framework to address the cost shift and free riding arguments inherent in traditional net metering by creating identifiable inputs, cataloguing which inputs are known and unknown, and allowing for a yearly refinement of the methodology to determine the costs and benefits of solar on the utility's system as a whole. It also allows an alternative to trying to wedge distributed solar payments into the traditional utility ratemaking process, which was not designed for these types of energy inputs. VOST, of course, is not the only approach. Scholars have proposed numerous other alternatives that include greater use of time-of-use rates, feed-in tariffs, better valuation of environmental benefits associated with distributed energy, and the like. VOST, however, is the primary alternative to net metering that exists today, and thus provides one pathway to get beyond the free riding and cost shift arguments that will always be present in debates over net metering.

C. Electric Utility Investment in EV Charging Infrastructure

Utility investment in EV charging infrastructure provides a third illustration of the use of free riding arguments in state energy policy. The debates in this context are more recent than those involving energy efficiency, which have had decades to develop, as well as those involving rooftop solar, which have been in play since

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[142] In re Petition of Northern States Power Co., dba Xcel Energy, For Approval of its Proposed Community Solar Garden Program, Docket No. E-002/M-13-867, 2016 WL 4701453 (Minn. P.U.C., Sept. 6, 2016).

[143] *See, e.g.,* Laura Hannah, *Xcel Energy's Community Solar Program Hits Major Milestones in Year Three*, GREENTECH MEDIA, Dec. 21, 2017 (discussing program developments and debates); Comments of Prof. Gabriel Chan on Xcel Energy's 2019 VOS Calculation and Proposed 2019 Vintage Year Bill Credit Tariff Sheets, Docket No. M-13-867 (Nov. 27, 2018) (raising conceptual errors, conceptual extensions, and process reforms for yearly VOS proceeding); Eleff, *supra* note __ (discussing a range of disputed issues surrounding VOST and solar gardens since the enactment of the statutory provisions).

approximately 2013, and have reached virtually all states. The debates over utility investment in EV charging infrastructure existed in only a few states prior to 2016, at which time an increasing number of state commissions began to open dockets on the topic.[144]

1. EV Sales in the United States and the Role of EV Charging Infrastructure

As an initial matter, although EV sales in the United States have increased significantly in recent years, EVs remain less than 1% of total vehicle sales in the United States, albeit with higher percentages in some states, particularly California, where the percentage of EV sales for several months in 2018 approached 10% of all vehicles sold.[145] The growth of EVs has resulted from improved battery technology as well as mandates that auto companies sell a certain percentage of EVs in some U.S. states (led by California) as well as in the EU and China.[146] As of October 2018, there were 1 million EVs on U.S. roads and analysts project that there will be 18 million EVs in the United States by 2030.[147] As of 2018, the auto companies have embraced EVs and virtually every major auto company plans to invest heavily in the technology.[148]

Environmental groups, along with some U.S. states, strongly support widespread EV adoption because it provides an opportunity to reduce the use of oil and its related GHG emissions and other pollutants in the transportation sector, which, as of 2018, emits more GHG emissions than any other sector.[149] Moreover, although fossil fuels still made up nearly 63% of U.S. electricity generation in 2017, that percentage is far less in many states and is declining nationwide as a result of state

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[144] *See* Klass, *supra* note __, at Part IV (discussing state legislative and regulatory action).

[145] *EV Market Share By State*, EV ADOPTION, evadoption.com/ev-market-share/ev-market-share-state/.

[146] *See* Int'l Energy Agency, *Strong Policy and Falling Battery Costs Drive Another Record Year for Electric Cars*, May 30, 2018 (discussing EV sales in the EU and China, with 580,000 EVs sold in China in 2017, which was a 72% increase from the prior year).

[147] *See* Edison Elec. Inst., Press Release, *EEI Celebrates 1 Million Electric Vehicles on U.S. Roads*, Nov. 30, 2018. *See also* Jeffrey Ryser & Keiron Greenhalgh, *U.S. EV Sales Jump 72.5% on Year in 2018, Top 354,000*, S&P GLOBAL, Jan. 3, 2019 (reporting that 2018 was a "break-out year" for EVs "with sales of more than 354,000 vehicles, or 72.5% more than the 199,000 EVs sold in the US in 2017).

[148] *See, e.g.,* Mark Matousek, *32 Electric Cars You'll See on the Road by 2025*, BUS. INSIDER, Nov. 28, 2018 (discussing auto companies investments in new models of EVs); Dan Neil, *Think Electric Vehicles are Great Now? Just Wait . . .*, WALL ST. J., Dec. 26, 2018.

[149] *See* Energy & Climate Staff, Rhodium Group, *Preliminary US Emissions Estimates for 2018* (Jan. 18, 2018) ("The transportation sector held its title as the largest source of US [CO_2] emissions for the third year running, as robust growth in demand for diesel and jet fuel offset a modest decline in gasoline consumption.").

RPSs and declining costs of utility-scale and distributed renewable energy.[150] As a result electrifying transportation is an important component of efforts worldwide to reduce GHG emissions.

As part of its efforts to reduce statewide GHG emissions from the transportations sector, California has enacted a Zero Emission Vehicle ("ZEV") mandate that requires auto companies to sell a certain percentage of EVs in the state, and nine other states have adopted the ZEV mandate.[151] Most of these ZEV states have also enacted legislative policies to facilitate the development of widespread EV charging infrastructure to increase consumer demand for EVs and reduce "range anxiety."[152]

Because the fuel EVs require is electricity, utilities have the opportunity to play a central role in building out EV charging infrastructure. This infrastructure includes the distribution wires and related equipment necessary to power the charging stations, and the charging stations themselves. With regard to the charging stations, private charging companies such as ChargePoint, Greenlots, Blink, and EVGo have developed a range of business models to support home and business charging. In addition, the Volkswagen ("VW") emissions cheating scandal resulted in a $14.7 billion dollar settlement in 2016 that included requiring VW to create a new company, Electrify America, to spend $2 billion building charging networks on interstates and in cities across the country. The settlement also requires VW to

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[150] *See supra* note __ and accompanying text; U.S. Energy Info. Admin., *U.S. Electricity Generation By Source,* Oct. 29, 2018, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3; Nadja Popovich, *How Your State Make Electricity*, N.Y. TIMES, Dec. 31, 2018 (showing over half the electricity in California generated from renewable energy resources, even larger percentages in Idaho, Washington, and Vermont, and nearly 40% of electricity in Iowa generated from wind energy alone).

[151] *See* Center for Climate and Energy Solutions, *U.S. Clean Energy Policies*, https://www.c2es.org/document/zev-program/ (listing Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont as "ZEV states" and discussing California's ZEV program). During the Obama Administration, the U.S. EPA was also a strong supporter of EV adoption but now, under President Trump, the EPA has proposed to eliminate California's authority to set its own vehicle emissions standards, including its EV mandate, as well as the ability of other states to adopt the California standards. *See* U.S. EPA and Nat'l Highway Safety Admin., The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks, 83 Fed. Reg. 42986 (Aug. 24, 2018).

[152] *See* Camille von Kaenel, *Luring Electric Vehicle Buyers with Swift Charging, Roller-Skating*, GOVERNORS' WIND & SOLAR ENERGY COAL. (Jan. 17, 2018), http://governorswindenergycoalition.org/luring-electric-vehicle-buyers-with-swift-charging-roller-skating (discussing industry, state, and utility efforts to build out public EV charging stations to reduce range anxiety and support EV drivers).

provide $2.7 billion in funds for grants to states to support EV charging infrastructure.[153]

These provisions of the VW settlement are a recognition that in order for consumers to embrace EVs, sufficient EV charging infrastructure must be built through a combination of EV charging stations in homes, at business locations, on highway corridors, and in public places such as shopping centers, government buildings, and even gas stations.[154] It is well documented that the lack of EV infrastructure can present a "chicken and egg" or "market coordination" problem in which consumers will not want to purchase an EV due to perceived lack of support, while no company will invest in EV infrastructure because it doesn't see sufficient demand.[155]

Who should build this infrastructure and who should pay for it, however, have become hotly contested issues in state public utility regulatory proceedings and state legislatures in recent years. Private charging companies and state commissions were initially opposed to utility investment in EV charging infrastructure, fearing the utilities would stifle competition and overbuild infrastructure in pursuit of profits. That opposition has softened considerably, however, and led the California Public Utilities Commission to reverse its position on the issue when it realized that substantial private infrastructure investment would not emerge until regulated

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[153] INGRID MALMGREN & CASSIE POWERS, NAT'L ASS'N OF STATE ENERGY OFFICIALS, VOLKSWAGEN SETTLEMENT: BENEFICIARY MITIGATION PLAN TOOLKIT 4–5 (2017), https://www.naseo.org/Data/Sites/1/naseo-vw-beneficiary-mitigation-plan-toolkit-final.pdf; David Ferris, *7 Takeaways From a Wild Year for EVs*, ENERGYWIRE, Dec. 21, 2018 (discussing VW settlement).

[154] Although the major oil companies oppose transportation electrification because of its impact on market share, retail gas stations are beginning to see an opportunity for increased sales of convenience store items if they install EV charging stations because customers will be forced to spend more time at the stores while they wait for the cars to charge. *See, e.g.*, Ken Doyle & Erika Myers, *Why Aren't More Convenience Stores Installing Electric Vehicle Chargers?*, SMART ELECTRIC POWER ALLIANCE, Nov. 9, 2017 (discussing financial benefits of EV chargers for service stations and convenience stores); Tina Casey, *It's Over: Oil Giant Shell Doubles Down on EV Charging Stations*, CLEAN TECHNICA, Oct. 16, 2017 (reporting on oil company Royal Dutch Shell decision in install EV charging stations at its gas stations in the EU).

[155] *See, e.g.*, Initial Comments of Fresh Energy, Natural Resources Defense Council, the Sierra Club, and Minnesota Center for Environmental Advocacy, Docket No. E999/CI-17-879, Minn. Pub. Util. Comm'n. at 17 (July 27, 2018), https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={80FFDC64-0000-CF18-AE69-6C936C279BF4}&documentTitle=20187-145282-01 [Hereinafter "CEO Initial Comments"]

utilities were permitted to enter the market.[156] Other state commissions, as well as state legislatures, have quickly followed suit.

2. State Regulatory Proceedings Governing Utility Investment in EV Charging

Regulators, scholars, auto manufacturers, environmental advocacy groups, and electric utilities nationwide are still struggling to determine best practices for cost-effective EV charging infrastructure investment. There appears to be broad consensus that EV adoption has substantial benefits, including "great potential to dramatically reduce local air pollution, greenhouse gas emissions and resulting climate change impacts, and oil use from the transport sector."[157] Widespread EV adoption could also lead to lower electricity rates, by better allocating grid load to more optimally use all power generated.[158] On the other hand, EV adoption is not without potential downsides, especially if EVs spike electricity demand at peak demand times.[159]

As noted above, utilities have been central actors in efforts to expand EV charging infrastructure. Many of the ZEV states have enacted legislation authorizing utilities to recover their costs and receive a rate of return on investments in EV charging infrastructure.[160] Indeed, state legislatures and regulatory commissions have

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(describing market coordination problem); Adele Peters, *Want Electric Vehicles to Scale? Add Chargers to Gas Stations*, FAST COMPANY, Oct. 8, 2018 (discussing "chicken and egg" problem in the context of EV charging and potential solutions).

[156] David Roberts, *Electric Vehicles Are Gaining Momentum, Despite Trump*, VOX, June 27, 2018; Klass, *supra* note __, at 584.

[157] DALE HALL & NIC LUTSEY, EMERGING BEST PRACTICES FOR ELECTRIC VEHICLE CHARGING INFRASTRUCTURE at iii (2017), https://www.theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf.

[158] Lisa Cohn, *Should All Utility Customers Pay for EV Infrastructure and Microgrids*, MICROGRID KNOWLEDGE (June 22, 2018), https://microgridknowledge.com/ev-infrastructure-rate-based-microgrids/.

[159] HALL & LUTSEY, *supra* note __, at 24. This could be particularly dangerous as solar power plays an increasingly large role in nationwide grids if EV owners opt to charge their EVs at home, after the sun sets. However, Hall and Lutsey hypothesize that improvements in technology may eliminate this issue. *Id.*

[160] *See* Klass, *supra* note __ at 584-89, 592-94. There are three primary regulatory models for utility investment in EV charging infrastructure: (1) the "make-ready model," where the utility owns the traditional utility infrastructure such as the transformers, utility services, meters, conduits, and wiring that supports the charging station but the "site host" such as a parking lot or shopping mall contracts with a private charging company like ChargePoint or Greenlots for the purchase and maintenance of the station itself; (2) the "end-to-end model," where the utility owns the charging station itself in addition to the utility

justified requiring all utility customers to pay for these investments based on evidence of the system-wide public benefits noted above, namely reduced GHG and other air pollutant emissions associated with transportation electrification as well as the potential for reduced electricity rates stemming from more efficient electric grid utilization.[161]

State public utility commissions approved major utility investments in EV charging infrastructure in 2018, including nearly $740 million in California, $20 million in Massachusetts, and $10 million in Ohio.[162] Other proposals are pending approval in New York, Maryland, and New Jersey, totaling nearly $700 million with total proposals filed in the states as of the end of 2018 for review and approval in 2019 totaling $1.5 billion in 18 states.[163] Each of these proposals would allow utilities to recover a rate of return on their investments, similar to traditional utility investments in electricity generation, transmission, and distribution assets.[164]

Although there are familiar free riding arguments in the EV charging infrastructure context, some of the key players in these debates have "switched sides" from the rooftop solar proceedings. Because of the anticipation of increased profits from EV charging infrastructure investments and increased electricity sales,[165] utilities generally favor policies encouraging EV adoption and utility-owned EV

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infrastructure required to support the station; and (3) a "hybrid model" where the utility has end-to-end ownership in underserved markets such as multi-family housing or low-income areas but only "make-ready" ownership in more competitive arenas such as workplace charging or public charging. *See* CEO Initial Comments, *infra* note __, at 13-16 (discussing models of utility investment in EV charging infrastructure).

[161] *See* HALL & LUTSEY, *supra* note __, at 24; *infra* notes __ - __ and accompanying text (discussing evidence in Illinois commission proceeding submitted by environmental groups showing efficiency benefits and lower electricity rates for all electricity customers resulting from transportation electrification).

[162] Ferris, *supra* note __.

[163] *Id. See also 2018 EV Recap: the Year of the Electric Vehicle and Tesla Prevails*, INSIDEEVS, Dec. 31, 2018 (summarizing state commission approval of utility investment in EV charging infrastructure); Gavin Bade, *10 Trends Shaping the Electric Power Sector in 2019*, UTILITY DIVE, Jan. 2, 2019 (noting that in the third quarter of 2018 alone, "32 states and D.C. took some action on electric vehicles, including the approval of utility EV charging programs in Massachusetts, Rhode Island, and earlier, in Nevada."); Additional Comments of the Signatory Parties in Further Support of the Petition for Implementation of a Statewide Electric Vehicle Portfolio, Case No. 9478, pp. 7-11 (Md. Pub. Serv. Comm'n, Aug. 30, 2018) (summarizing utility proposals nationwide for EV charging investments).

[164] Klass *supra* note __, at 569.

[165] Utilities only benefit from increased electricity sales due to EV or any other increased load in states that have not "decoupled" utility revenues from electricity sales. *See supra* notes __ - __ and accompanying text (discussing decoupling policies)

charging. Thus, utilities are aligned with environmental groups in these proceedings in arguing that such investments will not result in free riding and instead will provide system-wide benefits to all ratepayers, even those who do not currently own EVs. On the other side, many ratepayer advocacy groups oppose utility investment in EV charging infrastructure on grounds that it will result in free riding and unfair cross subsidies by providing financial benefits to EV owners that will be paid for disproportionately by non-EV owners who, like non-solar owners, tend to be lower income. But there are also new advocates making free riding arguments when it comes to EV charging—the oil companies.[166] Like the utilities in the rooftop solar debates, the oil companies are using free riding, cross subsidy, and "fairness" rhetoric to argue that utility customers will be hurt by these programs, and that such programs are not "just and reasonable" as required by state statutes governing utility rates.[167]

In the most recent of these proceedings, it is clear that proponents of utility investment in EV charging have learned from the contentious rooftop solar net metering disputes and have marshaled more sophisticated empirical evidence to support system-wide benefits of transportation electrification that requires EV charging programs. They also have the advantage of the utility supporting the program rather than opposing the program. For instance, in the net metering context, it is generally the utility that files a request with a state commission to eliminate net metering or impose fixed charges on solar customers, putting solar advocates in a defensive posture to justify the continuation of a net metering program. Moreover, supporters of net metering necessarily have more limited information on current costs and benefits of rooftop solar to the electric grid than the utilities possess. By contrast, when it comes to EV charging infrastructure, utilities are aligned with environmental groups and those groups, collectively, are making affirmative requests to state commissions to approve EV charging investment proposals, and providing evidence of public benefits to support the proposals.

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[166] *See* Jeffrey Tomich, *Big Oil Looks to Stop Utilities' Charging Investments*, ENERGYWIRE, Oct. 25, 2018; *2018 EV Recap*, *supra* note __ (discussing how 2018 was the year that the oil companies "stepped up their efforts" in Washington and in the states to oppose policies that support EVs). This recent activity is part of a larger campaign by U.S. oil companies to retain market share in the transportation sector. The New York Times reported in December 2018 that the major U.S. oil companies had worked behind the scenes since the beginning of the Trump Administration to encourage the administration to repeal the Obama Administration's signature vehicle fuel efficiency and vehicle emission standards, to discourage new states from adopting California's more stringent vehicle emission standards, and to work to revoke California's authority to set its own vehicle emission standards for GHG emissions, including the state's ZEV program. *See* Hiroko Tabuchi, *The Oil Industry's Covert Campaign to Rewrite American Car Emission Rules*, N.Y. TIMES, Dec. 13, 2018.

[167] *See infra* notes __ - __ and accompanying text.

The remainder of this section focuses on regulatory proceedings in Illinois, Missouri, and Maryland regarding utility investment in EV charging. These states show a range of arguments and analysis relating to free riding in very recent proceedings—with submission filed in 2018. This group of states also includes both ZEV and non-ZEV states which impacts whether free riding and cross subsidy arguments are used to oppose programs in their entirety or modify them to ensure that any program approved is cost-effective. As a general matter, in non-ZEV states, advocates cannot rely on a specific, state legislative or gubernatorial policy to support EV adoption or utility investment in EV charging infrastructure and instead must rely on more general state law governing "just and reasonable" rates.[168] This lack of legislative direction gives opponents of utility investment in EV charging stronger grounds to oppose such programs because there has not been a legislative recognition of the public benefits of EVs and EV charging like in California and other ZEV states.[169]

Finally, the proceedings in Illinois and Missouri highlight a recent development of oil companies and their trade associations beginning to react to the threat of EVs to their business interests, and responding by intervening in state regulatory proceedings and making free riding, fairness, and cross subsidy arguments in the name of utility customers to oppose these programs.[170] Thus, the oil companies have taken on the mantle of protecting the utility customers from programs allegedly rife with free riding, just as the utilities have done in the rooftop solar context.

a. Illinois

In September 2018, the Illinois Commerce Commission approved a Notice of Inquiry proceeding to gather "information and opinions from stakeholders on electric vehicles ('EVs') to help the Commission identify issues, potential challenges, and opportunities in EV deployment."[171] The Commission's goal was to use the

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[168] Some states have adopted California ZEV mandate through legislation while others have done so through gubernatorial action. Many ZEV states have also adopted specific legislation supporting EVs in general and utility investment in EV charging stations in particular. *See* Klass, *supra* note __, at 578, 583-90.

[169] For a discussion of state commission proceedings in ZEV states, see Klass, *supra* note __, at Part IV; David Ferris, *7 Takeaways From a Wild Year for EVs*, ENERGYWIRE, Dec. 21, 2018 (summarizing developments in the states).

[170] *See, e.g.*, Jeffrey Tomich, *Big Oil Looks to Stop Utilities' Charging Investments*, ENERGYWIRE, Oct. 25, 2018.

[171] Notice of Inquiry, Ill. Comm. Comm'n, Docket No. 18-NOI-01 (Sept. 24, 2018), https://www.icc.illinois.gov/downloads/public/ev/EV%20NOI.pdf; Electric Vehicles Notice of Inquiry, Ill. Comm. Comm'n,

proceeding "for studying and understanding the technical, financial, and policy implications of electric vehicles."[172] The Notice of Inquiry asked participants to respond to a range of issues including: (1) How EVs contribute to energy efficiency in Illinois by relying on electricity instead of fossil fuels and whether and how EV charging stations will affect overall energy efficiency in the state; (2) whether and how EVs will improve grid reliability and resilience and how best charging practices can impact efficient operation of the grid; (3) existing regulatory barriers to increased transportation electrification and possible solutions; (4) cost and environmental benefits associated with increased EV deployment in the state; (5) whether and how more EV charging stations should be developed in the state and whether utilities should own charging stations; and (6) whether utilities should charge time-of-use rates to incentivize EV penetration and whether charging infrastructure owned by utilities should be included in the utility's rate base.[173]

The Notice of Inquiry prompted a range of comments from the state's two investor-owned utilities, Ameren Illinois and Commonwealth Edison; environmental and energy efficiency groups; ratepayer advocates; the Illinois Attorney General's Office; industrial utility customers; an oil company trade association, Americans for Prosperity (a political advocacy group funded by the Koch brothers); EV charging companies; and others.[174]

Not surprisingly, the investor-owned utilities in the state—Ameren Illinois and Commonwealth Edison—both supported regulatory policies to encourage transportation electrification and utility investment in EV charging infrastructure, along with market approaches that included private EV charging companies.[175] The utilities also focused their comments in large part on how such programs would work in tandem with existing energy efficiency programs in the state to increase grid efficiencies and provide cost and environmental benefits for all utility customers.

Commonwealth Edison cited U.S. Department of Energy statistics showing that conventional vehicles convert only about 17% to 21% of the energy stored in

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https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx (describing notice of inquiry and providing links to all comments submitted in the proceeding and relevant news articles).

[172] Electric Vehicles Notice of Inquiry, *supra* note __.

[173] Notice of Inquiry, *supra* note __, at 4-7.

[174] *See* Electric Vehicles Notice of Inquiry, *supra* note __ (providing links to comments).

[175] Initial Comments of Commonwealth Edison Co., Docket No. 18-NOI-01 at p. 10 (Ill. Commerce Comm'n, Oct. 22, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx; Ameren Illinois Company's Initial Comments in Response to NOI Questions and Issues, Docket No. 18-NOI-01 at p. 17, (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

gasoline to vehicle power, while EV convert about 59% to 62% of electric energy from the grid to vehicle power.[176] It also cited potential energy efficiency opportunities of electric buses as compared to diesel buses.[177] The utility was careful to note that it was not using these statistics to argue that transportation electrification contributed to directly to the utility's energy efficiency program established under the 2016 Future Energy Jobs Act,[178] but did state that "additional EV charging stations could directly impact the Company's Energy Efficiency Program if the Program is able to incent and claim savings from energy efficient charging stations . . ."[179] The remainder of Commonwealth Edison's comments focused on how pricing signals through time of use rates would encourage EV users to charge at low peak times, resulting in better utilization of grid resources and put "downward pressure on per kWh rates."[180] Commonwealth Edison also cited studies showing the environmental benefits of wide scale EV adoption through reductions in GHG emissions, vehicle noise, and other aesthetic benefits.[181] It also stated that utility programs for EV charging could target "low-income communities not currently served by the competitive market" to increase EV adoption in those communities as well as make way for electric buses and trains in underserved neighborhoods.[182]

Ameren's comments were similar, focusing on "the economic benefits that can be socialized to all utility customers, most notably the potential downward rate pressure that can result from EV owners charging their vehicles."[183] Ameren also stressed the need to combine a sophisticated EV policy with "forward-thinking energy efficiency policy" in order to promote efficient use of electricity, reduce energy consumption on a per/BTU basis, and reduce air emissions which "would benefit Illinois customers under a variety of cost-benefit analyses.[184] Ameren argued for a program that would provide "a level of standardized savings, evaluation criteria, and costs associated with EV programs and design" that could include "modification of the existing Illinois energy efficiency [technical resource manual] to include EV-related measures, either of which could provide for a standard quantification of energy and environmental benefits—including novel categories of benefits related to bringing EV access to underserved areas, among other things."[185] To conclude on

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[176] Initial Comments of Commonwealth Edison Co., *supr*a note __, at 2.

[177] *Id.*

[178] *See supra* note __ and accompanying text (discussing energy efficiency provisions of Illinois Future Energy Jobs Act).

[179] Initial Comments of Commonwealth Edison Co., *supra* note __, at 3.

[180] *Id.* at 7.

[181] *Id.* at 7-8.

[182] *Id.* at 9-10.

[183] Initial Comments of Ameren Illinois, *supra* note __, at 1.

[184] *Id.* at 3-4.

[185] *Id.*

that issue, Ameren suggested that a "portfolio of EV programs that coordinates information with energy efficiency incentives and supportive public policy has the potential to reduce market barriers and the need for additional peak capacity investment. Such a result would provide benefits to the customers throughout Illinois."[186]

Environmental and energy nonprofit groups focused their comments on expert studies showing that EVs "provide the opportunity for broad-based cost savings for ratepayers" as well as "improved security from reduced dependence on imports of conventional fuels, improved local air quality, and reduced greenhouse gas emissions.[187] They also cited studies showing that increased EV adoption coupled with time of use rates and other "smart charging" program "can actually reduce costs for all ratepayers while benefiting the grid and providing a range of societal benefits."[188] The Sierra Club and Natural Resources Defense Council also stressed that transportation electrification is "not at odds with the utilities' statutorily-defined energy efficiency goals" and EVs themselves "are a form of energy efficiency because they reduce total energy consumption" as compared with conventional vehicles.[189] Other groups, including ratepayer advocacy groups, focused on the importance that electric load be managed cost-effectively through time of use rates to ensure that all ratepayers benefit from infrastructure costs.[190] They warned that any program for utility ownership of charging stations be designed in a way to not crowd out private investment and to avoid creating "a profit incentive for utilities to overbuild."[191]

ChargePoint's comments cited studies showing transportation electrification had the potential to "create value for all ratepayers" because "the expected long-term energy revenues from incremental EV load generally exceeds the costs for the grid to

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[186] *Id.* at 4.

[187] Comments of Advanced Energy Economy, Docket No. 18-NOI-01 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx. *See also* Comments of the Union of Concerned Scientists, Docket No. 18-NOI-01 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx; Comments of the Sierra Club and Natural Resources Defense Council, Docket No, 18-NOI-01 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[188] Comments of Advanced Energy Economy, *supra* note __.

[189] Comments of the Sierra Club and Natural Resources Defense Council, *supra* note __, at 2, 4.

[190] Initial Comments of Citizens Utility Board and Envtl. Defense Fund, Docket No. 18-NOI-01 at p. 4-5 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[191] *Id.* at 4.

support that load" which will "exert a downward pressure on unit energy costs that can benefit all utility customers regardless of EV ownership."[192] It warned, however, that this requires smart charging and other methods of avoiding "high cost 'peak' generation and/or distribution time periods."[193] ChargePoint cautiously supported ratepayer funding of utility investment in EV charging, citing specific criteria developed in other jurisdictions and highlighting the need to "maintain customer choice, encourage innovation, and stimulate competition."[194]

The strongest opposition to ratepayer funded utility investment in EV charging infrastructure came from Americans for Prosperity, a political advocacy group funded by David and Charles Koch of Koch Industries, a $110 billion private company with major investments in the oil refining and distribution industries.[195] It argued that the Commission must "carefully consider the rights and interests of all ratepayers" as it evaluates EV charging programs.[196] It stated it was submitting comments "in the interests of protecting ratepayers and consumers from program designs, rules, and regulations that promote unfair and regressive forms of cross-subsidization that have been enacted in other jurisdictions."[197] It warned the Commission that it was "required to prevent discriminatory practices where captive electric utility customers are forced to underwrite a distribution utility incursion into the EV charging infrastructure market" and that "[f]airness dictates that funding of non-public utility service needs to be done with shareholder funds, not through charges imposed on captive ratepayers with guaranteed cost recovery plus a guaranteed rate of return for the utility."[198] It contended that ratepayer-funded infrastructure is "unfair" because it will only "benefit the wealthiest ratepayers" who own EVs.[199] In closing, it cited the Commission's statutory mandate to ensure "just and reasonable" utility rates and charges and to prohibit and declare unlawful any "unjust and unreasonable" charges.[200]

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[192] Comments by ChargePoint, Docket No. 18-NOI-01 at p. 1-2 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[193] *Id.* at 2.

[194] *Id.* at 10-11.

[195] *See* Koch Industries, FORBES, https://www.forbes.com/companies/koch-industries/#732c6aa074ce.

[196] Americans for Prosperity Comments, Docket No. 18-NOI-01, at p. 1 (Ill. Commerce Comm'n, Oct. 23, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[197] *Id.*

[198] *Id.* (emphasis omitted).

[199] *Id.* at 3.

[200] *Id.*

The American Petroleum Institute-Illinois Petroleum Council expressed similar sentiments, stating that "[c]onsumers and taxpayers should not be forced to pay more in taxes, fees and/or electric utility rates so that someone else can purchase and operative an expensive electric vehicle."[201] It stated that EV charging "is currently only used by a small fraction of drivers, many of whom are wealthy enough to afford these more expensive vehicles" and that to allow utility investment in EV charging infrastructure and recover costs from all ratepayers "will result in an unfair shifting of costs onto those who have not opted for this technology."[202]

In reply comments, the Union for Concerned Scientists specifically singled out the comments of American for Prosperity, the Illinois Petroleum Council, and other commenters that opposed utility investment in EV charging.[203] In response to the stated concerns regarding wealth transfers from lower income to higher income ratepayers, the Union for Concerned Scientists acknowledged that "[r]egressive wealth transfer" is an important consideration in EV charging program design.[204] However, it warned that "categorically prohibiting utility investments due to the *possibility* of wealth transfer ignores the potential for programs to actively support equity and ensure benefits of transportation electrification to underserved markets."[205]

These comments show a range of opinions regarding the benefits of transportation electrification and utility investment in EV charging. Most commenters explicitly tied EV charging to energy efficiency, as the Commission had requested in its initial Notice of Inquiry order, and provided guidance on how EV charging could be made consistent with energy efficiency goals even though electricity use would likely increase through EV adoption. With utilities and environmental groups aligned, both groups could benefit from the superior information made available from the Illinois utilities' expertise with Illinois customer and grid data and the environmental groups' experience participating in numerous similar proceedings in other states. Whether to focus on current costs and benefits to ratepayers as opposed to future costs and benefits remained a constant theme in these proceedings, similar to the debate in the rooftop solar net metering context. And, once again, the party with the most to lose from the program—here, the oil

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[201] American Petroleum Institute-Illinois Petroleum Council Comments, Docket No. 18-NOI-01, at p. 1 (Ill. Commerce Comm'n, Oct. 22, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx (emphasis omitted).

[202] *Id.* at 2.

[203] Reply Comments of Union of Concerned Scientists (UCS), Docket No. 18-NOI-01 (Ill. Commerce Comm'n, Nov. 9, 2018), available at https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx.

[204] *Id.* at 3.

[205] *Id.* (emphasis in original).

companies—hid behind ratepayer fairness and cross subsidy arguments just as the utilities have done in the rooftop solar arena. Finally, it is important to note that the Illinois proceeding was a Notice of Inquiry soliciting responses to specific Commission questions, rather than an evaluation of a concrete utility proposal for investment. This means that the discuss was somewhat more general, allowing a broader discussion of potential benefits and concerns, and avoiding the need to delve too deeply into any of the data provided by proponents or opponents.

b. Missouri

Unlike the proceeding in Illinois, the Missouri proceeding involves a specific utility proposal for investment in EV charging infrastructure. In November 2017, Union Electric Company, d/b/a Ameren Missouri (Ameren), filed an "efficient electrification program" tariff case with the Missouri Public Service Commission.[206] Within this case was "[a] proposal to allow Ameren Missouri to provide incentives to encourage electric vehicle charging stations."[207] This "Charge Ahead—Electric Vehicles" program would "defray part or all of the cost of installing and operating electric vehicle ('EV') charging stations," and would include workplace, public space, multi-family dwelling, and interstate/highway corridor chargers.[208] The program would cost $11 million.[209] Ameren claimed that the program, along with a related program to provide financial incentives for adoption of electric forklifts and other business equipment (called the "Business Solutions Program") would "(a) provide benefits to both Ameren Missouri and its customers, both from the standpoint of lower overall rates, more efficient utilization of the electric grid, and reduced emissions in the areas where those customers work and live; and (b) not negatively affect[] either the Company's customers who are not participants in the program or regulated alternative fuel suppliers competing in the Company's service territory."[210]

Notably, in explaining why the program would benefit all utility customers, Ameren's written testimony made an analogy to the metrics used in evaluating the

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[206] Notice of Case Filing, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 15, 2017), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018006603.

[207] *Id.*

[208] Application, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 3 (Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018012294.

[209] *See* The Associated Press, *Ameren Plans $11 Million Program to Add Charging Stations*, US NEWS & WORLD REPORT, Feb. 22, 2018.

[210] *Id.* at 4-5.

cost-effectiveness of energy efficiency programs in discussing distribution line extension to support the new EV chargers. According to the testimony, such line extensions would generally decrease consumer costs while only putting a nominal (17 cent/month) burden on nonresidential customers, with the result being that the benefits of electrification would exceed those minimal costs.[211] In its Statement of Position supporting the program, Ameren stated that:

> The Rate Impact Measure ('RIM') test, a common cost effectiveness test that looks at the impact of a program on customer rates, indicates that the cost of the program will be more than fully offset by the benefits arising from the EVs using the program. The amount above program costs is a contribution to recovery of the fixed costs of the electric system which results in lower rates for all Ameren Missouri customers. Beyond the results of any of the cost effectiveness tests, this program also provides significant environmental benefits.[212]

In making this argument, it is notable that Ameren expressly relied on experience with evaluations of the cost-effectiveness of energy efficiency programs and set out a pathway to integrate investments in EV charging into those existing cost-effectiveness models.[213]

However, the Commission's Staff recommended the rejection of the EV program as proposed, and urged the Commission to "order modification of the Workplace, Multifamily, and Public Area subprograms to minimize free ridership and maximize public policy benefits."[214] While Staff conceded that all customers

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[211] Direct Testimony of Michael W. Harding, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 9–11 (Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018012299; Direct Testimony of Steven M. Wills, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 16 (Feb. 22, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2018012295..

[212] Ameren Missouri's Statement of Position, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 2 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007500.

[213] For a discussion of the various tests used for determining cost effectiveness of energy efficiency programs, including the Ratepayer Impact Measure ("RIM"), see *supra* note __, and accompanying text.

[214] Staff Position Statements, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018),

would in fact pay lower rates if Ameren could incentivize sufficient EV adoption such that additional revenues would exceed the costs of grid expansion, subsidies, and program costs, it found that Ameren had not provided sufficient evidence that such adoption would occur.[215]

Staff claimed it was unable to analyze free riding directly because Ameren failed to adequately connect the tariffed program to the proposed budget.[216] Indeed, Staff warned that, "as designed, these programs are rife with opportunities for free ridership and fail to include provisions to maximize public policy related benefits."[217] As an alternative approach, Staff recommended that the Commission order Ameren to "enter into a stakeholder process to develop and file a 'Make Ready' tariff to facilitate installation of customer-owned electric vehicle charging stations."[218] Then, any subsidies "would be limited to the line extension costs [associated with EV charging] otherwise payable by the entity seeking to install the charger."[219] Based on the current proposal, however, Staff found "Ameren Missouri has made no clear connection between this program and its estimate of an additional 7,500 electric vehicles in the Ameren Missouri service territory for parties to begin to determine what level of adoption is naturally occurring and what would be attributable to the $11 million ratepayer subsidy."[220]

The Office of the Public Counsel ("OPC")[221] was also critical of Ameren's proposal, but ultimately recommended approval of the program while imposing a performance-based recovery mechanism linking Ameren's recovery to EV adoption rates in its service territory.[222] It argued that Ameren had failed to show a need for its

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https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007510.

[215] *Id.* at 3.

[216] *Id.* at 5.

[217] *Id.* at 6.

[218] *Id.* at 9–10. For a discussion of the "make-ready" model of utility investment in EV charging, see *supra* note __, and accompanying text.

[219] *Id.* at 10.

[220] *Id.* at 1-2.

[221] The Missouri legislature created the Office of Public Counsel in 1975 to represent the interests of utility customers in proceedings before the Missouri Public Service Commission. The Office of Public Counsel has its own staff and budget and is independent from the Commission. *See* Missouri Office of Public Counsel, Who We Are, https://opc.mo.gov/who-we-are.html.

[222] Position Statement of the Office of the Public Counsel, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007507.

program, and that private companies could resolve EV demand without utility action.[223] Notably, OPC claimed there was no evidence that further EV infrastructure investment was required to spur EV adoption.[224] It agreed with Staff that Ameren had not shown its program to be cost effective, and essentially offered the performance-based mechanism as a concession to tie the fate of Ameren to the actual efficacy of its program without fully recommending outright rejection.[225]

On the other hand, the Sierra Club and Natural Resources Defense Council recommended approval of the program with only minor modifications.[226] They claimed that Ameren had actually been conservative in its estimate of public benefits of EV adoption, and that it should be allowed full recovery of prudently incurred costs.[227] The environmental groups' position focused on the claim that the public benefits of EVs actually are quite large, and are sufficient to mitigate any cost shift. The Missouri Division of Energy also supported the proposal, but recommended that 10% of the budget be allocated to support EV charging station development in "underserved and low-income communities" as a way to combat cost shifting.[228] The Division claimed that this would "promote more equitable access to electric vehicle charging and the associated benefits of cost savings resulting from electric vehicle use . . . ."[229] ChargePoint echoed these calls for approval, claiming that Ameren's "program design reduces risks to ratepayers, lowers the cost barrier to [EV charging infrastructure] deployment, allows the charging station site host to determine which equipment and services best meet their needs, and builds a sustainable EV charging marketplace to help accelerate EV adoption."[230]

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[223] *Id.* at 1–2.

[224] *Id.* at 2.

[225] *Id.* at 3–7.

[226] Position Statement of Sierra Club and Natural Resources Defense Council, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007488.

[227] *Id.* at 2.

[228] Missouri Division of Energy Statement of Positions, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 1 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007494.

[229] *Id.*

[230] Chargepoint, Inc.'s Statement of Position on the Issues, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n. at 2 (Nov. 27, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007499.

Notably, after all interested parties had filed their opening testimony, response testimony, and position statements, the Missouri Petroleum Marketers and Convenience Store Association ("MPCA") sought leave to file an Amicus Curiae Brief in the proceeding.[231] It argued that "Because Ameren Missouri seeks to compete with MPCA's members in the motor fuel market, MPCA is in a unique position to provide a legal perspective and background information to the Commission for its consideration of whether Ameren Missouri has provided sufficient evidence to show the Charge Ahead – [Electric Vehicle and Business Solutions] Programs are needed and cost effective; what, if any, cost recovery mechanisms may be appropriate for these Programs; and whether the Commission should impose any conditions on these Programs."[232] The Commission granted the request in December 2018.[233]

The Missouri proceeding, which is still pending before the Commission, showcases many of the same arguments made in the Illinois proceeding, but in the context of a concrete utility proposal for EV charging investment. Although the $11 million requested for the program is significantly more modest than other programs approved in California, Massachusetts, and other states in 2018, the Missouri Commission will need to act without the benefit of legislative or executive branch direction declaring the public benefits of transportation electrification or utility investment in EV charging. Instead, the parties supporting the program must rely on general statutory language regarding just and reasonable rates as well as fit the program within the cost-effectiveness regime that exists for utility-funded energy efficiency programs, which is a potentially a helpful model for other similarly situated states.

3. Maryland

In Maryland, in 2018, a coalition of charging companies, environmental groups, four Maryland investor-owned utilities, and other interested parties (referred to as the "Signatory Parties" filed a joint "Proposal to Implement a Statewide Electric Vehicle Portfolio" that included utility investments in EV charging totaling over

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[231] Petition of Missouri Petroleum Marketers & Convenience Store Association for Leave to File Amicus Curiae Brief and Request for Expedited Ruling, Docket No. ET-2018-0132, Mo. Pub. Serv. Comm'n (Nov. 30, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019007741.

[232] *Id.* at 2.

[233] Order Granting Leave to File Amicus Curiae Brief, Docket No. ET-2018-0132 (Mo. Pub. Serv. Comm'n, Dec. 11, 2018), https://www.efis.psc.mo.gov/mpsc/commoncomponents/view_itemno_details.asp?caseno=ET-2018-0132&attach_id=2019008382.

$100 million.[234] Program components included rebates for residential and commercial EV chargers, utility-owned public charging networks, as well as funding for customer outreach, innovation, and technological development, and implementation of time of use rates to support "smart charging."[235] Most of the rebates for private charging included dollar caps or percentage caps on the cost of the charger. In support of the program, the Signatory Parties cited to state policies supporting EVs and EV charging infrastructure, including "the State's Greenhouse Gas Reduction Act, the eight-state Zero-Emission Vehicle Memorandum of Understanding, Maryland's role in the Transportation Climate Initiative, the legislatively-created Electric Vehicle Infrastructure Council, and the Maryland EV Recharging Equipment Rebate Program.[236]

Early in the Proposal, the Signatory Parties state "it is not the responsibility of ratepayers to foot the bill for the entirety of the remaining charging infrastructure needed to fill the gap between what exists today and the projected infrastructure build-out necessary to support the State's ZEV MOU goal of 300,000 electric vehicles on the road by 2025."[237] Instead, they wish to make the case through the Proposal that "that a targeted ratepayer investment facilitated by the Utilities and made in conjunction with private market participants will seed the burgeoning Maryland EV landscape in a manner that will promote a healthy, competitive, and lasting private market moving forward."[238] In support of the Proposal, the Signatory Parties discuss a range of Maryland-specific expert cost-benefit studies to establish the cost-effectiveness of the Proposal and make the case why all utility customers will benefit from the investment. They also propose an "evaluation, measurement, and verification" strategy similar to the approaches used in the energy efficiency context.[239]

Numerous participants in the regulatory proceeding raised free riding and cost shift arguments targeted primarily at the rebates for residential and commercial EV chargers. It is this part of the program that most closely resembles energy efficiency programs, in that is it important to determine the extent to which utility customers would have purchased the EV chargers even in the absence of the subsidy. In energy

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[234] Signatory Parties Proposal to Implement a Statewide Electric Vehicle Portfolio, Case No. 9478 pp. 27-31, 56-60 (Jan. 19, 2018). The docket with links to all filings in the proceeding is at https://www.psc.state.md.us/search-results/?keyword=9478&x.x=16&x.y=13&search=all&search=case.

[235] *Id.*

[236] Proposal to Implement a Statewide Electric Vehicle Portfolio, *supra* note __, at 3-9.

[237] *Id.* at 9.

[238] *Id.* at 9.

[239] *Id.* at 36-39.

efficiency parlance, those customers are free riders and their actions should not be included as program benefits.

For instance, the Maryland Office of People's Counsel expressed concern that the utility programs would replace or subsidize private investment in EV charging, resulting in excessive costs for ratepayers and stifling the private market. It found deficiencies in the proposed cost-benefit analyses and suggested that "similar to the evaluation of energy-efficiency programs, an evaluation of the EV Proposal could also include deriving metrics like freeridership and net-to-gross."[240] In later comments, the Office of People's Counsel again stressed free riding concerns, stating that the utilities should use the metrics and data on free riding from their own energy efficiency programs, and finding that the rebates proposed for EV charger were at a much higher percentage than those used in the past for water heaters and other appliances. It warned that "[i]f rebates are set at a level that is higher than what is optimal, then less customers will be able to participate in the program and free ridership will increase."[241] Despite these criticisms, it expressed support that program modifications, along with a full evidentiary hearing, could "bring significant benefits to Maryland's ratepayers."[242]

Likewise, the Maryland Energy Administration requested a full evidentiary hearing due to the size and scope of the proposal, and found the proposal did not sufficiently make the case why the investment would lead to the increase in EVs needed to meet program goals and achieve system-wide benefits.[243] While it supported the time of use rate programs and pilot programs to assess managed charging, it opposed any subsidies or other utility investments in EV charging in areas that were not publically accessible, which would mean eliminating most of the residential and commercial rebates for EV chargers.[244] It cited to regulatory decisions in California, Georgia, and Kentucky where utility investment in EV charging was limited to public locations, workplaces, and multifamily units.[245] In later comments, the Administration again warned against allowing subsidies for private EV charging: "Meaningful portions of total program costs . . . represent large transfers to individual households, . . . This, in effect, means that lower-income households

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[240] Comments of the Maryland Office of People's Counsel, Case No. 9478 (Md. Pub. Serv. Comm'n, Mar. 27, 2018).

[241] Comments of the Maryland Office of People's Counsel, Case No. 9478, p. 6-7 (Md. Pub. Serv. Comm'n, Aug. 30, 2018).

[242] *Id.* at 15.

[243] Md. Energy Admin. Comments, Case No. 9478, p. 2-4 (Md. Pub. Serv. Comm'n, Mar. 29, 2018).

[244] *Id.* at 5-11.

[245] *Id.*

could be subsidizing upper-income households without receiving direct benefits, which presents a serious issue of equity for Maryland ratepayers."[246]

Finally, the Commission Staff filed comments that included free rider concerns associating with EV charger rebates. It suggested limiting rebates to EV owners who purchased EVs after the start of the program, on the theory that utility customers with EVs before the start of the program would be more likely to purchase an EV charger even without the program subsidy.[247] It also urged that the Commission reduce the subsidy amount in order to limit cross subsidization and to forbid utilities from owning public chargers, on the grounds that the private charging market could serve that role and also because of rate design challenges.[248] Commission Staff also urged the Commission to require the utilities to file yearly reports of costs and charger usage so it could monitor progress.

Maryland, by contrast, provides an example of state commission proceeding regarding utility investment EV charging where cost-effectiveness tests are used to refine a utility EV charging program, rather than oppose it completely. This is in large part because Maryland is a ZEV state, and has explicit legislative policies supporting transportation electrification and EV charging. Thus, it is far less difficult for opponents to argue that free riding and cross subsidy concerns should result in rejecting a utility program outright. Instead, those arguments are used to refine the program, more similar to how they are used in the energy efficiency context.

IV. MOVING BEYOND FREE RIDING AND CROSS SUBSIDY ARGUMENTS IN ENERGY POLICY

This Part builds on the previous discussion and suggests approaches for regulators in evaluating free riding, cross subsidy, and fairness arguments in energy ratemaking proceedings addressing "energy transition" issues such as promoting distributed solar or transportation electrification. First, it explains why regulators should pay close attention to the nature of free riding arguments and the financial interests of the parties who argue free riding should result in rejection of a particular program. Second, it proposes a long-term view of both costs and benefits for new programs that builds on precautionary principles. More specifically, in the context of

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[246] Md. Energy Admin. Comments, Case No. 9478, p. 4-5 (Md. Pub. Serv. Comm'n, Aug. 31, 2018).

[247] Comments of the Staff of the Md. Pub. Serv. Comm'n, Case No. 9478 (Md. Pub. Serv. Comm'n, Mar. 27, 2018); Comments of the Staff of the Md. Pub. Serv. Comm'n, Case No. 9478 (Md. Pub. Serv. Comm'n, Aug. 31, 2018); Comments of the Staff of the Md. Pub. Serv. Comm'n, Case No. 9478 (Md. Pub. Serv. Comm'n, Sept. 28, 2018).

[248] *Id.*

distributed solar and EV charging policies, it suggests that regulators adopt principles developed in the energy efficiency context and modify them for current programs.

A. Exercising Caution with Free Riding, Fairness, and Cross Subsidy Arguments

First, regulators should be skeptical of free riding and cross subsidy arguments coming from parties that risk losing market share from the regulatory policy in question. This point may seem fairly obvious but is worth stating expressly because it can become lost in a large regulatory docket where free riding arguments are embedded in other arguments and data regarding current and future costs and benefits of regulatory programs. This is true when it comes to electric utility arguments in the rooftop solar context and oil company arguments in the EV charging context. In each case the party making the free riding or cross subsidy argument is not the party that will actually pay "more than their fair share" of costs, but instead is the party that wants to maintain or increase their market share of a product that will be paid for by all utility customers.[249] Thus, the party making the free riding argument is concerned more about their overall share of the market rather than the distributional effects of the policy.

In the rooftop solar context, utilities are concerned that increased distributed solar generation will reduce the need for utility-scale electricity generation and, in the long term, transmission investments, resulting in reduced utility profits. In the EV charging context, more EV charging will lead to more EV adoptions, causing consumer to purchase less gasoline. Both the electric utilities and the oil companies have fiduciary duties to their shareholders to increase profitability. They do not have the same obligation to one class of utility customer or other.

This is not to say that regulators should ignore what utilities have to say in rooftop solar proceedings or even what oil companies have to say in EV charging proceedings. In the rooftop solar context, the utility has superior information regarding overall costs, customer bills, and virtually every other aspect of the utility system as a result of its role in running the system. But regulators should evaluate that data keeping in mind the utility's fiduciary duty to shareholders, ask hard

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[249] While this is more obvious in the case of the oil companies, the same is true for investor-owned electric utilities, which is why state public utility commissions exist to heavily regulate them. *See, e.g.*, MINN. STAT. § 216B.01 ("It is hereby declared to be in the public interest that public utilities be regulated as hereinafter provided in order to provide the retail consumers of natural gas and electric service in this state with adequate and reliable services at reasonable rates, consistent with the financial and economic requirements of public utilities and their need to construct facilities to provide such services or to otherwise obtain energy supplies, . . ."); Peskoe, *supra* note __, at 118-29 (discussing state regulatory commission oversight of utilities and citing state statutes).

questions, and consider competing data on costs and benefits that is developing rapidly in multiple sectors due to the growth of rooftop solar as well as legislation like the Minnesota VOST, which requires the development of new metrics to determine the costs and benefits of distributed solar.

In the EV charging context, the oil companies possess far less helpful information regarding costs and benefits associated with EV charging policies than utilities do in the rooftop solar context. Nevertheless, it is a fair point that state public utility commissions with jurisdiction over the state's energy system as a whole should consider any impacts EV charging may have on the gasoline market and the impact of that market on the state's consumers. But regulators should certainly pause before giving credence to arguments by groups like Americans for Prosperity purporting to represent the interests of low-income electric utility customers in a particular state.[250]

Arguments by ratepayer advocacy groups like the Citizens Utility Board in Illinois or the Office of Public Counsel in Missouri and Maryland are a different matter. In some states they are created by statute while in others they are nonprofit organizations. In either case, their mission is to advocate on behalf of state utility customers, particularly residential, small business, or low-income customers, to ensure rates are not excessive and that particular classes of customers are not unduly burdened by rate increases. Thus, such groups have an obligation to make cross subsidy and free riding arguments on behalf of the interests they represent.[251] But such arguments necessarily focus fairly narrowly on current costs and current benefits of any new policies as the concern is primarily about the impacts of increased electricity costs at a time when the benefits of increased rooftop solar penetration or increased EV adoption is difficult to value. Thus, in evaluating free riding and cross subsidy arguments in this context, regulators should develop metrics to incorporate the longer-term benefits of these new policies before deciding that current costs, or the distribution of those current costs, do not justify the policy. How do to develop these metrics is explored in more detail below.

B. Recognizing Information Gaps and Developing Appropriate Cost-Effectiveness Measures: Applying Energy Efficiency Models to the Rooftop Solar and EV Charging Debates

As discussed in Part III, regulators have decades of experience evaluating utility-funded energy efficiency programs, as well as the system-wide benefits of those

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[250] *See supra* notes __ - __ and accompanying text.

[251] The same can be said for state Attorney General offices and, in many cases state public utility commission staff, which must consider the distributional impacts of electricity rate increases in their evaluation of net metering, EV charging, energy efficiency, or other state policy developments.

programs on a long-term basis. The metrics are far from perfect, as evidenced by continuing debates over the role of energy efficiency programs in reducing energy use,[252] but there is at least a general consensus that energy efficiency can have significant present and future benefits to all utility customers, even if the full extend of free riders, spillovers, and other factors remains in dispute. The same cannot be said for the long-term benefits of distributed solar and EV charging. From a regulatory perspective, these programs are in their infancy. As a result, state public utility commissions are reviewing dockets, sometimes with and sometimes without the benefit of specific legislative direction, and making decisions that will impact technological developments, utility experience, and utility customer choices.

In many ways, there are important parallels between these current regulatory challenges and the longstanding debates pitting cost-benefit analysis against the precautionary principle in developing environmental, health, and safety regulations. Cost-benefit analysis "is a well-established, if fallible, methodology for ensuring that regulations enhance, rather than detract from, overall social welfare."[253] It does so by attempting to prevent inefficient regulations by comparing the costs and benefits of a particular regulatory action.[254] Many scholars criticize cost benefit analysis because its evaluation of costs and benefits are inherently imprecise and subjective.[255] This is particularly true because it is very difficult to place a monetary value on many of the benefits of environmental, health, sand safety regulations, such as clean air, clean water, human life and health, scenic and aesthetic values, and plant and animal health.[256]

Environmental law scholars have long pointed to the "precautionary principle" as a potential alternative approach. The precautionary principle calls for a higher level of regulation—or precaution—when significant but uncertain risks, such as climate change or harm from toxic chemicals, exist. One articulation of the precautionary principle from the 1992 Rio Declaration on Environment and Development states that "[w]hen there are threats of serious or irreversible damage,

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[252] *See supra* notes __ - __ and accompanying text.

[253] *See* Daniel H. Cole, *Reconciling Cost-Benefit Analysis with the Precautionary Principle*, The REGULATORY REVIEW (Mar. 5, 2012).

[254] *Id. See also* David M. Driesen, *Cost-Benefit Analysis and the Precautionary Principle: Can They Be Reconciled?*, 2013 MICH. ST. L. REV. 771, 776-77 (2013); Daniel A. Farber, *Coping with Uncertainty: Cost-Benefit Analysis, the Precautionary Principle, and Climate Change*, 90 WASH. L. REV. 1659,

[255] Cole, *supra* note __.

[256] *See, e.g.*, Center for Progressive Reform, *Cost-Benefit Analysis: Bad Numbers, Bad Decisions,* www.progressivereform.org/costBenefit.cfm (collecting scholarship critical of cost-benefit analysis); Daniel A. Farber, *Rethinking the Role of Cost-Benefit Analysis*, 76 U. CHI. L. REV. 1355 (2009) (discussing extensive literature on cost benefit analysis and precautionary principle).

lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[257] Thus, the precautionary principle generally places the burden of proof on those who would limit regulation with the potential to enhance public welfare, particularly environmental health and safety benefits, in the face of uncertainty. By contrast, cost-benefit analysis places the burden of proof on proponents of regulation; if benefits of regulation or risks of harm in the absence of regulation are uncertain or difficult to value, regulation is likely to be deemed inefficient under a cost-benefit test.

The literature supporting and criticizing cost-benefit analysis and the ability to manipulate its inputs is extensive and beyond the scope of this Article. The same is true for scholarly and regulatory debate on the role of the precautionary principle, both as an alternative to cost-benefit analysis or as a principle to integrate into cost-benefit analysis.[258] These debates, however, are similar to the concerns raised repeatedly in the regulatory proceedings over how to value the costs and benefits of distributed solar compensation and EV charging investments. In both instances, questions arise over how to weigh current and future costs to non-solar customers and non-EV drivers against system-wide benefits that may not accrue to all utility customers until far into the future, if at all. Should the precautionary principle be applied to these regulatory analyses to support higher compensation for distributed solar and rapid EV charging investment? Or should a narrower form of cost-benefit analysis be applied? Does the precautionary principle justify borrowing one of the broader cost-effectiveness tests from the energy efficiency context like the Societal Impact Test in evaluating these programs or should regulators use a more conservative test like the Ratepayer Impact Test?[259] The remainder of this Part provides an evaluation of these issues.

1. Distributed Solar

The regulatory proceedings in Arizona and Nevada illustrate state regulatory commissions struggling to deal with uncertainties over how to monetize, calculate, and weigh future costs and benefits associated with creating incentives for rooftop solar through net metering policies. Both commissions were faced with a similar problem, namely, the absence of reliable data regarding the costs and benefits of a utility subsidy program—net metering—that may provide more obvious benefits for

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[257] Cole, *supra* note __ (citing and quoting 1992 Rio Declaration on Environment and Development). *See also* Farber, *supra* note __, at 1671-78 (discussing precautionary principle and scholarly criticisms of same).

[258] *See supra* notes __ - __.

[259] *See supra* notes __ - __ and accompanying test (explaining different cost-effectiveness tests).

one group of customers now, but may provide overall benefits to all customers both now and in the future, including reduced electricity bills and improved public welfare through reduced GHG emissions and other air pollutants. In both cases, the utility raised free riding, fairness, and cross subsidy arguments and, because of its role in managing the grid and customers, was at an information advantage as compared to solar proponents. One commission, Arizona, was receptive to the utility's arguments regarding fairness while the other commission, Nevada, looked beyond those arguments to the bigger picture of the overall benefits that rooftop solar could provide to the entire utility system and the state.

In the Arizona proceeding, the Commission found a lack of measurable "objective" and "subjective" values distributed solar provided to the utility system.[260] In the absence of hard data showing those values were equitably distributed across all customers, the Commission felt compelled to place at least some additional charges on solar customers.[261] Even thought the fixed charges the Commission imposed were far less than those requested by the utility, the order assumes there is at least some cross subsidy that must be addressed to ensure just and reasonable rates.

By contrast, in Nevada, the Commission focused on whether there was an "unreasonable" cost shift between customer classes rather than any cost shift at all, based on the applicable statute.[262] In finding no unreasonable cost shift, the Commission recognized that the evidence was in conflict, that present and future costs and benefits could not be measured accurately, and stated its intent to "avoid jumping to a premature conclusion for the mere sake of having a resolution while the conversation and technology is evolving . . ."[263] The Commission was concerned that a "wrong answer" was worse than an "uncertain" answer, particularly when the benefits associated with distributed solar were real but "hard to quantify."[264] This analysis has many hallmarks of the application of the precautionary principle, even if the Commission did not use that term. In the face of uncertainty, it chose a policy that would potentially provide environmental and system-wide economic benefits to all utility customers in the future as well as public benefits to the entire state, even if there may be some shifting of costs to certain utility customers in the short term.

Moreover, although neither commission expressly referred to the cost-effectiveness tests from the energy efficiency realm, the debate over whether to use a narrow test looking at current, distributional fairness or a broader test that considers future, societal impacts, could be seen just barely below the surface of the

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[260] *See* APS Order, *supra* note __, at ¶¶ 25-26.

[261] *See supra* note __, and accompanying text.

[262] Sierra Pacific Power Co., *supra* note __, at 36.

[263] *Id.* at 33.

[264] *Id.* at 34.

proceedings. Both commissions recognized they were working with incomplete information on costs, benefits, and distributional implications of the policies under consideration. The Arizona Commission appeared to apply a more traditional cost-benefit analysis that heavily weighed the inputs the utility provided while the Nevada Commission took a different approach that more resembled application of the precautionary principle. Both commissions recognized that their results were crude at best and would need to be modified in the future.[265]

Most experts in the field recognize that solar net metering is a fairly crude approach to compensating a growing energy resource across the country, particularly when the costs of net metering on a kWh basis far exceed those of utility-scale solar and other utility-scale renewable energy resources in wholesale markets.[266] By the same token, paying distributed solar customers a rate that is based on wholesale prices for utility-scale wind and solar energy is also not appropriate, as such pricing fails to compensate distributed solar customers for the value of distributed energy, which, if widely adopted, may lead to new markets, technology and investment in micro-grids, battery storage, and the like.

In considering new approaches, however, public utility commissions should be cautious of free riding arguments articulated by utilities in a regulatory forum that cannot fully value the present and future costs and benefits of distributed solar energy on the electric grid.[267] More states are beginning to enact legislation and regulations to replace net metering, similar to Minnesota, to avoid the net metering disputes on display in the Arizona and Nevada proceedings.[268] Scholars have also suggested an "avoided cost plus social benefit" approach that resembles some of the

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[265] *See* APS Order, *supra* note __, at ¶¶ 30-32 (stating the need to quantify both the costs and benefits of distributed solar and then "allocate[] these costs and benefits equitably among customers [as] a matter of rate design."

[266] *See supra* note __ and accompanying text (discussing markets for wholesale electricity sales that value energy based on demand and resource).

[267] *See, e.g.*, Welton, *supra* note __, at 595 ("Frustratingly for regulators, empirical evidence does not provide conclusive answers to this debate. Most studies show that average retail rates—at which net-metered customers are credited—approximate the value of solar to the grid, with about half of the studies finding that solar is underpaid and the other half finding that solar is overpaid. These divergent results point to a deeper challenge in framing this equity debate as an empirical question.").

[268] *See, e.g.*, Julia Pyper, *Maine Proposes to Replace Net Metering with a Market Alternative*, GTM, Feb. 26, 2016; New York State, *Value of Distributed Energy Resources*, https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources (discussing new regulations for valuing solar in New York State as a replacement to net metering); NYSDERA, *Summary of Value of Distributed Energy Resources,* Oct. 13, 2017 (explaining same).

broader energy efficiency tests discussed in Part III.A in that it expressly values social benefits of distributed solar.[269]

In the interim, there is value in recognizing that in most areas of the country, penetration levels of distributed solar energy are still extremely small. Regulators have time to develop metrics to evaluate the costs and benefits of distributed solar now and worry about the effects of larger penetration and ultimate rate design later, when more is known about the scale at which solar penetration will have a measurable positive or negative impact on rates, utility costs, and other factors. Using a precautionary approach will allows regulators to put the burden on utilities and others to show that rooftop solar is a problem for system maintenance or that cross subsidies are significant. To assume that is the case now in addressing concerns over net metering risks stifling expansion of an important energy resource with the potential for significant public benefits. This is particularly true because improved metrics will be developed within a regulatory system where cross subsidies have always existed and will continue to exist, often without objection by participants and regulators. To single out one type of cross subsidy without recognizing the context in which it exists is short sighted.[270]

2. Utility Investment in EV Charging

In the EV charging context, proponents are approaching state regulatory commissions with increasingly sophisticated analyses of future program benefits, and this time it is the opponents of such programs who are at a relative information disadvantage. This is because in the EV charging context, utilities are aligned, for the most part, with private charging companies and environmental nonprofit groups, reducing some of the information asymmetries on display in the rooftop solar context. Nevertheless, there is still an information deficit because there are many unknowns regarding the extent of climate change damage associated with continuing to drive conventional vehicles, the pace of EV adoption, and the impact of EVs, both positive and negative, on the electric grid. This information will not exist until electric utilities, drivers, car companies, and others can evaluate the impacts of broad-based transportation electrification.

Nevertheless, state regulatory commissions are responding to utility proposals for EV charging investments and participants in these proceedings are making much more explicit use of energy efficiency cost-effectiveness tests than they are in the

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[269] *See* Revesz & Unel, *supra* note __, at 84-95, 99-101.

[270] *See, e.g.*, Revesz & Unel, *supra* note __, at 102 ("Cost-recovery and cost-shifting problems are unintended consequences of the current, inefficient retail rate designs, and should not be blamed on net metering policies); Rule *supra* note __ (discussing cost shifts inherent in the utility ratemaking process).

distributed solar context. This is in part because the parallels between utility investment in energy efficiency programs and utility investment in EV charging are much more obvious, at least in the context of utility rebates for EV chargers, which are a component of many utility proposals. In the energy efficiency context, a major goal of regulatory design is to identify free riders—utility customers who would have purchased a new furnace, energy efficient lighting, new insulation, or the like even in the absence of the utility subsidy. The same should be true for EV chargers in that a utility program to incentivize the purchase of EV chargers is not cost-effective if significant ratepayer funds are being used to subsidize customer purchases of EV chargers that would have occurred even absent the subsidy program.[271]

For instance in the Illinois Notice of Inquiry proceeding described above, the Commission specifically asked participants to discuss how EVs would contribute to energy efficiency in Illinois through fuel switching and how EV charging stations would affect utility energy efficiency programs.[272] Because the Illinois Commission was not considering a specific utility proposal, the participants did not evaluate any cost-effectiveness tests but instead provided general information on how EVs and EV charging would impact utility energy efficiency programs in the state.

In Missouri, by contrast, there was significant testimony regarding whether Ameren's EV charging proposal would meet the RIM Test, with Ameren contending that it would meet the test as well as "provide significant environmental benefits."[273] In response, Commission Staff recommended rejection of the EV program because there was insufficient evidence that the program would spur sufficient EV adoption to result in utility revenues at a level that would exceed the costs of the grid expansion, subsidies, and program costs.[274] Moreover, Commission Staff found Ameren did not provide sufficient evidence that the subsidy proposed for EV chargers would avoid significant free riding.[275] Comments from the Office of Public Counsel were similar, arguing that Ameren had failed to show a need for the

---

[271] Indeed, the National Efficiency Screening Project, a stakeholder organization with a mission to improve cost-effectiveness evaluation of energy efficiency resources, has stated that its metrics designed for energy efficiency programs "can be used to assess the cost-effectiveness of supply-side resources or distributed energy resources (DERs)—including EE, demand response, distributed generation, distributed storage, electric vehicles, and strategic electrification technologies. National Efficiency Screening Project, https://nationalefficiencyscreening.org/.

[272] *See supra* note __ and accompanying text.

[273] *See supra* note __ and accompanying text.

[274] *See supra* note __ and accompanying text.

[275] *See supra* note __ and accompanying text.

program at all and that it had failed to meet its burden of showing was cost-effective.[276]

Notably, in their comments, opponents of Ameren's proposal use energy efficiency metrics to oppose the program in its entirety rather than to urge revisions to the program, as would be the case in the energy efficiency context. This is not surprising. Nothing in any of the Missouri filings cites to any legislation or regulation in the state that exists to promote EVs or EV charging, whereas utility-funded energy efficiency program are creatures of state statute. As a result, free riding arguments in non ZEV states can be used in a way that is similar how they have been used are used in the rooftop solar context, which is quite different from how they are used in the energy efficiency context, where they provide an evaluative purpose to refine and improve programs rather than eliminate them. This stands in contrast to Maryland, where free riding arguments were used to attempt to modify the program and to encourage the development of metrics to ensure cost-effectiveness.[277]

V. CONCLUSION

There is no doubt a role for free riding and cross subsidy concerns in both the distributed solar EV charging contexts. But it is also clear that opponents of regulatory programs to incentivize distributed solar and EV adoption have used and will continue to use free riding and cross subsidy arguments to block programs that may hurt them financially. Commissions should look beyond these arguments and consider free riding and cross subsidy concerns for purposes of requiring program advocates to develop appropriate metrics to optimize the programs at issue, rather than to impede them before they can provide system-wide benefits. In order to do so, state utility commissions can apply a precautionary approach with regard to evaluating present and future costs and benefits, and urge participants in regulatory proceedings to look to existing energy efficiency metrics as a starting point for analysis and modify these metrics to meet the needs of developing programs.

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[276] *See supra* note __ and accompanying text.

[277] *See supra* notes __ - __ and accompanying text.

Re: Article Draft -- Regulating the Energy "Free Riders"

From: Alexandra Klass <aklass@umn.edu>
To: Andrew Twite <twite@fresh-energy.org>
Sent: January 9, 2019 11:31:38 AM CST

Anytime the next couple of weeks would be great if you have time.

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Wed, Jan 9, 2019 at 11:30 AM Andrew Twite <twite@fresh-energy.org> wrote:

> Hi Alex,
>
> I'd be happy to give it a read. When were you hoping to get feedback by?
>
> Hope all's well,
>
> Andrew Twite
>
> Fresh Energy
>
> Phone 651 726 7576
>
> www.fresh-energy.org | twitter.com/AndrewTwiteMN
>
> *Practical policy. Brighter future.* ***Support our work today.***
>
> **From:** Alexandra Klass <aklass@umn.edu>
> **Sent:** Wednesday, January 9, 2019 11:28 AM
> **To:** Andrew Twite <twite@fresh-energy.org>
> **Subject:** Article Draft -- Regulating the Energy "Free Riders"
>
> Dear Andrew -- Happy new year! I hope all is well. I was hoping you might have time to read an early draft of a new article that discusses free riding arguments in state public utility commission proceedings involving energy efficiency, distributed solar, and EV charging. It is very rough, and I would love your comments/suggestions to make it better!

Best,

Alex

Alexandra B. Klass

Distinguished McKnight University Professor
University of Minnesota Law School

229-19th Avenue South

Minneapolis, MN 55455

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Bio: https://www.law.umn.edu/profiles/alexandra-klass

Re: Article Draft -- Regulating the Energy "Free Riders"

From: Alexandra Klass <aklass@umn.edu>
To: Allen Gleckner <gleckner@fresh-energy.org>
Sent: January 9, 2019 12:18:20 PM CST

Thank you!

Alex

Alexandra B. Klass
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aklass@umn.edu
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On Wed, Jan 9, 2019 at 12:17 PM Allen Gleckner <gleckner@fresh-energy.org> wrote:

> Hi Alex – I'd be glad to! Thanks for thinking of me.
>
> Allen Gleckner
>
> Director, Energy Markets
>
> Fresh Energy
>
> Phone 651 726 7570; 612 554 3291 (mobile)
>
> www.fresh-energy.org | twitter.com/freshenergy
>
> *Practical policy. Brighter future.* ***Support our work today****.*
>
> **From:** Alexandra Klass <aklass@umn.edu>
> **Sent:** Wednesday, January 9, 2019 11:27 AM
> **To:** Allen Gleckner <gleckner@fresh-energy.org>
> **Subject:** Article Draft -- Regulating the Energy "Free Riders"
>
> Dear Allen -- Happy new year! I hope all is well. I was hoping you might have time to read an early draft of a new article that discusses free riding arguments in state public utility commission proceedings involving energy efficiency, distributed solar, and EV charging. It is very rough, and I would love your comments/suggestions to make it better!
>
> Best,

Alex

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RE: $3K contract

From:	Ellen Palmer <palmer@fresh-energy.org>
To:	Alexandra Klass <aklass@umn.edu>
Cc:	Michael Noble <Noble@fresh-energy.org>
Sent:	January 10, 2019 1:59:13 PM CST
Received:	January 10, 2019 1:59:16 PM CST
Attachments:	FE Contract_RegentsUofMLawSchool.pdf

Alexandra,

I have the contract attached here. Will you be sending it along to Robin or do you want me to email to her directly?

Ellen Palmer
Chief Operations and Finance Officer
Fresh Energy
Phone 651 294 7142
www.fresh-energy.org | twitter.com/freshenergy

Practical policy. Brighter future. ***Support our work today****.*

From: Alexandra Klass <aklass@umn.edu>
Sent: Tuesday, January 8, 2019 12:05 PM
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Michael Noble <Noble@fresh-energy.org>
Subject: Re: $3K contract

Dear Ellen and Michael: Let's make it for 2 months as you suggest. Here are details from our finance department:

(1) The contract should be between Fresh Energy and the "Regents of the University of Minnesota through its Law School." The law school's finance director, Robin Dittmann, will sign the contract.
(2) The check should be made payable to The University of Minnesota Foundation. You can mail it to the Law School at:

University of Minnesota Law School
Attn Robin Dittmann
229 19th Avenue South
Minneapolis, MN 55455

Best,

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Tue, Jan 8, 2019 at 11:27 AM Ellen Palmer <palmer@fresh-energy.org> wrote:

Great, thanks. The contract should cover the period in which the work takes place, whether that be one or two months.

Ellen Palmer
Chief Operations and Finance Officer
Fresh Energy
Phone 651 294 7142
www.fresh-energy.org | twitter.com/freshenergy

Practical policy. Brighter future. ***Support our work today****.*

From: Michael Noble <Noble@fresh-energy.org>
Sent: Tuesday, January 8, 2019 11:21 AM
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Alexandra Klass <aklass@umn.edu>
Subject: $3K contract

Ellen,

Alex is verifying with the law school financial people to make sure this can all go to its intended purpose, but she also strongly agrees that there shouldn't be Fresh Energy funding law students direct.

This would be very likely be 100% expended all by 1/31/19 (but maybe you or Alex would rather write the contract for 2 months instead of one.

I'm indifferent.

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

1. FE Contract_RegentsUofMLawSchool.pdf

Type:	application/pdf
Size:	97 KB (99,926 bytes)

CONTRACT FOR SERVICES

This Agreement is entered into between Fresh Energy, 408 St Peter Street, Suite 220, St. Paul, MN 55102, and Regents of University of Minnesota through its Law School, 229 19th Avenue South Minneapolis, MN 55455 (hereinafter Contractor).

The terms of the Agreement are as follows:

1. SERVICES TO BE PROVIDED

   The Contractor will provide Climate change legal research.

2. TERMS OF CONTRACT

   Once signed by the Contractor and Fresh Energy, this Agreement will become effective January 1, 2019 and will remain in effect until March 1, 2019.

3. COMPENSATION AND TERMS OF PAYMENT

   A. Cost of Services: $3,000

   B. Terms of Payment: Payment will be made within 30 days of receiving signed contract and W9 from the Contractor, emailed to info@fresh-energy.org.

   C. Check Payable to: University of Minnesota Foundation

   D. Check Mailed to:
   University of Minnesota Law School
   Attn: Robin Dittmann
   229 19th Avenue South
   Minneapolis, MN 55455

4. TERMINATION OF CONTRACT

   A. Fresh Energy and the Contractor shall both have the right to terminate this Contract at any time for any reason by submitting written notice of the intention to do so to the other party at least thirty days prior to the specified effective date of such termination. If terminated upon action of the Contractor, funds shall be transferred back to Fresh Energy in a manner pro-rated to the expenditures to date. In addition, Fresh Energy shall have the right to terminate on thirty days written notice in the event that Contractor performance hereunder is substantially unsatisfactory or if the Contractor has violated any of the covenants, agreements, or stipulations contained herein.

B. In the event of the termination of this Agreement prior to normal completion, all finished or unfinished documents, data, studies, surveys, drawings, maps, photographs, and reports prepared by the Contractor in carrying out the work tasks hereunder shall be delivered to Fresh Energy subject to the terms and conditions of Section 7 of this Agreement.

C. Notwithstanding the above, the Contractor shall not be relieved of the liability for damages sustained by Fresh Energy by virtue of any breach of Contract.

5. LIABILITY AND INDEMNIFICATION

A. The Contractor represents that the services to be provided under this Agreement are reasonable in scope and that the Contractor has the experience and ability to provide the services.

B. The Contractor shall indemnify, defend, and hold harmless Fresh Energy and its officers, directors, employees and agents from and against any and all claims, damages, loss, injuries, and expenses (including attorney's fees and damages for death, personal injury, and property damage) which Fresh Energy may incur as a result of any act or omission by the Contractor in providing services under this Agreement.

6. RELATIONSHIP OF PARTIES

The Contractor will provide services as an independent contractor under this Agreement. Neither the Contractor nor any of its employees or agents shall be considered employees of Fresh Energy for any purpose, and neither shall the Contractor be eligible for any compensation or benefits which Fresh Energy may provide to its employees from time to time. The Contractor shall be solely responsible for all employment and other taxes applicable to providing service hereunder, and Fresh Energy will not withhold any taxes or contributions from the compensation payable to the Contractor under this Agreement. If any governmental authority (federal, state, or other) claims that Fresh Energy owes taxes or contributions which allegedly should have been withheld or made, then, to the extent permitted by law, the Contractor shall pay Fresh Energy the amounts claimed to be due, plus reasonable attorneys' fees and any other costs which Fresh Energy may incur in defending such claim, whether or not a lawsuit is commenced.

7. GOVERNING LAW

This Agreement shall be governed by and construed in accordance with the laws of the State of Minnesota.

In witness whereof, the Parties have set their hands and each warrants that he/she is empowered to execute this Agreement and accept the Terms and Conditions as attached.

_____	_____
Robin Dittmann	Ellen Palmer, Fresh Energy
_____	Chief Operations and Finance Officer___
Title	Title
_____	_____
Date	Date

Re: $3K contract

From: Alexandra Klass <aklass@umn.edu>
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Michael Noble <Noble@fresh-energy.org>
Sent: January 10, 2019 2:23:58 PM CST

I'll forward it. Thanks!

Alex

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Thu, Jan 10, 2019 at 1:59 PM Ellen Palmer <palmer@fresh-energy.org> wrote:

> Alexandra,
>
> I have the contract attached here. Will you be sending it along to Robin or do you want me to email to her directly?
>
> Ellen Palmer
>
> Chief Operations and Finance Officer
>
> Fresh Energy
>
> Phone 651 294 7142
>
> www.fresh-energy.org | twitter.com/freshenergy
>
> *Practical policy. Brighter future.* ***Support our work today****.*
>
> **From:** Alexandra Klass <aklass@umn.edu>
> **Sent:** Tuesday, January 8, 2019 12:05 PM
> **To:** Ellen Palmer <palmer@fresh-energy.org>
> **Cc:** Michael Noble <Noble@fresh-energy.org>
> **Subject:** Re: $3K contract

Dear Ellen and Michael: Let's make it for 2 months as you suggest. Here are details from our finance department:

(1) The contract should be between Fresh Energy and the "Regents of the University of Minnesota through its Law School." The law school's finance director, Robin Dittmann, will sign the contract.

(2) The check should be made payable to The University of Minnesota Foundation. You can mail it to the Law School at:

University of Minnesota Law School

Attn Robin Dittmann

229 19th Avenue South

Minneapolis, MN 55455

Best,

Alex

Alexandra B. Klass

Distinguished McKnight University Professor
University of Minnesota Law School

229-19th Avenue South

Minneapolis, MN 55455

aklass@umn.edu

Bio: https://www.law.umn.edu/profiles/alexandra-klass

On Tue, Jan 8, 2019 at 11:27 AM Ellen Palmer <palmer@fresh-energy.org> wrote:

> Great, thanks. The contract should cover the period in which the work takes place, whether that be one or two months.

Ellen Palmer

Chief Operations and Finance Officer

Fresh Energy

Phone 651 294 7142

www.fresh-energy.org | twitter.com/freshenergy

Practical policy. Brighter future. ***Support our work today****.*

From: Michael Noble <Noble@fresh-energy.org>
Sent: Tuesday, January 8, 2019 11:21 AM
To: Ellen Palmer <palmer@fresh-energy.org>
Cc: Alexandra Klass <aklass@umn.edu>
Subject: $3K contract

Ellen,

Alex is verifying with the law school financial people to make sure this can all go to its intended purpose, but she also strongly agrees that there shouldn't be Fresh Energy funding law students direct.

This would be very likely be 100% expended all by 1/31/19 (but maybe you or Alex would rather write the contract for 2 months instead of one.

I'm indifferent.

Michael Noble

Executive Director

Fresh Energy

Direct: 651 726-7563

Mobile: 612 963-1268

Web: Www.fresh-energy.org

Twitter: @NobleIdeas

Rhode Island Complaint and Colorado counties/cities Complaint

From:	Alexandra Klass <aklass@umn.edu>
To:	J. Drake Hamilton <Hamilton@fresh-energy.org>
Sent:	January 11, 2019 2:28:51 PM CST
Attachments:	Rhode Island Complaint.pdf

One is an attachment the other is a google link (too big to attach)

Colorado Counties and Cities Amended Complaint.pdf

Alexandra B. Klass
Distinguished McKnight University Professor
University of Minnesota Law School
229-19th Avenue South
Minneapolis, MN 55455
aklass@umn.edu
Bio: https://www.law.umn.edu/profiles/alexandra-klass

1. Rhode Island Complaint.pdf

Type:	application/pdf
Size:	16 MB (17,479,476 bytes)

Case Number: PC-2018-4716
Filed in Providence/Bristol County Superior Court
Submitted: 7/2/2018 9:57 AM
Envelope: 1610605
Reviewer: Alexa G.

STATE OF RHODE ISLAND
PROVIDENCE, SC.

SUPERIOR COURT

STATE OF RHODE ISLAND

Plaintiff,

vs.

Case Number:

CHEVRON CORP.;
CHEVRON U.S.A. INC.;
EXXONMOBIL CORP.;
BP P.L.C.;
BP AMERICA, INC.;
BP PRODUCTS NORTH AMERICA, INC.;
ROYAL DUTCH SHELL PLC;
MOTIVA ENTERPRISES, LLC;
SHELL OIL PRODUCTS COMPANY LLC;
CITGO PETROLEUM CORP.;
CONOCOPHILLIPS;
CONOCOPHILLIPS COMPANY;
PHILLIPS 66;
MARATHON OIL COMPANY;
MARATHON OIL CORPORATION;
MARATHON PETROLEUM CORP.;
MARATHON PETROLEUM COMPANY LP;
SPEEDWAY LLC;
HESS CORP.;
LUKOIL PAN AMERICAS, LLC;
GETTY PETROLEUM MARKETING, INC.; AND
DOES 1 through 100, inclusive,

JURY TRIAL DEMANDED

Defendants.

Case Number: PC-2018-4716
Filed in Providence/Bristol County Superior Court
Submitted: 7/2/2018 9:57 AM
Envelope: 1610605
Reviewer: Alexa G.

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PLAINTIFF'S COMPLAINT

I. INTRODUCTION

1. Defendants, major corporate members of the fossil fuel industry, have known for nearly a half century that unrestricted production and use of their fossil fuel products create greenhouse gas pollution that warms the planet and changes our climate. They have known for decades that those impacts could be catastrophic and that only a narrow window existed to take action before the consequences would be irreversible. They have nevertheless engaged in a coordinated, multi-front effort to conceal and deny their own knowledge of those threats, discredit the growing body of publicly available scientific evidence, and persistently create doubt in the minds of customers, consumers, regulators, the media, journalists, teachers, and the public about the reality and consequences of the impacts of their fossil fuel pollution. At the same time, Defendants have promoted and profited from a massive increase in the extraction and consumption of oil, coal, and natural gas, which has in turn caused an enormous, foreseeable, and avoidable increase in global greenhouse gas pollution and a concordant increase in the concentration of greenhouse gases,[1] particularly carbon dioxide ("CO_2") and methane, in the Earth's atmosphere. Those disruptions of the Earth's otherwise balanced carbon cycle have substantially contributed to a wide range of dire climate-related effects, including, but not limited to, global warming, rising atmospheric and ocean temperatures, ocean acidification, melting polar ice caps and glaciers, more extreme and volatile weather, drought, and sea level rise. Plaintiff, the State of Rhode Island,[2] along with the State's citizens, infrastructure, and natural resources, suffer the consequences.

---

[1] As used in this Complaint, "greenhouse gases" refers collectively to carbon dioxide, methane, and nitrous oxide. Where a source refers to a specific gas or gases, or when a process relates only to a specific gas or gases, this Complaint refers to them by name.

[2] As used in this Complaint when referring to geographic locations, "Rhode Island" and "State" refer to all non-federal lands within the geographic boundaries of the State of Rhode Island.

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Reviewer: Alexa G.

2. Defendants are vertically integrated extractors, producers, refiners, manufacturers, distributors, promoters, marketers, and sellers of fossil fuel products. Decades of scientific research show that pollution from the production and use of Defendants' fossil fuel products plays a direct and substantial role in the unprecedented rise in emissions of greenhouse gas pollution and increased atmospheric CO_2 concentrations since the mid-20th century. This dramatic increase in atmospheric CO_2 and other greenhouse gases is the main driver of the gravely dangerous changes occurring to the global climate.

3. Anthropogenic (human-caused) greenhouse gas pollution, primarily in the form of CO_2, is far and away the dominant cause of global warming, and results in severe impacts including, but not limited to, sea level rise, disruption to the hydrologic cycle, more frequent and more intense drought, more frequent and more extreme precipitation, more frequent and more intense heatwaves, and associated consequences of those physical and environmental changes.[3] The primary source of this pollution is the extraction, production, and consumption of coal, oil, and natural gas, referred to collectively in this Complaint as "fossil fuel products."[4]

4. The rate at which Defendants have extracted and sold fossil fuel products has exploded since the Second World War, as have emissions from those products. The substantial majority of all greenhouse gas emissions in history has occurred since the 1950s, a period known

---

[3] *See* IPCC, *Climate Change 2014: Synthesis Report*, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland (2014), 6, Figure SMP.3, https://www.ipcc.ch/report/ar5/syr.

[4] *See* C. Le Quéré et al., *Global Carbon Budget 2016*, EARTH SYST. SCI. DATA 8, 632 (2016), http://www.earth-syst-sci-data.net/8/605/2016. Cumulative emissions since the beginning of the industrial revolution to 2015 were 413 gigatons of carbon ("GtC") attributable to fossil fuels, and 190 GtC attributable to land use change. *Id.* Global CO_2 emissions from fossil fuels and industry remained nearly constant at 9.9 GtC in 2015, distributed among coal (41 %), oil (34 %), gas (19 %), cement (5.6 %), and gas flaring (0.7 %). *Id.* at 629.

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as the "Great Acceleration."[5] About three quarters of all industrial CO_2 emissions in history have occurred since the 1960s,[6] and more than half have occurred since the late 1980s.[7] The annual rate of CO_2 emissions from extraction, production, and consumption of fossil fuels has increased by more than 60% since 1990.[8]

5. Defendants have known for nearly 50 years that greenhouse gas pollution from their fossil fuel products has a significant impact on the Earth's climate and sea levels. Defendants' awareness of the negative implications of their own behavior corresponds almost exactly with the Great Acceleration, and with skyrocketing greenhouse gas emissions. With that knowledge, Defendants took steps to protect their own assets from these threats through immense internal investment in research, infrastructure improvements, and plans to exploit new opportunities in a warming world.

6. Instead of working to reduce the use and combustion of fossil fuel products, lower the rate of greenhouse gas emissions, minimize the damage associated with continued high use and combustion of such products, and ease the transition to a lower carbon economy, Defendants concealed the dangers, sought to undermine public support for greenhouse gas regulation, and engaged in massive campaigns to promote the ever-increasing use of their products at ever greater volumes. Thus, each Defendant's conduct has contributed substantially to the buildup of CO_2 in the environment that drives global warming and its physical, environmental, and socioeconomic consequences.

---

[5] Will Steffen et al., *The Trajectory of the Anthropocene: The Great Acceleration*, 2 THE ANTHROPOCENE REVIEW 81, 81 (Jan. 2015), http://journals.sagepub.com/doi/abs/10.1177/2053019614564785.

[6] R. J. Andres et al., *A Synthesis of Carbon Dioxide Emissions from Fossil-Fuel Combustion*, 9 BIOGEOSCIENCES 1845, 1851 (May 2012), http://www.biogeosciences.net/9/1845/2012.

[7] *Id.* at 1848.

[8] C. Le Quéré et al., *supra* note 4, at 630.

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7. Defendants are directly responsible for 182.9 gigatons of CO_2 emissions between 1965 and 2015, representing 14.81% of total emissions of that potent greenhouse gas during that period. Accordingly, Defendants are directly responsible for a substantial portion of past and committed sea level rise (sea level rise that will occur even in the absence of any future emissions), as well as for a substantial portion of changes to the hydrologic cycle, because of the consumption of their fossil fuel products.

8. As a direct and proximate consequence of Defendants' wrongful conduct described in this Complaint, average sea level will rise substantially along Rhode Island's coast; average temperatures and extreme heat days will increase; flooding, extreme precipitation events such as tropical storms and hurricanes, and drought will become more frequent and more severe; and the ocean will warm and become more acidic. The State, situated on the coast of Southern New England boasting over 400 miles of coastline is particularly vulnerable to sea level rise, cyclones, and flooding, and already has spent significant funds to study, mitigate, and adapt to the effects of global warming. Climate change impacts already adversely affect Rhode Island and jeopardize State-owned or operated facilities critical for operations, utility services, and risk management, as well as real property and other assets that are essential to community health, safety, and well-being.

9. The State of Rhode Island has engaged in several planning processes to prepare for the multitude of impacts from climatic shifts and has recognized increasingly severe consequences.

10. Defendants' production, promotion, and marketing of fossil fuel products, simultaneous concealment of the known hazards of those products, and their championing of anti-science campaigns, actually and proximately caused Rhode Island's injuries.

11. Accordingly, the State brings claims against Defendants for Public Nuisance, and Strict Liability for Failure to Warn, Strict Liability for Design Defect, Negligent Design Defect,

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Negligent Failure to Warn, Trespass, Impairment of Public Trust Resources, and violations of the State Environmental Rights Act.

12. By this action, Rhode Island seeks to ensure that the parties who have profited from externalizing the responsibility for sea level rise, drought, extreme precipitation events, heatwaves, other results of the changing hydrologic and meteorological regime caused by global warming, and associated consequences of those physical and environmental changes, bear the costs of those impacts on Rhode Island, rather than the State, local taxpayers, residents, or broader segments of the public. Rhode Island does not seek to impose liability on Defendants for harms other than those to the State, including in its parens patriae capacity, nor for their direct emissions of greenhouse gases, and does not seek to restrain Defendants from engaging in their business operations.

II. PARTIES

A. Plaintiff

13. Plaintiff, the State of Rhode Island, by and through the Attorney General of the State of Rhode Island ("Rhode Island" or the "State"), brings this action as an exercise of its authority to protect public trust resources and its police power, which includes, but is not limited to, its power to prevent pollution of the State's property and waters, to prevent and abate nuisances, and to prevent and abate hazards to public health, safety, welfare, and the environment.

14. The State also brings this action in its *parens patriae* capacity for the benefit of the citizens of the State.

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15. Rhode Island is already experiencing sea level rise and associated impacts. The State will experience significant additional sea level rise over the coming decades through at least the end of the century.[9]

16. The sea level rise impacts to the State associated with an increase in average mean sea level height include, but are not limited to, permanent increased inundation and temporary flooding in natural and built environments because of higher tides and intensified wave and storm surge events; aggravated wave impacts, including erosion, damage, and destruction of built structures and infrastructure, as well as natural features such as cliffs, beaches, and dunes, with consequent landslides; changes in sediment supply that could alter or destroy natural coastal habitats such as beaches and wetlands, which otherwise would have naturally mitigated sea level rise impacts; and saltwater intrusion on groundwater and built infrastructure.

17. In addition, Rhode Island is and will continue to be impacted by increased temperatures and disruptions to the hydrologic cycle. The State is already experiencing a climatic and meteorological shift toward winters and springs with more extreme precipitation events contrasted by hotter, drier, and longer summers. These changes have led to increased property damage, economic injuries, and impacts to public health. The State must spend substantial funds to plan for and respond to these phenomena, and to mitigate their secondary and tertiary impacts.

18. Compounding these environmental impacts are cascading social and economic impacts that cause injuries to the State and that arise out of localized climate change-related conditions.

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[9] Erika Spanger-Siegfried et al., *When Rising Seas Hit Home: Hard Choices Ahead for Hundreds of US Coastal Communities*, Union of Concerned Scientists, 10–11 (Apr. 2017), https://www.ucsusa.org/sites/default/files/attach/2017/07/when-rising-seas-hit-home-full-report.pdf.

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B. Defendants

19. Defendants are responsible for a substantial portion of the total greenhouse gases emitted since 1965. Defendants, individually and collectively, are responsible for extracting, refining, processing, producing, promoting, and marketing fossil fuel products, the normal and intended use of which has led to the emission of a substantial percentage of the total volume of greenhouse gases released into the atmosphere since 1965. Indeed, between 1965 and 2015, the named Defendants extracted from the earth enough fossil fuel materials (i.e. crude oil, coal, and natural gas) to account for more than one in every seven tons of CO_2 and methane emitted worldwide. Accounting for their wrongful promotion and marketing activities, Defendants bear a dominant responsibility for global warming generally, and for Plaintiff's injuries in particular.

20. When this Complaint references an act or omission of the Defendants, unless specifically attributed or otherwise stated, such references should be interpreted to mean that the officers, directors, agents, employees, or representatives of the Defendants committed or authorized such an act or omission, or failed to adequately supervise or properly control or direct their employees while engaged in the management, direction, operation or control of the affairs of Defendants, and did so while acting within the scope of their employment or agency.

21. **Chevron Entities**

a. Chevron Corporation is a multinational, vertically integrated energy and chemicals company incorporated in the State of Delaware, with its global headquarters and principal place of business in San Ramon, California.

b. Chevron Corporation operates through a web of United States and international subsidiaries at all levels of the fossil fuel supply chain. Chevron Corporation's and its subsidiaries' operations consist of exploring for, developing, and producing crude oil and natural gas; processing, liquefaction, transportation, and regasification associated with liquefied

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natural gas; transporting crude oil by major international oil export pipelines; transporting, storage, and marketing of natural gas; refining crude oil into petroleum products; marketing of crude oil and refined products; transporting crude and refined oil products by pipeline, marine vessel, motor equipment, and rail car; basic and applied research in multiple scientific fields including of chemistry, geology, and engineering; and manufacturing and marketing of commodity petrochemicals, plastics for industrial uses, and fuel and lubricant additives.

c. Chevron Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

d. Chevron Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

e. Chevron U.S.A. Inc. is a Pennsylvania corporation with its principal place of business located in San Ramon, California. Chevron U.S.A. Inc. is qualified to do business in Rhode Island. Chevron U.S.A. Inc. is a wholly owned subsidiary of Chevron Corporation that acts on Chevron Corporation's behalf and subject to Chevron Corporation's control. Chevron U.S.A. Inc. was formerly known as, and did or does business as, and/or is the successor in liability to Gulf Oil Corporation, Gulf Oil Corporation of Pennsylvania, Chevron Products Company, Chevron Chemical Company, Chevron Energy Solutions Company, ChevronTexaco Products Company, Chevron U.S.A. Production Company, and Chevron U.S.A. Products Company.

f. "Chevron" as used hereafter, means collectively, Defendants Chevron Corporation and Chevron U.S.A. Inc., and their predecessors, successors, parents, subsidiaries, affiliates, and divisions.

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g. Chevron directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Chevron's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which Chevron derives and has derived substantial revenue. For instance, Chevron formerly owned and operated a petroleum products terminal on Veteran's Memorial Parkway in East Providence that was used for oil storage and fossil fuel product distribution, marketing, and/or sales. Additionally, Chevron markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Chevron- and Gulf-branded petroleum service stations in Rhode Island.

22. **ExxonMobil**

a. Exxon Mobil Corporation, doing business as ExxonMobil, is a multinational, vertically integrated energy and chemicals company incorporated in the State of New Jersey with its headquarters and principal place of business in Irving, Texas. Exxon is among the largest publicly traded international oil and gas companies in the world. Exxon Mobil Corporation was formerly known as, did or does business as, and/or is the successor in liability to ExxonMobil Refining and Supply Company, Exxon Chemical U.S.A., ExxonMobil Chemical Corporation, ExxonMobil Chemical U.S.A., ExxonMobil Refining & Supply Corporation, Exxon Company, U.S.A., Exxon Corporation, and Mobil Corporation.

b. Exxon Mobil Corporation controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. Exxon Mobil Corporation recently represented that its success, including its "ability to mitigate risk and provide attractive returns to shareholders, depends on [its] ability to

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successfully manage [its] overall portfolio, including diversification among types and locations of our projects."

c. Exxon Mobil Corporation controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. Exxon Mobil Corporation's Board, or an individual/sub-set of the Board, or another committee appointed by the Board, holds the highest level of direct responsibility for climate change policy within the company. Exxon Mobil Corporation's Chairman of the Board and Chief Executive Officer, its President and the other members of its Management Committee are actively engaged in discussions relating to greenhouse gas emissions and the risks of climate change on an ongoing basis. Exxon Mobil Corporation require its subsidiaries to provide an estimate of greenhouse gas-related emissions costs in their economic projections when seeking funding for capital investments.

d. ExxonMobil Oil Corporation is wholly-owned subsidiary of Exxon Mobil Corporation that acts on Exxon Mobil Corporation's behalf and subject to Exxon Mobil Corporation's control. ExxonMobil Oil Corporation is incorporated in the State of New York with its principal place of business in Irving, Texas. ExxonMobil Oil Corporation is qualified to do business in Rhode Island. ExxonMobil Oil Corporation was formerly known as, did or does business as, and/or is the successor in liability to Mobil Oil Corporation.

e. "Exxon" as used hereafter, means collectively defendants Exxon Mobil Corporation and ExxonMobil Oil Corporation, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions.

f. Exxon consists of numerous divisions and affiliates in all areas of the fossil fuel industry, including exploration for and production of crude oil and natural gas; manufacture

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of petroleum products; and transportation, marketing, promotion, and sale of crude oil, natural gas, and petroleum products. Exxon is also a major manufacturer and marketer of commodity petrochemical products.

g. Exxon directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Exxon's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which Exxon derives and has derived substantial revenue. For example, Exxon markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Mobil-branded petroleum service stations in Rhode Island. Additionally, Exxon has owned and operated a fossil fuel product terminal in East Providence that was used for petroleum product storage, formulation, repackaging, and marketing, among other uses.

23. **BP Entities**

a. BP P.L.C. is a multinational, vertically integrated energy and petrochemical public limited company, registered in England and Wales with its principal place of business in London, England. BP P.L.C. consists of three main operating segments: (1) exploration and production, (2) refining and marketing, and (3) gas power and renewables. BP P.L.C. is the ultimate parent company for numerous subsidiaries that find and produce oil and gas worldwide, that refine oil into fossil fuel products such as gasoline, and that market and sell oil, fuel, other refined petroleum products, and natural gas worldwide. BP P.L.C.'s subsidiaries explore for oil and natural gas under a wide range of licensing, joint arrangement, and other contractual agreements.

b. BP P.L.C. controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. BP P.L.C.

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is the ultimate decisionmaker on fundamental decisions about the company's core business, *i.e.*, the level of companywide fossil fuels to produce, including production among BP P.L.C.'s subsidiaries. For instance, BP P.L.C. reported that in 2016–2017 it brought online thirteen major exploration and production projects. These contributed to a 12% increase in the BP group's overall fossil fuel product production. These projects were carried out by BP P.L.C.'s subsidiaries. Based on these projects, BP P.L.C. expects the company to deliver to customers 900,000 barrels of new product per day by 2021. BP P.L.C. further reported that in 2017 it sanctioned three new exploration projects in Trinidad, India, and the Gulf of Mexico and added 143% reserves replacement for the group.

c. BP P.L.C. controls and has controlled companywide decisions about the quantity and extent of fossil fuel production, including those of its subsidiaries. BP P.L.C. makes fossil fuel production decisions for the entire BP group based on a number of factors, including climate change. BP P.L.C.'s Board, an individual/subset of the Board, or a committee appointed by the Board, is the highest level within the company with direct responsibility for climate change policy. BP P.L.C.'s chief executive is responsible for maintaining the BP group's system of internal control that governs the BP group's business conduct. BP P.L.C. reviews climate change risks facing the BP group through two executive committees chaired by the group chief executive and one working group chaired by the executive vice president and group chief of staff, as part of BP group's established management structure.

d. BP America Inc. is a wholly-owned subsidiary of BP P.L.C. that acts on BP P.L.C.'s behalf and subject to BP P.L.C.'s control. BP America Inc. is a vertically integrated energy and petrochemical company incorporated in the State of Delaware with its headquarters and principal place of business in Houston, Texas. BP America Inc., consists of numerous

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divisions and affiliates in all aspects of the fossil fuel industry, including exploration for and production of crude oil and natural gas; manufacture of petroleum products; and transportation, marketing, and sale of crude oil, natural gas, and petroleum products. BP America Inc. has been qualified to do business in Rhode Island. BP America Inc. was formerly known as, did or does business as, and/or is the successor in liability to BP Products North America Inc., Atlantic Richfield Company, BP Amoco Corporation, Amoco Corporation, Amoco Oil Company, The American Oil Company, BP Exploration & Oil Inc., Sohio Oil Company, Standard Oil of Ohio (SOHIO), Standard Oil (Indiana), BP Amoco Plc, BP Oil Inc., BP Oil Company, Atlantic Richfield Delaware Corporation, Atlantic Richfield Company (a Pennsylvania corporation), ARCO Products Company, and Arco Chemical Company, a division of Atlantic Richfield Company.

e. BP Products North America Inc. is a subsidiary of BP P.L.C. that acts on BP P.L.C.'s behalf and subject to BP P.L.C.'s control. BP Products North America Inc. is engaged in fossil fuel exploration, production, refining, and marketing. BP Products North America Inc. is incorporated in Maryland and has its principal office in Naperville, Illinois. BP Products North America Inc. qualified to do business in Rhode Island.

f. Defendants BP P.L.C., BP America, Inc., BP Products North America, Inc., and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to herein as "BP."

g. BP directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of BP's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which BP derives and has derived substantial revenue. For example, BP predecessors-in-interest Arco and Amoco owned and operated a petroleum terminal at Kettle Point

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in East Providence that began operating in the early 20th century. The terminal was used for fossil fuel product storage and marketing. BP is the current owner of the terminal property. Additionally, BP markets and/or has marketed gasoline and other fossil fuel products to consumers through BP- and Amoco-branded petroleum service stations in Rhode Island. BP owns and operates an interactive webpage that allow consumers to locate BP-branded gas stations in the state.

24. **Shell Entities**

a. Royal Dutch Shell PLC is a vertically integrated, multinational energy and petrochemical company. Royal Dutch Shell PLC is incorporated in England and Wales, with its headquarters and principle place of business in the Hague, Netherlands. Royal Dutch Shell PLC consists of over a thousand divisions, subsidiaries, and affiliates engaged in all aspects of the fossil fuel industry, including exploration, development, extraction, manufacturing, and energy production, transport, trading, marketing, and sales.

b. Royal Dutch Shell PLC controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. Royal Dutch Shell PLC's Board of Directors in the Hague determines whether and to what extent Shell subsidiary holdings around the globe produce Shell-branded fossil fuel products. For instance, Royal Dutch Shell PLC's Board of Directors makes individual decisions on whether and when to initiate drilling in particular oil reserves.

c. Royal Dutch Shell PLC controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. Overall accountability for climate change within the Shell group of companies lies with Royal Dutch Shell PLC's Chief Executive Officer and Executive Committee. Additionally, Royal Dutch Shell PLC has directed its subsidiaries to reduce the carbon footprint

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of all fossil fuel products produced under the Shell brand, including those of its subsidiaries, and across all upstream and downstream segments of its operations.

d. Shell Oil Company is a wholly owned subsidiary of Royal Dutch Shell PLC that acts on Royal Dutch Shell PLC's behalf and subject to Royal Dutch Shell PLC's control. Shell Oil Company is incorporated in Delaware and with its principal place of business in Houston, Texas. Shell Oil Company is qualified to do business in Rhode Island. Shell Oil Company was formerly known as, did or does business as, and/or is the successor in liability to Deer Park Refining LP, Shell Oil, Shell Oil Products, Shell Chemical, Shell Trading US, Shell Trading (US) Company, Shell Energy Services, Texaco Inc., The Pennzoil Company, Shell Oil Products Company LLC, Shell Oil Products Company, Star Enterprise, LLC, Star Enterprise LLC, Pennzoil-Quaker State Company, and Motiva Enterprises LLC.

e. Motiva Enterprises LLC has refined and marketed and continues to refine and market Shell-branded products through approximately 8,300 Shell-branded petroleum service stations in the eastern and southern United States. Motiva Enterprises LLC is incorporated in Delaware with its principal place of business in Houston, Texas. Motiva Enterprises LLC is qualified to do business and is registered in Rhode Island as a petroleum product merchant. At times relevant to this Complaint, Motiva Enterprises LLC has been a wholly owned subsidiary of Royal Dutch Shell PLC that acts on Royal Dutch Shell PLC's behalf and subject to Royal Dutch Shell PLC's control.

f. Defendants Royal Dutch Shell PLC, Shell Oil Company, Motiva Enterprises LLC, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to as "Shell."

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g. Shell directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Shell's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufacturer, sold, and/or consumed in Rhode Island, from which Shell derives and has derived substantial revenue. For example, Shell until 2017 operated the largest capacity fossil fuel terminal in Rhode Island, at 520 Allens Avenue in Providence. The terminal was used for fossil fuel product storage, distribution, and sales. Additionally, Shell markets and/or has marketed gasoline and other fossil fuel products to consumers through Shell-branded petroleum service stations in Rhode Island. Shell owns and operates an interactive webpage that allows consumers to locate Shell-branded gas stations in the state.

25. **ConocoPhillips Entities**

a. ConocoPhillips is a multinational energy company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. ConocoPhillips consists of numerous divisions, subsidiaries, and affiliates that carry out ConocoPhillips's fundamental decisions related to all aspects of the fossil fuel industry, including exploration, extraction, production, manufacture, transport, and marketing.

b. ConocoPhillips controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries. ConocoPhillips' most recent annual report subsumes the operations of the entire ConocoPhillips group of subsidiaries under its name. Therein, ConocoPhillips represents that its value—for which ConocoPhillips maintains ultimate responsibility—is a function of its decisions to direct subsidiaries to explore for and produce fossil fuels: "Unless we successfully add to our existing proved reserves, our future crude oil, bitumen, natural gas and natural gas liquids production will

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decline, resulting in an adverse impact to our business." ConocoPhillips optimizes the ConocoPhillips group's oil and gas portfolio to fit ConocoPhillips' strategic plan. For example, in November 2016, ConocoPhillips announced a plan to generate $5 billion to $8 billion of proceeds over two years by optimizing its business portfolio, including its fossil fuel product business, to focus on low cost-of-supply fossil fuel production projects that strategically fit its development plans.

c. ConocoPhillips controls and has controlled companywide decisions related to global warming and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries. For instance, ConocoPhillips' Board has the highest level of direct responsibility for climate change policy within the company. ConocoPhillips has developed and implements a corporate Climate Change Action Plan to govern climate change decision-making across all entities in the ConocoPhillips group.

d. ConocoPhillips Company is a wholly owned subsidiary of ConocoPhillips that acts on ConocoPhillips' behalf and subject to ConocoPhillips' control. ConocoPhillips Company is incorporated in Delaware and has its principal office in Bartlesville, Oklahoma. ConocoPhillips Company is qualified to do business in Rhode Island and has a registered agent for service of process in Rhode Island.

e. Phillips 66 is a multinational energy and petrochemical company incorporated in Delaware and with its principal place of business in Houston, Texas. It encompasses downstream fossil fuel processing, refining, transport, and marketing segments that were formerly owned and/or controlled by ConocoPhillips.

f. Phillips 66 Company is a subsidiary of Phillips 66 that acts on Phillips 66's behalf and subject to Phillips 66's control. Phillips 66 Company is incorporated in Delaware and

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has its principal office in Houston, Texas. Phillips 66 Company is qualified to do business in Rhode Island and has a registered agent for service of process in Rhode Island. Phillips 66 Company was formerly known as, did or does business as, and/or is the successor in liability to Phillips Petroleum Company, Conoco, Inc., Tosco Corporation, and Tosco Refining Co.

g. Defendants ConocoPhillips, ConocoPhillips Company, Phillips 66, Phillips 66 Company, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions are collectively referred to herein as "ConocoPhillips."

h. ConocoPhillips transacts and has transacted substantial fossil fuel-related business in Rhode Island. A substantial portion of ConocoPhillips's fossil fuel products are or have been extracted, refined, transported, traded, distributed, promoted, marketed, manufactured, sold, and/or consumed in Rhode Island, from which ConocoPhillips derives and has derived substantial revenue. For instance, ConocoPhillips shipped gasoline manufactured at their refineries via common carrier pipelines intended to deliver gasoline to Petroleum Administration for Defense District 1, including Rhode Island.

26. **Citgo Petroleum Corporation**

a. Citgo Petroleum Corporation ("Citgo") is a direct, wholly owned subsidiary of PDV America, Incorporated, which is a wholly owned subsidiary of PDV Holding, Incorporated. These organizations' ultimate parent is Petróleos de Venezuela, S.A. ("PDVSA"), an entity wholly owned by the Republic of Venezuela that plans, coordinates, supervises, and controls activities carried out by its subsidiaries. Citgo is incorporated in the State of Delaware and maintains its headquarters in Houston, Texas. Citgo is qualified to do business in Rhode Island.

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b. Citgo controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

c. Citgo controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

d. Citgo and its subsidiaries are engaged in refining, marketing, and transporting petroleum products, including gasoline, diesel fuel, jet fuel, petrochemicals, lubricants, asphalt, and refined waxes.

e. Citgo directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Citgo's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which Citgo derives and has derived substantial revenue. For instance, Citgo has marketed, sold, and/or distributed heating oil in Rhode Island including through the CITGO – Venezuela Heating Oil program, a heating oil assistance program. Additionally, Citgo markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Citgo-branded petroleum service stations in Rhode Island. Citgo owns and operates an interactive webpage that allows consumers to locate Citgo-branded gas stations in the state. Citgo also supplied gasoline to 7-Eleven gas stations located in Rhode Island.

27. **Marathon Entities**

a. Marathon Oil Company is an energy company incorporated in the State of Ohio with its principal place of business in Houston, Texas. Marathon Oil Company is a corporate ancestor of Marathon Oil Corporation and Marathon Petroleum Company.

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b. Marathon Oil Corporation is a multinational energy company incorporated in the State of Delaware and with its principal place of business in Houston, Texas. Marathon Oil Corporation consists of multiple subsidiaries and affiliates involved in the exploration for, extraction, production, and marketing of fossil fuel products.

c. Marathon Petroleum Corporation is a multinational energy company incorporated in Delaware and with its principal place of business in Findlay, Ohio. Marathon Petroleum Corporation was spun off from the operations of Marathon Oil Corporation in 2011. It consists of multiple subsidiaries and affiliates involved in fossil fuel product refining, marketing, retail, and transport, including both petroleum and natural gas products.

d. Marathon Oil Corporation and Marathon Petroleum Corporation control and have controlled their companywide decisions about the quantity and extent of fossil fuel production and sales, including those of their subsidiaries.

e. Marathon Oil Corporation and Marathon Petroleum Corporation control and have controlled their companywide decisions about the quantity and extent of fossil fuel production, including those of their subsidiaries.

f. Marathon Petroleum Company LP is a wholly owned subsidiary of Marathon Petroleum Corporation that acts on Marathon Petroleum Corporation's behalf and subject to Marathon Petroleum Corporation's control. Marathon Petroleum Company LP is incorporated in Delaware with its principal place of business in Findlay, Ohio. Marathon Petroleum Company LP is qualified to do business in Rhode Island. Marathon Petroleum Company LP is engaged in the marketing of motor fuels and other refined products.

g. Speedway LLC is a wholly owned subsidiary of Marathon Petroleum Corporation that acts on Marathon Petroleum Corporation's behalf and subject to Marathon

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Petroleum Corporation's control. Speedway LLC is incorporated in the State of Delaware with its principal place of business in Enon, Ohio. Speedway LLC is qualified to do business in Rhode Island and has a registered agent for service of process in Rhode Island.

h. Defendants Marathon Oil Company, Marathon Oil Corporation, Marathon Petroleum Corporation, Marathon Petroleum Company LP, Speedway LLC, and their predecessors, successors, parents, subsidiaries, affiliates, and divisions, are collectively referred to as "Marathon."

i. Marathon directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Marathon's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which Marathon derives and has derived substantial revenue. For example, Marathon markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Speedway-branded petroleum service stations in Rhode Island. Marathon owns and operates an interactive webpage that allow consumers to locate Speedway-branded gas stations in the state.

28. **Hess Corporation**

a. Hess Corporation ("Hess") is a global, vertically integrated petroleum exploration and extraction company incorporated in the State of Delaware with its headquarters and principal place of business in New York, New York. Hess is qualified to do business in Rhode Island and has a registered agent for service of process in Rhode Island. Hess was formerly known as, did or does business as, and/or is the successor in liability to Amerada Hess Corporation,

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WilcoHess LLC, Hess Oil Virgin Islands Corporation, Hess Energy Trading Company, LLC, and Hartree Partners, LP.

b. Hess is engaged in the exploration, development, production, transportation, purchase, marketing, and sale of crude oil and natural gas. Its oil and gas production operations are located primarily in the United States, Denmark, Equatorial Guinea, Malaysia, Thailand, and Norway. Prior to 2014, Hess also conducted extensive retail operations in its own name and through its subsidiaries.

c. Hess controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

d. Hess controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

e. Hess directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Hess's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which Hess derives and has derived substantial revenue. For example, Hess markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Hess-branded petroleum service stations in Rhode Island.

29. **Lukoil Pan Americas, LLC**

a. Lukoil Pan Americas, LLC ("Lukoil") is a global, vertically integrated petroleum exploration and extraction company incorporated in the State of Delaware with its

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headquarters and principal place of business in New York, New York. Lukoil is qualified to do business in Rhode Island and has a registered agent for service of process in Rhode Island.

b. Lukoil is engaged in the exploration, development, production, transportation, purchase, marketing, and sale of crude oil and natural gas; gas processing; oil refining; generation, transmission and distribution of heat and power; and manufacturing and marketing of commodity petrochemicals. Lukoil is the ultimate parent company for numerous subsidiaries.

c. Lukoil controls and has controlled companywide decisions about the quantity and extent of fossil fuel production and sales, including those of its subsidiaries.

d. Lukoil controls and has controlled companywide decisions related to climate change and greenhouse gas emissions from its fossil fuel products, including those of its subsidiaries.

e. Lukoil directs and has directed substantial fossil fuel-related business to Rhode Island. A substantial portion of Lukoil's fossil fuel products are or have been extracted, refined, transported, traded, distributed, marketed, promoted, manufactured, sold, and/or consumed in Rhode Island, from which Lukoil derives and has derived substantial revenue. For example, Lukoil markets and/or has marketed gasoline and other fossil fuel products to consumers, including through Lukoil-branded petroleum service stations in Rhode Island.

f. Getty Petroleum Marketing, Inc. markets and/or marketed gasoline and petroleum products. Getty Petroleum Marketing Inc. is registered in Rhode Island as a non-resident landlord, as the owner of at least one gas station located at 7780 Post Road, North Kingstown, Rhode Island. At times relevant to this Complaint, Getty Petroleum Marketing, Inc. has been a wholly owned subsidiary of Lukoil that acted on Lukoil's behalf and subject to Lukoil's control.

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During that time, Getty Petroleum Marketing leased a pipeline at the East Providence Terminal in Rhode Island.

30. **Doe Defendants:** The true names and capacities, whether individual, corporate, associate, or otherwise of Defendants Does 1 through 100, inclusive, are unknown to Plaintiff, who therefore sues said Defendants by such fictitious names pursuant to R.I. Gen. Laws § 9-5-20. Plaintiff is informed and believes, and on that basis alleges, that each of the fictitiously named Defendants is responsible in some manner for the acts and occurrences herein alleged, and that Plaintiff's damages were caused by such Defendants.

31. **Relevant Non-Parties: Fossil Fuel Industry Associations:** As set forth in greater detail below, each Defendant had actual knowledge that its fossil fuel products were hazardous. Defendants obtained knowledge of the hazards of their products independently and through their membership and involvement in trade associations.

32. Each Defendant's fossil fuel promotion and marketing efforts were assisted by the trade associations described below. Acting on behalf of the Defendants, the industry associations engaged in a long-term course of conduct to misrepresent, omit, and conceal the dangers of Defendants' fossil fuel products.

a. **The American Petroleum Institute (API)**: API is a national trade association representing the oil and gas industry, formed in 1919. The following Defendants and/or their predecessors in interest are and/or have been API members at times relevant to this litigation: Chevron, ExxonMobil, BP, Shell, Total, Marathon, and Hess.[10]

[10] American Petroleum Institute, *Members* (webpage) (accessed June 18, 2018), http://www.api.org/membership/members.

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b. **The Western States Petroleum Association (WSPA)**: WSPA is a trade association representing oil producers in Arizona, California, Nevada, Oregon, and Washington.[11] Membership has included, among other entities: BP, Chevron, Shell, and ExxonMobil.[12]

c. **The American Fuel and Petrochemical Manufacturers (AFPM)** is a national association of petroleum and petrochemical companies, formerly known as the National Petroleum Refiners Association. At relevant times, its members included, but were not limited to, Chevron, Exxon, BP, Shell, Citgo, Total, and Marathon.[13]

d. **U.S. Oil & Gas Association (USOGA)** is a national trade association representing oil and gas producers, formerly known as the Mid-Continent Oil & Gas Association. USOGA's membership has included BP, Chevron, Citgo, Exxon, Shell, Marathon, and Hess.[14]

e. **Western Oil & Gas Association (WOGA)** was a California nonprofit trade association representing the oil and gas industries, consisting of over 75 member companies. Its members included companies and individual responsible for more than 65% of petroleum production and 90% of petroleum refining and marketing

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[11] Western States Petroleum Association, *About* (webpage) (accessed June 18, 2018), https://www.wspa.org/about.

[12] Western States Petroleum Association, *Member Companies* (webpage) (accessed June 27, 2018), https://www.wspa.org/about.

[13] American Fuel and Petrochemical Manufacturers, *Membership Directory* (webpage) (accessed June 18, 2018), https://www.afpm.org/membership-directory.

[14] *See, e.g.*, Louisiana Mid-Continent Oil & Gas Association, *Member Companies* (webpage) (accessed June 18, 2018), http://www.lmoga.com/members/member-companies. USOGA's membership is divided among its four subsidiary divisions.

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in the Western United States.[15] WOGA membership likely included, but was not limited to, defendants Chevron, Exxon, and Shell.[16] Other fossil fuel company members of WOGA may have included, but were not limited to ConocoPhillips, Champlin Petroleum Company (Anadarko)[17] and Reserve Oil & Gas Company.[18]

f. **The Information Council for the Environment (ICE)**: ICE was formed by coal companies and their allies, including Western Fuels Association and the National Coal Association. Associated companies included Pittsburg and Midway Coal Mining (Chevron).

g. **The Global Climate Coalition (GCC)**: GCC was an industry group formed to oppose greenhouse gas emission reduction policies and the Kyoto Protocol. It was founded in 1989 shortly after the first Intergovernmental Panel on Climate Change meeting was held, and disbanded in 2001. Founding members included the National Association of Manufacturers, the National Coal Association, the Edison Electric Institute, and the United States Chamber of Commerce. The GCC's early individual corporate members included Amoco (BP), API, Chevron, Exxon, Ford, Shell, and Texaco (Chevron). Over its existence other members and funders included ARCO (BP), and the Western Fuels Association. The coalition also operated for several years out of the National Association of Manufacturers' offices.

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[15] *Am. Petroleum Inst. v. Knecht*, 456 F. Supp. 889, 894 n.2 (C.D. Cal. 1978), *aff'd*, 609 F.2d 1306 (9th Cir. 1979).

[16] *See id.* at 894 n.3.

[17] Hereinafter, parenthetical references to Defendants indicate corporate ancestry and/or affiliation.

[18] *See Am. Petroleum Inst.*, *supra* note 15, 456 F. Supp. at 894 n.3.

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III. AGENCY

33. At all times herein mentioned, each of the Defendants was the agent, servant, partner, aider and abettor, co-conspirator, and/or joint venturer of each of the remaining Defendants herein and was at all times operating and acting within the purpose and scope of said agency, service, employment, partnership, conspiracy, and joint venture and rendered substantial assistance and encouragement to the other Defendants, knowing that their conduct was wrongful and/or constituted a breach of duty.

IV. JURISDICTION AND VENUE

34. Each Defendant named here maintains sufficient minimum contacts with Rhode Island, as described above, such that this Court's exercise of jurisdiction over it is not contrary to the provisions of the constitution or laws of the United States, and this Court therefore has jurisdiction pursuant to R.I. Gen. Laws § 9-5-33.

35. The Providence County Superior Court is a court of general jurisdiction and therefore has subject matter jurisdiction over this action. Because the amount in controversy exceeds $10,000, this Court has exclusive original jurisdiction pursuant to R.I. Gen. Laws §8-2-14(a).

36. Venue is proper in Providence County pursuant to R.I. Gen. Laws § 9-4-2 because this matter concerns rights and interests in real property lying within this County; and pursuant to R.I. Gen. Laws § 9-4-5 because some of the Defendants maintain operations and may be found in this County.

V. FACTUAL BACKGROUND

A. Global Warming—Observed Effects and Known Cause

37. Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes to the climate system are unprecedented over decades to millennia. Globally,

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the atmosphere and ocean have warmed, sea level has risen, and the amounts of snow and ice have diminished, thereby altering hydrologic systems.[19] As a result, extreme weather events have increased, including, but not limited to, heat waves, droughts, and extreme precipitation events.[20]

38. Ocean and land surface temperatures have increased at a rapid pace during the late 20th and early 21st centuries:

a. 2016 was the hottest year on record by globally averaged surface temperatures, exceeding mid-20th century mean ocean and land surface temperatures by approximately 1.69°F.[21] Eight of the twelve months in 2016 were hotter by globally averaged surface temperatures than those respective months in any previous year. October, November, and December 2016 showed the second hottest average surface temperatures for those months, second only to temperatures recorded in 2015.[22]

b. The Earth's hottest month ever recorded was February 2016, followed immediately by the second hottest month on record, March 2016.[23]

c. The second hottest year on record by globally averaged surface temperatures was 2015, and the third hottest was 2017.[24]

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[19] IPCC, *Climate Change 2014: Synthesis Report*, *supra* note 3, at 40.

[20] *Id.* at 8.

[21] NOAA, *Global Climate Report – Annual 2017*, https://www.ncdc.noaa.gov/sotc/global/201713; NASA, "NASA, NOAA Data Show 2016 Warmest Year on Record Globally" (press release) (Jan. 18, 2017), https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally.

[22] *Id.*

[23] Jugal K. Patel, "How 2016 Became Earth's Hottest Year on Record," N.Y. TIMES (Jan. 18, 2017), https://www.nytimes.com/interactive/2017/01/18/science/earth/2016-hottest-year-on-record.html.

[24] NOAA, *Global Climate Report – Annual 2017*, *supra* note 21.

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d. The ten hottest years on record by globally averaged surface temperature have all occurred since 1998,[25] and sixteen of the seventeen hottest years have occurred since 2001.[26]

e. Each of the past three decades has been warmer by average surface temperature than any preceding decade on record.[27]

f. The period between 1983 and 2012 was likely the warmest 30-year period in the Northern Hemisphere since approximately 700 AD.[28]

39. The average global surface and ocean temperature in 2016 was approximately 1.7°F warmer than the 20th century baseline, which is the greatest positive anomaly observed since at least 1880.[29] The increase in hotter temperatures and more frequent positive anomalies during the Great Acceleration is occurring both globally and locally, including in Rhode Island. The graph below shows the increase in global land and ocean temperature anomalies since 1880, as measured against the 1910–2000 global average temperature.[30]

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[25] *Id.*

[26] NASA, "NASA, NOAA Data Show 2016 Warmest Year on Record Globally" (press release) (Jan. 18, 2017), https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally.

[27] *IPCC Climate Change 2014: Synthesis Report*, *supra* note 3, 2.

[28] *Id.*

[29] NOAA, National Centers for Environmental Information, *Climate at a Glance (Global Time Series)* (June 2017), https://www.ncdc.noaa.gov/cag/time-series/global/globe/land_ocean/ytd/12/1880-2016.

[30] *Id.*

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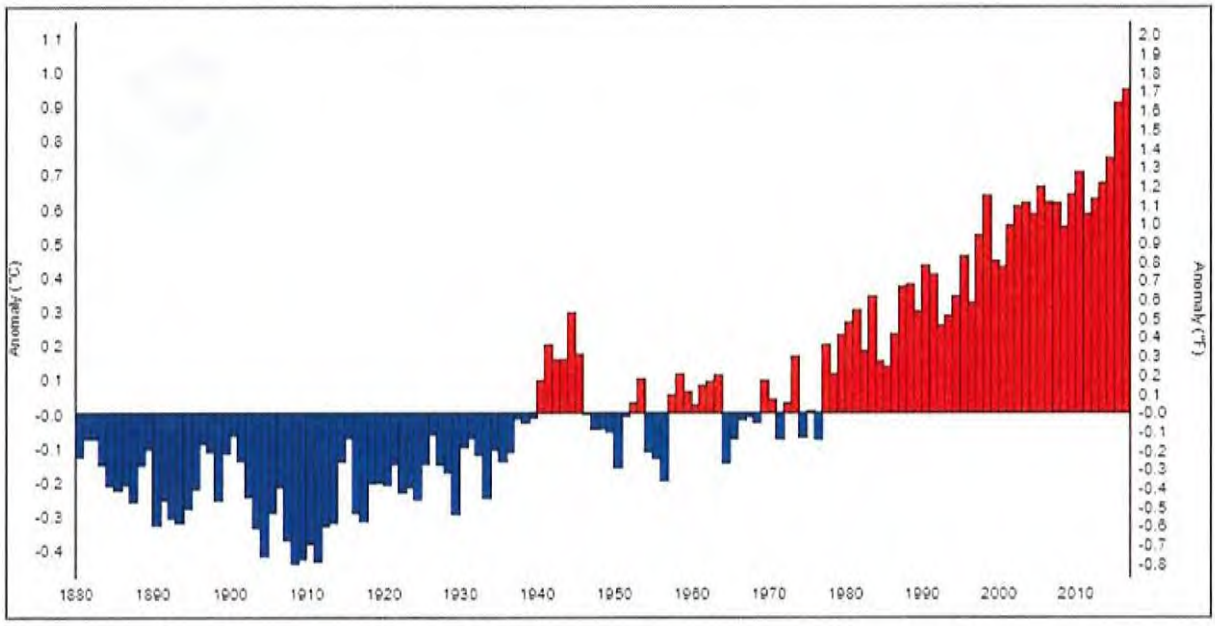
Fig. 1: Global Land and Ocean Temperature Anomalies, January – December



40. The mechanism by which human activity causes global warming and climate change is well established: ocean and atmospheric warming is overwhelmingly caused by anthropogenic greenhouse gas emissions.[31]

41. When emitted, greenhouse gases trap heat within the Earth's atmosphere that would otherwise radiate into space.

42. Greenhouse gases are largely byproducts of humans combusting fossil fuels to produce energy and using fossil fuels to create petrochemical products.

43. Human activity, particularly greenhouse gas emissions, is the primary cause of global warming and its associated effects on Earth's climate.

44. Prior to World War II, most anthropogenic CO_2 emissions were caused by land-use practices, such as forestry and agriculture, which altered the ability of the land and global biosphere

[31] IPCC, *Climate Change 2014: Synthesis Report*, supra note 3, at 4.

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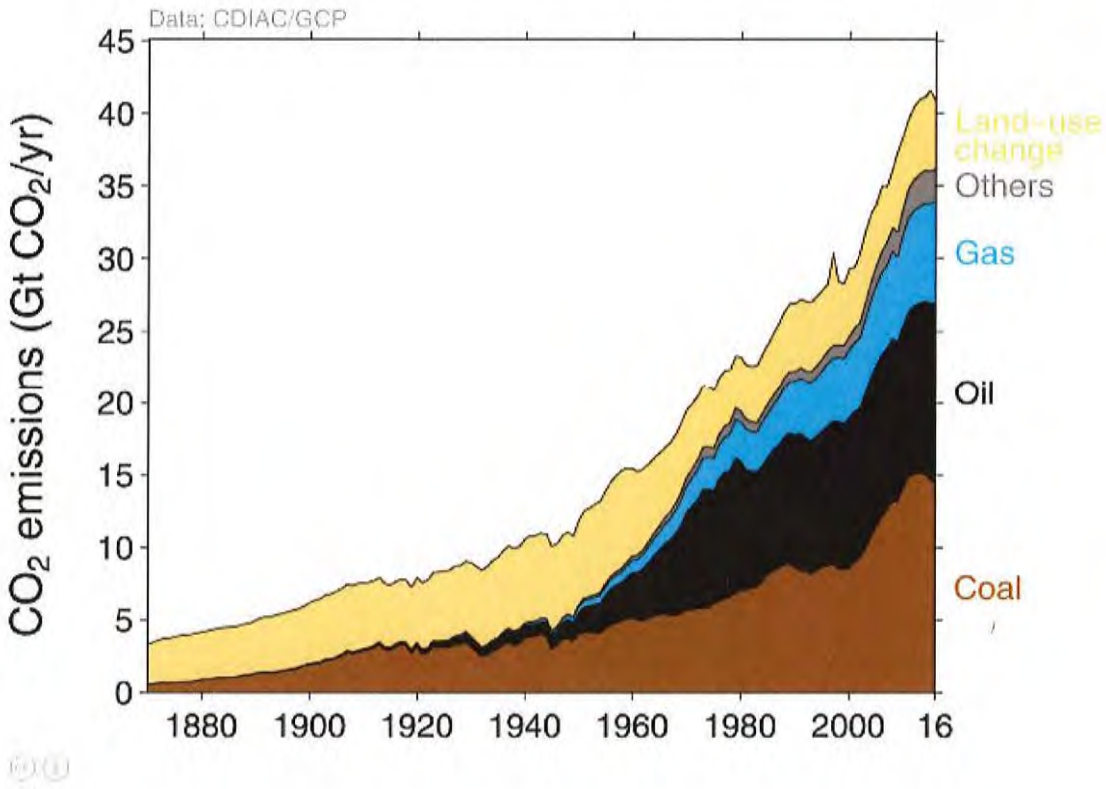
to absorb CO_2 from the atmosphere; the impacts of such activities on Earth's climate were relatively minor. Since the beginning of the Great Acceleration, however, both the annual rate and total volume of anthropogenic CO_2 emissions have increased enormously following the advent of major uses of oil, gas, and coal. The graph below shows that while CO_2 emissions attributable to forestry and other land-use change have remained relatively constant, total emissions attributable to fossil fuels have increased dramatically since the 1950s.[32]

Fig. 2: Total Annual Carbon Dioxide Emissions by Source, 1860–2016



[32] Global Carbon Project, Global Carbon Budget 2017 (Nov. 13, 2017), http://www.globalcarbonproject.org/carbonbudget/17/files/GCP_CarbonBudget_2017.pdf (*citing* CDIAC; R.A. Houghton & Alexander A. Nassikas, *Global and Regional Fluxes of Carbon from Land Use and Land Cover Change 1850–2015*, 31 GLOBAL BIOCHEMICAL CYCLES 3, 456 (Feb. 2017)).

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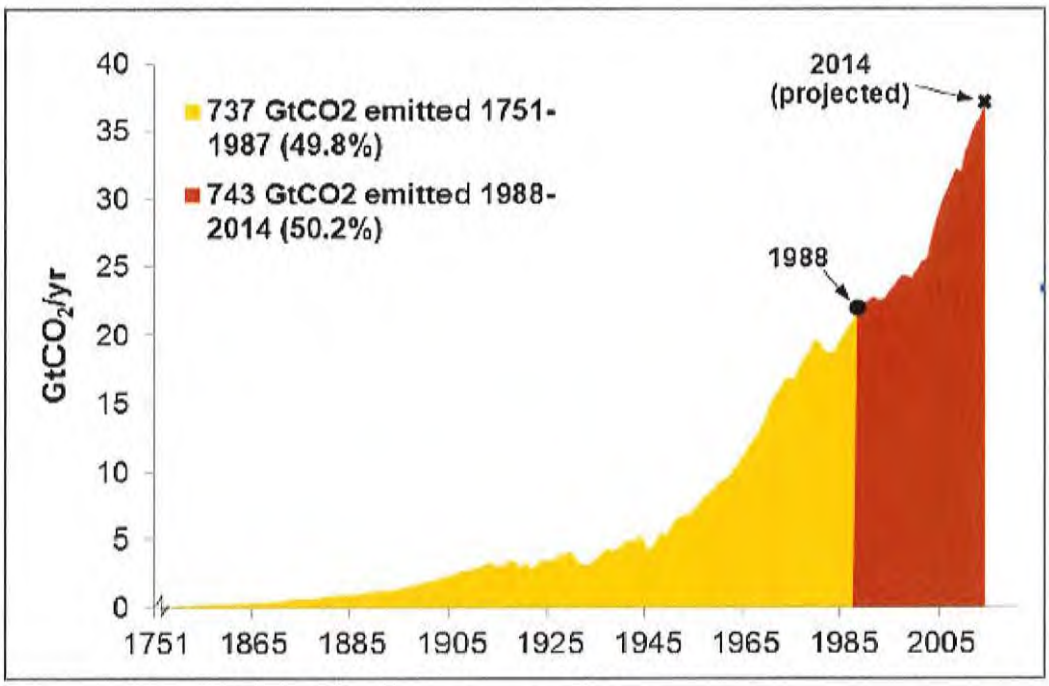
45. As human reliance on fossil fuels for industrial and mechanical processes has increased, so too have greenhouse gas emissions, especially of CO_2. The Great Acceleration is marked by a massive increase in the annual rate of fossil fuel emissions: more than half of all cumulative CO_2 emissions have occurred since 1988.[33] The rate of CO_2 emissions from fossil fuels and industry, moreover, has increased threefold since the 1960s, and by more than 60% since 1990.[34] The graph below illustrates the increasing rate of global CO_2 emissions since the industrial era began.[35]

Fig. 3: Cumulative Annual Anthropogenic Carbon Dioxide Emissions, 1751–2014



[33] R. J. Andres et al., *supra* note 6, at 1851.

[34] C. Le Quéré et al., *supra* note 4, at 630 ("Global CO_2 emissions from fossil fuels and industry have increased every decade from an average of 3.1±0.2 GtC/yr in the 1960s to an average of 9.3±0.5 GtC/yr during 2006–2015.").

[35] Peter Frumhoff et al., *The Climate Responsibilities of Industrial Carbon Producers*, 132 CLIMATIC CHANGE 157, 164 (2015).

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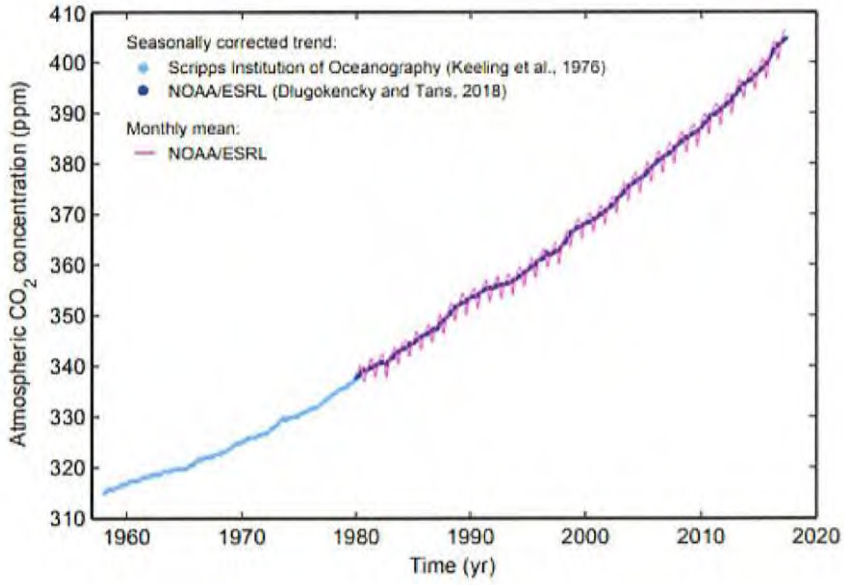
46. Because of the increased use of fossil fuel products, concentrations of greenhouse gases in the atmosphere are now at a level unprecedented in at least 800,000 years.[36] The graph below illustrates the nearly 30% increase in atmospheric CO_2 concentration above pre-Industrial levels since 1960.[37]

Fig. 4: Atmospheric Carbon Dioxide Concentration in Parts Per Million, 1960–2017



B. Sea Level Rise—Known Causes and Observed Effects

47. Sea level rise is the physical consequence of (a) the thermal expansion of ocean waters as they warm; (b) increased mass loss from land-based glaciers that are melting as ambient air temperature increases; and (c) the shrinking of land-based ice sheets due to increasing ocean

[36] IPCC, *Climate Change 2014: Synthesis Report*, *supra* note 3, at 4.

[37] C. Le Quéré et al., *Global Carbon Budget 2017*, 10 EARTH SYST. SCI. DATA 405, 408 (Mar. 2018)).

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and air temperature.[38]

48. Of the increase in energy that has accumulated in the Earth's atmosphere between 1971 and 2010, more than 90% is stored in the oceans.[39]

49. Anthropogenic forcing, in the form of greenhouse gas pollution largely from the production, use, and combustion of fossil fuel products, is the dominant cause of global mean sea level rise since 1970, explaining at least 70% of the sea level rise observed between 1970 and 2000.[40] Natural radiative forcing—that is, causes of climate change not related to human activity—"makes essentially zero contribution [to observed sea level rise] over the twentieth century (2% over the period 1900–2005)."[41]

50. Anthropogenic greenhouse gas pollution is the dominant factor in each of the independent causes of sea level rise, including the increase in ocean thermal expansion,[42] in glacier mass loss, and in more negative surface mass balance from the ice sheets.[43]

51. There is a well-defined relation between cumulative emissions of CO_2 and committed global mean sea level. This relation, moreover, holds proportionately for committed regional sea level rise.[44]

52. Nearly 100% of the sea level rise from any projected greenhouse gas emissions

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[38] NOAA, *Is Sea Level Rising?* (webpage) (last updated June 25, 2018), http://oceanservice.noaa.gov/facts/sealevel.html.

[39] IPCC, *Climate Change 2014: Synthesis Report*, *supra* note 3, at 4.

[40] Aimée B. A. Slangen, et al., *Anthropogenic Forcing Dominates Global Mean Sea-Level Rise Since 1970*, 6 NATURE CLIMATE CHANGE 701, 701 (2016).

[41] *Id.*

[42] *Id.*

[43] *Id.*

[44] Peter U. Clark, et al., *Consequences of Twenty-First-Century Policy for Multi-Millennial Climate and Sea-Level Change*, 6 NATURE CLIMATE CHANGE 360, 365 (2016).

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scenario will persist for at least 10,000 years.[45] This owes to the long residence time of CO_2 in the atmosphere that sustains temperature increases, and inertia in the climate system.[46]

53. Anthropogenic greenhouse gas pollution caused the increased frequency and severity of extreme sea level events (temporary sea level height increases due to storm surges or extreme tides, exacerbated by elevated baseline sea level) observed during the Great Acceleration.[47] The incidence and magnitude of extreme sea level events has increased globally since 1970.[48] The impacts of such events, which generally occur with large storms, high tidal events, offshore low-pressure systems associated with high winds, or the confluence of any of these factors,[49] are exacerbated with higher average sea level, which functionally raises the baseline for the destructive impact of extreme weather and tidal events. Indeed, the magnitude and frequency of extreme sea level events can occur in the absence of increased intensity of storm events, given the increased average elevation from which flooding and inundation events begin. These effects, and others, significantly and adversely affect Rhode Island, with increased severity in the future.

54. Historical greenhouse gas emissions alone through 2000 will cause a global mean sea level rise of at least 7.4 feet.[50] Additional greenhouse gas emissions from 2001–2015 have caused approximately 10 additional feet of committed sea level rise. Even immediate and

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[45] *Id.* at 361.

[46] *Id.* at 360.

[47] IPCC, *Climate Change 2013: Summary for Policymakers*, 7 Table SPM.1 (2013), https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WGIAR5_SPM_brochure_en.pdf.

[48] IPCC, Thomas F. Stocker et al., *Climate Change 2013: The Physical Science Basis*, Intergovernmental Panel on Climate Change, Cambridge University Press, 290 (2013), http://www.ipcc.ch/report/ar5/wg1.

[49] *Id.*

[50] Peter U. Clark et al., *supra* note 44, at 365.

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permanent cessation of all additional anthropogenic greenhouse gas emissions would not prevent the eventual inundation of land at elevations between current average mean sea level and 17.4 feet of elevation in the absence of adaptive measures.

55. The relationship between anthropogenic CO_2 emissions and committed sea level rise is nearly linear and always positive. For emissions, including future emissions, from the year 2001, the relation is approximately 0.25 inches of committed sea level rise per 1 $GtCO_2$ released. For the period 1965 to 2000, the relation is approximately 0.05 inches of committed sea level rose per 1 $GtCO_2$ released. For the period 1965 to 2015, normal use of Defendants' fossil fuel products caused a substantial portion of committed sea level rise. Each and every additional unit of CO_2 emitted from the use of Defendants' fossil fuel products will add to the sea level rise already committed to the geophysical system.

56. Projected onshore impacts associated with rising sea temperature and water level include, but are not limited to, increases in flooding and erosion; increases in the occurrence, persistence, and severity of storm surges; infrastructure inundation; saltwater intrusion in groundwater; public and private property damage; and pollution associated with damaged wastewater infrastructure. All of these effects significantly and adversely affect Rhode Island.

57. Sea level rise has already taken grave tolls on inhabited coastlines. For instance, the U.S. National Oceanic and Atmospheric Administration ("NOAA") estimates that nuisance flooding occurs from 300% to 900% more frequently within U.S. coastal communities today than just 50 years ago.[51]

58. Nationwide, more than three quarters (76%) of flood days caused by high water levels from sea level rise between 2005 and 2014 (2,505 of the 3,291 flood days) would not have

[51] NOAA, *Is Sea Level Rising?*, *supra* note 38.

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happened but for human-caused climate change. More than two-thirds (67%) of flood days since 1950 would not have happened without the sea level rise caused by increasing greenhouse gas emissions.[52]

59. Regional expressions of sea level rise will differ from the global mean, and are especially influenced by changes in ocean and atmospheric dynamics, as well as the gravitational, deformational, and rotational effects of the loss of glaciers and ice sheets.[53] Over the past half century, sea levels in the Northeast have been increasing 3 to 4 times faster than the global average rate.[54] Rhode Island is experiencing and will continue to experience greater sea level rise than the global average, due to several factors including changes in ocean circulation as a result of climate change and land subsistence.[55]

60. Rhode Island has experienced over 10 inches of sea level rise since 1930, averaging over an inch per decade.[56] The mean annual rate of sea level rise has increased in recent decades and will continue to rise significantly. According to NOAA, Rhode Island could experience 9 feet of sea level rise by 2100, along with substantial increase in the frequency of nuisance tidal flooding.[57]

61. Rhode Island's topography, geography, and land use patterns make it particularly susceptible to injuries from sea level rise. Rhode Island has substantial public assets in 21 coastal

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[52] Climate Central, *Sea Level Rise Upping Ante on 'Sunny Day' Floods* (Oct. 17, 2016), http://www.climatecentral.org/news/climate-change-increases-sunny-day-floods-20784.

[53] Peter U. Clark et al., *supra* note 44, at 364.

[54] Rhode Island Sea Grant et al., *Sea Level Rise in Rhode Island: Trends and Impacts,* 2 (Jan 2013) http://www.beachsamp.org/wp-content/uploads/2016/09/climate_SLR_factsheet2013.pdf

[55] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, 10 (2015), http://health.ri.gov/publications/reports/ClimateChangeAndHealthResiliency.pdf.

[56] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, 12 (July 2018).

[57] *Id.*

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municipalities along its 400 miles of coastline.[58] Twenty Rhode Island municipalities have acreage lying below the floodplain.[59]

62. Without Defendants' fossil fuel-related greenhouse gas pollution, current sea level rise would have been far less than the observed sea level rise to date.[60] Similarly, committed sea level rise that will occur in the future would also be far less.[61]

C. Warming Air Temperatures—Known Causes and Observed Effects

63. Carbon dioxide and other greenhouse gases are impairing the radiation of heat back into the atmosphere. This is slowly driving up temperatures, especially nighttime lows, as the concentration of greenhouse gases thickens.[62]

64. As the Earth's surface temperature warms, there is not only an overall increase in average temperature but also in frequency of extremely warm temperatures, corresponding with a decrease in frequency of extremely cold temperatures. The following graph illustrates the statistical shift in expected average and extreme temperatures due to anthropogenic global warming.[63]

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[58] Final Report: "Special House Commission to Study Economic Risk Due to Flooding and Sea Level Rise," 6, 32 (May 12, 2016), http://www.rilin.state.ri.us/commissions/fsrcomm/commdocs/20160512%20Economic%20Risk%20Due%20to%20Flooding%20and%20Sea%20Level%20Rise%20-%20final.pdf.

[59] *Id.* at 6.

[60] Robert E. Kopp et al., *Temperature-driven Global Sea-level Variability in the Common Era*, 113 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, No. 11, E1434-E1441, E1438 (2016), http://www.pnas.org/content/113/11/E1434.full.

[61] Peter U. Clark et al., *supra* note 44, at 365.

[62] IPCC, Thomas F. Stocker et al., *Climate Change 2013: The Physical Science Basis*, *supra* note 48.

[63] IPCC, *Fourth Assessment Report: Climate Change 2007: Working Group I: The Physical Science*, Basis Box TS.5, Figure 1, https://www.ipcc.ch/publications_and_data/ar4/wg1/en/box-ts-5-figure-1.html.

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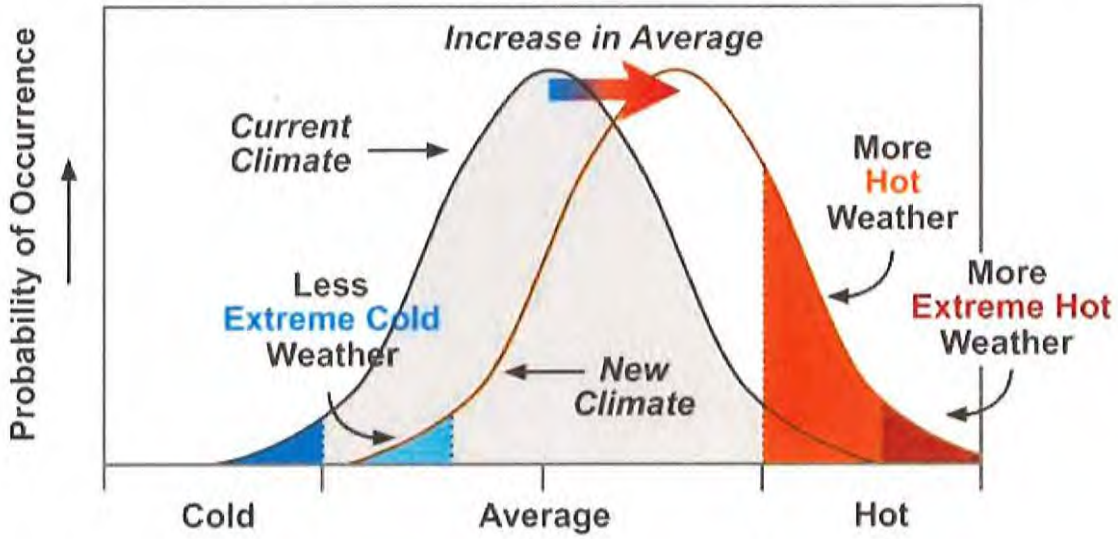
Fig. 5: Effect of Mean Temperature on Extreme Temperature Occurrence



65. Record-breaking high temperatures are now outnumbering record lows by an average decadal ratio of 2:1 across the United States.[64] This represents an increase from approximately 1.09 high temperature records for every one low temperature record in the 1950s, and 1.36 high temperature records for every one low temperature record in the 1990s.[65]

66. Rhode Island has already begun experiencing a substantial increase in extreme heat days. As the figure below shows, 1950s and 1960s, an average summer included 54 days with a heat index above 80 degrees. By the 1990s and 2000s, that average had climbed to nearly 64 days. In 2010 through 2014, that number rose to 71 days above 80 degrees.[66]

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[64] Gerald A. Meehl et al., *Relative Increase of Record High Maximum Temperatures Compared to Record Low Minimum Temperatures in the U.S.*, GEOPHYSICAL RESEARCH LETTERS, L23701 at 3 (2009).

[65] *See* Climate Signals, *Record High Temps vs. Record Low Temps* (last accessed June 27, 2018), http://www.climatesignals.org/data/record-high-temps-vs-record-low-temps.

[66] "Number of 80°-plus days rising steadily in RI," BROWN UNIVERSITY NEWS (Sept. 8, 2015), https://news.brown.edu/articles/2015/09/temperature.

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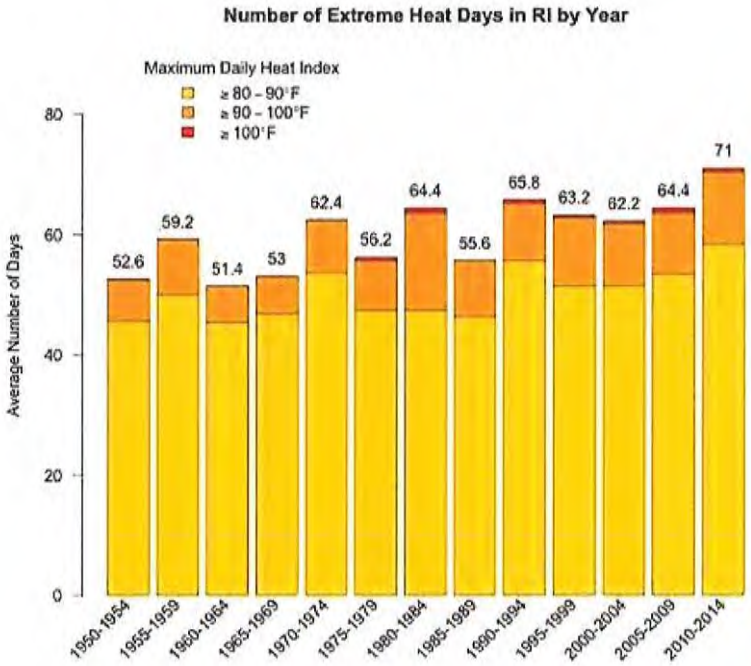
Fig. 6: Number of Extreme Heat Days Per Year in Rhode Island, 1950–2014



Melissa Eliot/Brown University

67. Heatwaves are prolonged periods with excessive ambient temperatures, often (but not necessarily) defined with reference to historical temperatures at a given locale. Since as early as the 1950s, increases in the duration, intensity, and especially the frequency of heatwaves have been detected over many regions,[67] including the eastern United States.[68]

68. With future emissions, the annual average number of extreme heat days and heat waves will continue to increase substantially. For instance, under a moderate rising emissions scenario, the ratio of record high maximum to record low minimum temperatures in the United

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[67] S.E. Perkins-Kirkpatrick & P.B. Gibson, *Changes in Regional Heatwave Characteristics as a Function of Increasing Global Temperature*, SCIENTIFIC REPORTS, 7:12256, 1 (2017).

[68] Noah. S. Diffenbaugh & Moestasim Ashfaq, *Intensification of Hot Extremes in the United States*, 37 GEOPHYSICAL RESEARCH LETTERS L15701 (2010).

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States will continue to increase, reaching ratios of about 20:1 by 2050, and roughly 50:1 by 2100.[69] Even under a pathway of lower greenhouse gas emissions, average annual temperatures are projected to most likely exceed historical record levels by the middle of the 21st century.[70]

69. Because of Rhode Island's urban infrastructure, increased temperatures will add to the heat load of buildings and exacerbate existing urban heat islands, adding to the risks of high ambient temperatures.

D. Disruption to the Hydrologic Cycle—Known Causes and Observed Effects

70. The "hydrologic cycle" describes the temporal and spatial movement of water through oceans, land, and the atmosphere.[71] "Evapotranspiration" is the process by which water on the Earth's surface turns to vapor and is absorbed into the atmosphere. The vast majority of evapotranspiration is due to the sun's energy heating water molecules, resulting in evaporation.[72] Plants also draw water into the atmosphere from soil through transpiration. Volcanoes, sublimation (the process by which solid water changes to water vapor), and human activity also contribute to atmospheric moisture.[73] As water vapor rises through the atmosphere and reaches cooler air, it becomes more likely to condense and fall back to Earth as precipitation.

71. Upon reaching Earth's surface as precipitation, water may take several different paths. It can be reevaporated into the atmosphere; seep into the ground as soil moisture or

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[69] Gerald A. Meehl et al., *supra* note 64, at 3.

[70] NOAA, National Centers for Environmental Information, *Climate at a Glance (Global Time Series)* (June 2017), https://www.ncdc.noaa.gov/cag/time-series/global/globe/land_ocean/ytd/12/1880-2016.

[71] NASA Earth Observatory, *The Water Cycle*, (webpage) (accessed June 27, 2018), https://earthobservatory.nasa.gov/Features/Water/page1.php.

[72] See USGS, *The Water Cycle: Evaporation* (webpage) (accessed June 27, 2018), https://water.usgs.gov/edu/watercycleevaporation.html.

[73] NASA Earth Observatory, *The Water Cycle*, *supra* note 71.

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groundwater; run off into rivers and streams; or stop temporarily as snowpack or ice. It is during these phases, when water is available at or near the Earth's surface, that water is captured for use by humans.

72. Anthropogenic global warming caused by Defendants' fossil fuel products is disrupting and will continue to disrupt the hydrologic cycle in Rhode Island by changing evapotranspiration patterns.[74] As the lower atmosphere becomes warmer, evaporation rates have and will continue to increase, resulting in an increase in the amount of moisture circulating throughout the lower atmosphere. As the Earth's surface temperature has increased, so has evaporation.[75] For every 1.8°F of anthropogenic global warming, the atmosphere's capacity to hold water vapor increases by 7%.[76] Thus, anthropogenic global warming has increased substantially the total volume of water vapor in the atmosphere at any given time.[77]

73. An observed consequence of higher water vapor concentrations is a shift toward increased frequency of intense precipitation events, mainly over land areas. Furthermore, because of warmer temperatures, more precipitation is falling as rain rather than snow. These changes affect both the quantity and quality of water resources available to both human and ecological systems, including in Rhode Island.

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[74] *Id.*

[75] *Id.*

[76] IPCC, Thomas F. Stocker et al., *Climate Change 2013: The Physical Science Basis*, *supra* note 48.

[77] NASA Earth Observatory, *The Water Cycle*, *supra* note 71.

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74. As a result of anthropogenic climate change, Rhode Island has experienced and will experience increased precipitation extremes, leading to both increased frequency of intense precipitation events and extremely dry periods.[78]

i. Extreme Precipitation

75. Global warming has contributed and will contribute to more intense and wetter precipitation events, now and into the future. Average annual precipitation in Providence, Rhode Island, has increased by 0.4 inches per decade since 1895.[79] Intense rainfall events (heaviest 1% of all daily events from 1901 to 2012 in New England) increased 71% between 1958 and 2000.[80] Climate models project that annual precipitation will continue to increase by up to three inches per decade locally and that more precipitation will fall during intense storms.[81]

76. Over the past 80 years, Rhode Island has experienced a significant increase in both flood frequency and flood severity. Along with most of southern New England, the State has experienced a doubling of the frequency of flooding and an increase in the magnitude of flood events.[82] Rhode Island experienced more extreme precipitation events between 2005 and 2014 than any prior decade in the State's history.[83]

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[78] SafeWater RI, *Ensuring Water for Rhode Island's Future*, 11 (July 2013), http://www.health.ri.gov/publications/reports/2013EnsuringSafeWaterForRhodeIslandsFuture.pdf.

[79] Radley Horton et al., CLIMATE CHANGE IMPACTS IN THE UNITED STATES, Ch. 16: *Northeast* 373 (2014), http://s3.amazonaws.com/nca2014/low/NCA3_Full_Report_16_Northeast_LowRes.pdf.

[80] *Id.*

[81] Narragansett Bay Estuary Program, *State of Narragansett Bay and Its Watershed Summary Report*, 21 (2017), http://nbep.org/01/wp-content/uploads/2017/10/State-of-Narragansett-Bay-and-Its-Watershed-Summary-Report.pdf.

[82] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 15.

[83] NOAA National Centers for Environmental Information, *State Summaries 149-RI, "Rhode Island,"* 1 (2017), http://climatechange.ri.gov/documents/noaa-climate-rhode-island-state-summary.pdf.

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77. Due to anthropogenic climate change, seasonality of precipitation will shift so that more precipitation occurs during winter, as rain, and less during summer.[84]

78. Tropical cyclone rainfall rates will increase in the future due to anthropogenic warming and accompanying increase in atmospheric moisture content. Models project an increase on the order of 10–15% for rainfall rates averaged within about 100 km of the storm for a 2°C global warming scenario. The intensity of tropical cyclones will also increase by 1 to 10% according to model projections for a 2°C global warming.[85] Increased intensity of storms means that the destructive potential per storm increases.[86]

79. Heavy precipitation events (defined as rainfall equal to or greater than the historical 95th percentile) will significantly increase in frequency at least through the year 2100.[87]

ii. Drought

80. Drought is a period of moisture deficit defined either by a deficiency in the amount or timing of precipitation relative to a reference period ("meteorological drought"), or by a shortage of water supply for specific human, ecological, or other uses ("hydrologic drought"). Drought originates from a deficiency in precipitation and/or an elevation of temperature (and

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[84] Narragansett Bay Estuary Program, *supra* note 81, at 21.

[85] Princeton University Geophysical Fluid Dynamics Laboratory, "Global Warming and Hurricanes" (website) (last revised June 6, 2018), https://www.gfdl.noaa.gov/global-warming-and-hurricanes.

[86] *Id.*

[87] Xiang Gao et al., *21st Century Changes in U.S. Heavy Precipitation Frequency Based on Resolved Atmospheric Patterns*, MIT Joint Program on the Science and Policy of Global Change: Report 302, 15 (2016).

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therefore evaporation) relative to normal conditions, resulting in a water shortage for an activity, group, or ecological use.[88]

81. As rising temperatures lead to greater rainfall variability, Rhode Island will begin to experience more frequent seasonal droughts in the summer and fall.[89]

82. As annual rainfall concentrates into a shorter time span, the annual dry period is growing longer, resulting in conditions of moisture deficiency over longer periods. Even in the absence of substantial changes in average precipitation in the State, precipitation will fall in a shorter time span and therefore be less susceptible to retention and use.

83. Thus, future droughts in the State will be more severe than historical droughts, with an attendant exacerbation of drought impacts.

E. Ocean Warming and Acidification—Known Causes and Observed Effects

84. The ocean has played an unparalleled role in response to climate change, storing approximately 93% of the excess heat energy over the last 50 years.[90]

85. As the atmospheric greenhouse gas concentrations increase, the water in Narragansett Bay is getting warmer and more acidic. Over the past 50 years, the average surface temperature of the Bay has increased 1.4° to 1.6°C (2.5° to 2.9°F). Winter water temperatures in the Bay have increased even more, from 1.6° to 2.0°C (2.9° to 3.6°F).[91]

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[88] *See, e.g.*, Donald A. Wilhite & Michael H. Glantz, *Understanding the Drought Phenomenon: The Role of Definitions*, Drought Mitigation Center Faculty Publications 20 (1985)

[89] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, *supra* note 55, at 10.

[90] IPCC, *Observations: Oceans*, Ch. 3 260, https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter03_FINAL.pdf.

[91] R.W. Fulweiler et al., *Whole truths vs. half truths – And a search for clarity in long-term water temperature records*, 157 ESTUARINE, COASTAL AND SHELF SCIENCE A1–A6 (May 2015), https://www.sciencedirect.com/science/article/pii/S0272771415000426.

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86. Due to increased water temperatures among other factors, iconic cold-water fishery species such as cod, red hake, and winter flounder are being increasingly displaced by scup and black sea bass. Overtime, Narragansett Bay is expected to increasingly resemble that of a more southerly, mid-Atlantic estuary with associated shifts in species that are iconic in southern New England's culture.[92]

87. Uptake of carbon dioxide is also causing changes to ocean chemistry, including in Narragansett Bay, by changing the pH to be more acidic.[93] Ocean acidification, is expected to continue as global warming progresses.[94] Increased ocean acidity makes the formation and maintenance of shells and other calcareous structure by bivalves and other shellfish more energetically expensive or even impossible.[95]

F. Public Health Impacts of Anthropogenic Global Warming

88. Sea level rise, increased air temperatures and changes to the hydrologic cycle associated with anthropogenic climate change have resulted and will result in public health impacts for the state of Rhode Island.

89. Extreme weather events, such as hurricanes and inland flooding, have immediate health consequences, including danger to personal safety and longer-term consequences, including social and economic disruption, population displacement, and mental trauma.[96]

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[92] Narragansett Bay Estuary Program, *supra* note 81, at 24.
[93] *Id.* at 45.
[94] *Id.*
[95] *Id.* at 46.
[96] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 63.

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90. Extreme heat-induced public health impacts in the State will result in increased risk of heat-related illnesses such as heat exhaustion and dehydration, increased hospitalizations, and death.[97]

91. Increased heat also intensifies the photochemical reactions that produce smog, ground level ozone, and fine particulate matter (PM2.5), which contribute to and exacerbate respiratory disease in children and adults. Increased heat and CO_2 enhance the growth of plants that produce pollen, which are associated with allergies.[98]

92. In addition, the warming climate system will create disease-related public health impacts in the State, including but not limited to, increased incidence of cyanobacteria blooms (toxic alga) in aquatic systems and vector-borne disease with migration of animal and insect disease vectors.[99]

93. Public health impacts of these climatological changes are likely to be disproportionately borne by communities made vulnerable by geographic, racial, or income disparities.

G. Attribution

94. "Carbon factors" analysis, devised by the International Panel on Climate Change (IPCC), the United Nations International Energy Agency, and the U.S. Environmental Protection Agency, quantifies the amount of CO_2 emissions attributable to a unit of raw fossil fuel extracted from the Earth.[100] Emissions factors for oil, coal, liquid natural gas, and natural gas are different

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[97] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, *supra* note 55, at 14.

[98] *Id.* at 25–26.

[99] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 15.

[100] *See* Richard Heede, *Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers, 1854-2010*, 122 CLIMATIC CHANGE 229, 232–33 (2014).

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for each material but are nevertheless known and quantifiable for each.[101] This analysis accounts for the use of Defendants' fossil fuel products, including non-combustion purposes that sequester CO_2 rather than emit it (e.g., asphalt production).

95. Defendants' historical and current fossil fuel extraction and production records are publicly available in various fora. These include university and public library collections, company websites, company reports filed with the U.S. Securities and Exchange Commission, company histories, and other sources. The cumulative CO_2 and methane emissions attributable to Defendants' fossil fuel products were calculated by reference to such publicly available documents.

96. Cumulative carbon analysis allows an accurate calculation of net annual CO_2 and methane emissions attributable to each Defendant by quantifying the amount and type of fossil fuels products each Defendant extracted and placed into the stream of commerce, and multiplying those quantities by each fossil fuel product's carbon factor.

97. Defendants, through their extraction, promotion, marketing, and sale of their fossil fuel products, caused over 14.5% of global fossil fuel product-related CO_2 between 1965 and 2015, with contributions currently continuing unabated. This constitutes a substantial portion of all such emissions in history, and the attendant historical, projected, and committed sea level rise and disruptions to the hydrologic cycle associated therewith.

98. By quantifying CO_2 and methane pollution attributable to Defendants by and through their fossil fuel products, ambient air and ocean temperature, sea level, and hydrologic cycle responses to those emissions are also calculable, and can be attributed to Defendants on an individual and aggregate basis. Individually and collectively, Defendants' through their control of

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[101] *See, e.g., id.*

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the extraction, sale, and promotion of their fossil fuel products are responsible for substantial increases in ambient (surface) temperature, ocean temperature, sea level, droughts, extreme precipitation events, heat waves, and other adverse impacts on Rhode Island described herein.

99. Anthropogenic CO_2 emissions have caused a substantial portion of both observed and committed mean global sea level rise.[102]

100. Anthropogenic CO_2 emissions have caused and will continue to cause increased maximum temperature extremes relative to the historical baseline.[103]

101. Anthropogenic CO_2 emissions have caused and will continue to cause increases in daily precipitation extremes over land.[104]

102. Anthropogenic CO_2 emissions have caused and will continue to cause increased frequency and severity of droughts. [105]

103. Defendants, through their extraction, promotion, marketing, and sale of their fossil fuel products, caused a substantial portion of both those emissions and the attendant historical, projected, and committed sea level rise and other consequences of the resulting climatic changes described herein, including increased incidences of extreme temperatures and extreme weather events.

104. As explained above, this analysis considers only the volume of raw material actually extracted from the Earth by these Defendants. Many of these Defendants actually are responsible for far greater volumes of emissions because they also refine, manufacture, produce,

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[102] Peter U. Clark et al., *supra* note 44, at 365.

[103] *Id.*

[104] *See, e.g.*, E.M. Fischer & R. Knutti, *Anthropogenic Contribution to Global Occurrence of Heavy-Precipitation and High-Temperature Extremes*, 5 NATURE CLIMATE CHANGE 560–64 (2015).

[105] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, *supra* note 55, at 10.

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market, promote, and sell more fossil fuel derivatives than they extract themselves by purchasing fossil fuel products extracted by independent third parties.

105. In addition, considering the Defendants' lead role in promoting, marketing, and selling their fossil fuels products between 1965 and 2015; their efforts to conceal the hazards of those products from consumers; their promotion of their fossil fuel products despite knowing the dangers associate with those products; their dogged campaign against regulation of those products based on falsehoods, omissions, and deceptions; and their failure to pursue less hazardous alternatives available to them, Defendants, individually and together, have substantially and measurably contributed to the State's climate change-related injuries.

H. Defendants Went to Great Lengths to Understand the Hazards Associated with, and Knew or Should Have Known of the Dangers Associated with the Extraction, Promotion, and Sale of Their Fossil Fuel Products.

106. By 1965, concern about the risks of anthropogenic greenhouse gas emissions reached the highest level of the United States' scientific community. In that year, President Lyndon B. Johnson's Science Advisory Committee Panel on Environmental Pollution reported that by the year 2000, anthropogenic CO_2 emissions would "modify the heat balance of the atmosphere to such an extent that marked changes in climate . . . could occur."[106] President Johnson announced in a special message to Congress that "[t]his generation has altered the composition of the atmosphere on a global scale through . . . a steady increase in carbon dioxide from the burning of fossil fuels."[107]

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[106] President's Science Advisory Committee, *Restoring the Quality of Our Environment: Report of the Environmental Pollution Panel*, 9 (Nov. 1965), https://hdl.handle.net/2027/uc1.b4315678.

[107] President Lyndon B. Johnson, *Special Message to Congress on Conservation and Restoration of Natural Beauty* (Feb. 8, 1965), http://acsc.lib.udel.edu/items/show/292.

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107. These statements from the Johnson Administration, at a minimum, put Defendants on notice of the potentially substantial dangers to people, communities, and the planet associated with unabated use of their fossil fuel products. Moreover, Defendants had amassed a considerable body of knowledge on the subject through their own independent efforts.

108. A 1963 Conservation Foundation report on a conference of scientists referenced in the 1966 World Book Encyclopedia, as well as in presidential panel reports and other sources around that time, described many specific consequences of rising levels of greenhouse gas pollution in the atmosphere. It warned that a doubling of carbon dioxide "could be enough to bring about immense flooding of lower portions of the world's land surface, resulting from increased melting of glaciers." The publication also asserted that "a continuing rise in the amount of atmospheric carbon dioxide is likely to be accompanied by a significant warming of the surface of the earth which by melting the polar ice caps would raise sea level and by warming the oceans would change considerably the distributions of marine species including commercial fisheries." It warned of the potential inundation of "many densely settled coastal areas, including the cities of New York and London" and the possibility of "wiping out the world's present commercial fisheries." The report, in fact, noted that "the changes in marine life in the North Atlantic which accompanied the temperature change have been very noticeable".[108]

109. But industry interest in carbon accumulation goes back at least to 1958. A review in that year of the American Petroleum Institute ("API") Smoke and Fumes Committee's Air Pollution Research Program by Charles Jones (the committee secretary and Shell executive),

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[108] The Conservation Foundation, *Implications of Rising Carbon Dioxide Content of the Atmosphere: A statement of trends and implications of carbon dioxide research reviewed at a conference of scientists* (Mar. 1963), https://babel.hathitrust.org/cgi/pt?id=mdp.39015004619030.

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mentions a project focused on analyzing gaseous carbon data to determine the amount of carbon of fossil origin compared to the total amount.[109]

110. At that point in time API's stance was that "the petroleum industry supplies the fuel used by the automobile, and thus has a sincere interest in the solution to the problem of pollution from automobile exhaust," according to an API presentation at the 1958 National Conference on Air Pollution. API acknowledged the industry's responsibility in mitigating some of the negative impacts of its products, stating that the objective of its Smoke and Fumes committee was to "determine the causes and methods of control of objectional atmospheric pollution resulting from the production, manufacture, transportation, sale, and use of petroleum and its products."[110]

111. In 1968, a Stanford Research Institute ("SRI") report commissioned by the API and made available to all its members, concluded, among other things:

> If the Earth's temperature increases significantly, a number of events might be expected to occur including the melting of the Antarctic ice cap, a rise in sea levels, warming of the oceans and an increase in photosynthesis. . . .
>
> It is clear that we are unsure as to what our long-lived pollutants are doing to our environment; however, there seems to be no doubt that the potential damage to our environment could be severe. . . . [T]he prospect for the future must be of serious concern.[111]

112. In a supplement to the 1968 report prepared for API in 1969, authors Robinson and Robbins projected that based on current fuel usage, atmospheric CO_2 concentrations would reach

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[109] Charles A. Jones, *A Review of the Air Pollution Research Program of the Smoke and Fumes Committee of the American Petroleum Institute*, JOURNAL OF THE AIR POLLUTION CONTROL ASSOCIATION (1958), https://www.tandfonline.com/doi/pdf/10.1080/00966665.1958.10467854.

[110] C.A. Jones, *Sources of Air Pollution – Transportation (Petroleum)* (Nov. 19, 1958), https://www.industrydocumentslibrary.ucsf.edu/tobacco/docs/#id=xrcm0047.

[111] Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants*, Stanford Research Institute (Feb. 1968), https://www.smokeandfumes.org/documents/document16.

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370 ppm by 2000[112]—almost exactly what it turned out to be (369.34 ppm, according to data from NASA).[113] The report also draws the connection between the rising concentration and the use of fossil fuels stating that "balance between environmental sources and sinks has been disturbed by the emission to the atmosphere of additional CO_2 from the increased combustion of carbonaceous fuels" and that it seemed "unlikely that the observed rise in atmospheric CO_2 has been due to changes in the biosphere." The authors warn repeatedly of the temptations and consequences of ignoring CO_2 as a problem and pollutant:

> CO_2 is so common and such an integral part of all our activities that air pollution regulations typically state that CO_2 emissions are not to be considered as pollutants. This is perhaps fortunate for our present mode of living, centered as it is around carbon combustion. However, this seeming necessity, the CO_2 emission, is the only air pollutant, as we shall see, that has been shown to be of global importance as a factor that could change man's environment on the basis of a long period of scientific investigation.[114]

113. In 1969, Shell memorialized an on-going 18-month project to collect ocean data from oil platforms to develop and calibrate environmental forecasting theories related to predicting wave, wind, storm, sea level, and current changes and trends.[115] Several Defendants and/or their predecessors in interest participated in the project, including Esso Production Research Company (ExxonMobil), Mobil Research and Development Company (ExxonMobil), Pan American Petroleum Corporation (BP), Gulf Oil Corporation (Chevron), Texaco Inc. (Chevron), and the Chevron Oil Field Research Company (Chevron).

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[112] Elmer Robinson & R.C. Robbins, *Sources, Abundance, and Fate of Gaseous Atmospheric Pollutants Supplement*, Stanford Research Institute (June 1969).

[113] "Global Mean CO_2 Mixing Ratios (ppm): Observations," NASA Goddard Institute for Space Studies, https://data.giss.nasa.gov/modelforce/ghgases/Fig1A.ext.txt (webpage) (accessed June 16, 2018).

[114] Elmer Robinson & R.C. Robbins, *supra* note 112.

[115] M.M. Patterson, *An Ocean Data Gathering Program for the Gulf of Mexico*, Society of Petroleum Engineers (1969), https://www.onepetro.org/conference-paper/SPE-2638-MS.

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114. In a 1970 report by H.R. Holland from the Engineering Division of Imperial Oil (Exxon), he stated: "Since pollution means disaster to the affected species, the only satisfactory course of action is to prevent it – to maintain the addition of foreign matter at such levels that it can be diluted, assimilated or destroyed by natural processes – to protect man's environment from man." He also noted that "a problem of such size, complexity and importance cannot be dealt with on a voluntary basis." CO_2 was listed as an air pollutant in the document.[116]

115. In 1972, API members, including Defendants, received a status report on all environmental research projects funded by API. The report summarized the 1968 SRI report describing the impact of fossil fuel products, including Defendants', on the environment, including global warming and attendant consequences. Defendants and/or their predecessors in interest that received this report include, but were not limited to: American Standard of Indiana (BP), Asiatic (Shell), Ashland (Marathon), Atlantic Richfield (BP), British Petroleum (BP), Chevron Standard of California (Chevron), Cities Service (Citgo), Esso Research (ExxonMobil), Ethyl (formerly affiliated with Esso, which was subsumed by ExxonMobil), Getty (ExxonMobil), Gulf (Chevron, among others), Humble Standard of New Jersey (ExxonMobil/Chevron/BP), Marathon, Mobil (ExxonMobil), Pan American (BP), Shell, Standard of Ohio (BP), Texaco (Chevron), Union (Chevron), Skelly (ExxonMobil), Colonial Pipeline (ownership has included BP, Citgo, ExxonMobil, and Chevron entities, among others) and Caltex (Chevron).[117] Other members of the fossil fuel industry that received the report include, but were not limited to, Continental (ConocoPhillips), Dupont (former owner of Conoco), Phillips (ConocoPhillips), Sun (Sunoco),

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[116] H.R. Holland, *Pollution is Everybody's Business*, Imperial Oil (1970), https://www.desmogblog.com/sites/beta.desmogblog.com/files/DeSmogBlog-Imperial%20Oil%20Archive-Pollution-Everyone-Business-1970.pdf.

[117] American Petroleum Institute, *Environmental Research, A Status Report*, Committee for Air and Water Conservation (January 1972), http://files.eric.ed.gov/fulltext/ED066339.pdf.

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Rock Island (Koch Industries), Signal (Honeywell), Great Northern, Edison Electric Institute (representing electric utilities), Bituminous Coal Research (coal industry research group), Mid-Continent Oil & Gas Association (presently the U.S. Oil & Gas Association, a national trade association), Western Oil & Gas Association, National Petroleum Refiners Association (presently the American Fuel and Petrochemical Manufacturers Association, a national trade association), and Champlin (Anadarko), among others.[118]

116. In a 1977 presentation and again in a 1978 briefing, Exxon scientists warned the Exxon Corporation Management Committee that CO_2 concentrations were building in the Earth's atmosphere at an increasing rate, that CO_2 emissions attributable to fossil fuels were retained in the atmosphere, and that CO_2 was contributing to global warming.[119] The report stated:

> There is general scientific agreement that the most likely manner in which mankind is influencing the global climate is through carbon dioxide release from the burning of fossil fuels . . . [and that] Man has a time window of five to ten years before the need for hard decisions regarding changes in energy strategies might become critical.[120]

117. One presentation slide read: "Current scientific opinion overwhelmingly favors attributing atmospheric carbon dioxide increase to fossil fuel combustion."[121] The report also warned that "a study of past climates suggests that if the earth does become warmer, more rainfall should result. But an increase as large as 2°C would probably also affect the distribution of the rainfall." Moreover, the report concluded that "doubling in CO_2 could increase average global

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[118] *Id.*

[119] Memo from J.F. Black to F.G. Turpin, *The Greenhouse Effect*, Exxon Research and Engineering Company (June 6, 1978), http://www.climatefiles.com/exxonmobil/1978-exxon-memo-on-greenhouse-effect-for-exxon-corporation-management-committee.

[120] *Id.*

[121] *Id.*

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temperature 1°C to 3°C by 2050 A.D. (10°C predicted at poles)."[122]

118. Thereafter, Exxon engaged in a research program to study the environmental fate of fossil fuel-derived greenhouse gases and their impacts, which included publication of peer-reviewed research by Exxon staff scientists and the conversion of a supertanker into a research vessel to study the greenhouse effect and the role of the oceans in absorbing anthropogenic CO_2. Much of this research was shared in a variety of fora, symposia, and shared papers through trade associations and directly with other Defendants.

119. Exxon scientists made the case internally for using company resources to build corporate knowledge about the impacts of the promotion, marketing, and consumption of Defendants' fossil fuel products. Exxon climate researcher Henry Shaw wrote in 1978: "The rationale for Exxon's involvement and commitment of funds and personnel is based on our need to assess the possible impact of the greenhouse effect on Exxon business. Exxon must develop a credible scientific team that can critically evaluate the information generated on the subject and be able to carry bad news, if any, to the corporation."[123] Moreover, Shaw emphasized the need to collaborate with universities and government to more completely understand what he called the "CO_2 problem."[124]

120. In 1979, API and its members, including Defendants, convened a Task Force to monitor and share cutting edge climate research among the oil industry. The group was initially called the CO_2 and Climate Task Force, but changed its name to the Climate and Energy Task

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[122] *Id.*

[123] Henry Shaw, *Memo to Edward David Jr. on the "Greenhouse Effect*, Exxon Research and Engineering Company (Dec. 7, 1978), http://insideclimatenews.org/sites/default/files/documents/Credible%20Scientific%20Team%201978%20Letter.pdf.

[124] *Id.*

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Force in 1980 (hereinafter referred to as "API CO_2 Task Force"). Membership included senior scientists and engineers from nearly every major U.S. and multinational oil and gas company, including Exxon, Mobil (ExxonMobil), Amoco (BP), Phillips (ConocoPhillips), Texaco (Chevron), Shell, Sunoco, Sohio (BP) as well as Standard Oil of California (BP) and Gulf Oil (Chevron), among others. The Task Force was charged with assessing the implications of emerging science on the petroleum and gas industries and identifying where reductions in greenhouse gas emissions from Defendants' fossil fuel products could be made.[125]

121. In 1979, API sent its members a background memo related to the API CO_2 and Climate Task Force's efforts, stating that CO_2 concentrations were rising steadily in the atmosphere, and predicting when the first clear effects of climate change might be felt.[126]

122. Also in 1979, Exxon scientists advocated internally for additional fossil fuel industry-generated atmospheric research in light of the growing consensus that consumption of fossil fuel products was changing the Earth's climate:

> We should determine how Exxon can best participate in all these [atmospheric science research] areas and influence possible legislation on environmental controls. It is important to begin to anticipate the strong intervention of environmental groups and be prepared to respond with reliable and credible data. It behooves [Exxon] to start a very aggressive defensive program in the indicated areas of atmospheric science and climate because there is a good probability that legislation affecting our business will be passed. Clearly, it is in our interest for such legislation to be based on hard scientific data. The data obtained from research

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[125] American Petroleum Institute, *AQ-9 Task Force Meeting Minutes* (March 18, 1980), http://insideclimatenews.org/sites/default/files/documents/AQ-9%20Task%20Force%20Meeting%20%281980%29.pdf (AQ-9 refers to the "CO_2 and Climate" Task Force).

[126] Neela Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, INSIDE CLIMATE NEWS (Dec. 22, 2015), https://insideclimatenews.org/news/22122015/exxon-mobil-oil-industry-peers-knew-about-climate-change-dangers-1970s-american-petroleum-institute-api-shell-chevron-texaco.

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> on the global damage from pollution, e.g., from coal combustion, will give us the needed focus for further research to avoid or control such pollutants.[127]

123. That same year, Exxon Research and Engineering reported that: "The most widely held theory [about increasing CO_2 concentration] is that the increase is due to fossil fuel combustion, increasing CO_2 concentration will cause a warming of the earth's surface, and the present trend of fossil fuel consumption will cause dramatic environmental effects before the year 2050."[128] According to the report, "ecological consequences of increased CO_2" to 500 ppm (1.7 times 1850 levels) could mean: "a global temperature increase of 3°F;" "the southwest states would be hotter, probably by more than 3°F, and drier;" "most of the glaciers in the North Cascades and Glacier National Park would be melted;" "there would be less of a winter snow pack in the Cascades, Sierras, and Rockies, necessitating a major increase in storage reservoirs;" "marine life would be markedly changed;" and "maintaining runs of salmon and steelhead and other subarctic species in the Columbia River system would become increasingly difficult."[129] With a doubling of the 1860 CO_2 concentration, "ocean levels would rise four feet" and "the Arctic Ocean would be ice free for at least six months each year, causing major shifts in weather patterns in the northern hemisphere."[130]

124. Further, the report stated that unless fossil fuel use was constrained, there would be "noticeable temperature changes" associated with an increase in atmospheric CO_2 from about 280

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[127] Henry Shaw, *Exxon Memo to H.N. Weinberg about "Research in Atmospheric Science"*, Exxon Inter-Office Correspondence (Nov. 19, 1979), https://insideclimatenews.org/sites/default/files/documents/Probable%20Legislation%20Memo%20(1979).pdf.

[128] W.L. Ferrall, *Exxon Memo to R.L. Hirsch about "Controlling Atmospheric CO_2"*, Exxon Research and Engineering Company (Oct. 16, 1979), http://insideclimatenews.org/sites/default/files/documents/CO2%20and%20Fuel%20Use%20Projections.pdf.

[129] *Id.*

[130] *Id.*

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parts per million before the Industrial Revolution to 400 parts per million by the year 2010.[131] Those projections proved remarkably accurate—atmospheric CO_2 concentrations surpassed 400 parts per million in May 2013, for the first time in millions of years.[132] In 2015, the annual average CO_2 concentration rose above 400 parts per million, and in 2016 the annual low surpassed 400 parts per million, meaning atmospheric CO_2 concentration remained above that threshold all year.[133]

125. In 1980, API's CO_2 Task Force members discussed the oil industry's responsibility to reduce CO_2 emissions by changing refining processes and developing fuels that emit less CO_2. The minutes from the Task Force's February 29, 1980, meeting included a summary of a presentation on "The CO_2 Problem" given by Dr. John Laurmann, which identified the "scientific consensus on the potential for large future climatic response to increased CO_2 levels" as a reason for API members to have concern with the "CO_2 problem" and informed attendees that there was "strong empirical evidence that rise [in CO_2 concentration was] caused by anthropogenic release of CO_2, mainly from fossil fuel combustion."[134] Moreover, Dr. Laurmann warned that the amount of CO_2 in the atmosphere could double by 2038, which he said would likely lead to a 2.5°C (4.5°F) rise in global average temperatures with "major economic consequences." He then told the Task Force that models showed a 5°C (9°F) rise by 2067, with "globally catastrophic effects."[135] A

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[131] *Id.*

[132] Nicola Jones, *How the World Passed a Carbon Threshold and Why it Matters*, YALE ENVIRONMENT 360 (Jan. 26, 2017), http://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters.

[133] *Id.*

[134] American Petroleum Institute, *AQ-9 Task Force Meeting Minutes* (Mar. 18, 1980), http://insideclimatenews.org/sites/default/files/documents/AQ-9%20Task%20Force%20Meeting%20%281980%29.pdf (AQ-9 refers to the "CO_2 and Climate" Task Force).

[135] *Id.*

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taskforce member and representative of Texaco (Chevron) leadership present at the meeting posited that the API CO_2 Task Force should develop ground rules for energy release of fuels and the cleanup of fuels as they relate to CO_2 creation.

126. In 1980, the API CO_2 Task Force also discussed a potential area for investigation: alternative energy sources as a means of mitigating CO_2 emissions from Defendants' fossil fuel products. These efforts called for research and development to "Investigate the Market Penetration Requirements of Introducing a New Energy Source into World Wide Use." Such investigation was to include the technical implications of energy source changeover, research timing, and requirements.[136]

127. By 1980, Exxon's senior leadership had become intimately familiar with the greenhouse effect and the role of CO_2 in the atmosphere. In that year, Exxon Senior Vice President and Board member George Piercy questioned Exxon researchers on the minutiae of the ocean's role in absorbing atmospheric CO_2, including whether there was a net CO_2 flux out of the ocean into the atmosphere in certain zones where upwelling of cold water to the surface occurs, because Piercy evidently believed that the oceans could absorb and retain higher concentrations of CO_2 than the atmosphere.[137] This inquiry aligns with Exxon supertanker research into whether the ocean would act as a significant CO_2 sink that would sequester atmospheric CO_2 long enough to allow unabated emissions without triggering dire climatic consequences. As described below,

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[136] *Id.*

[137] Neela Banerjee, *More Exxon Documents Show How Much It Knew About Climate 35 Years Ago*, INSIDE CLIMATE NEWS (Dec. 1, 2015), https://insideclimatenews.org/news/01122015/documents-exxons-early-co2-position-senior-executives-engage-and-warming-forecast.

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Exxon eventually discontinued this research before it produced enough data from which to derive a conclusion.[138]

128. Also in 1980, Imperial Oil (ExxonMobil) reported to Esso and Exxon managers and environmental staff that increases in fossil fuel usage aggravates CO_2 in the atmosphere. Noting that the United Nations was encouraging research into the carbon cycle, Imperial reported that "[t]echnology exists to remove CO_2 from [fossil fuel power plant] stack gases but removal of only 50% of the CO_2 would double the cost of power generation."

129. Exxon scientist Roger Cohen warned his colleagues in a 1981 internal memorandum that "future developments in global data gathering and analysis, along with advances in climate modeling, may provide strong evidence for a delayed CO_2 effect of a truly substantial magnitude," and that under certain circumstances it would be "very likely that we will unambiguously recognize the threat by the year 2000."[139] Cohen had expressed concern that the memorandum mischaracterized potential effects of unabated CO_2 emissions from Defendants' fossil fuel products: ". . . it is distinctly possible that the . . . [Exxon Planning Division's] scenario will produce effects which will indeed be catastrophic (at least for a substantial fraction of the world's population)."[140]

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[138] Neela Banerjee et al., *Exxon Believed Deep Dive into Climate Research Would Protect Its Business*, INSIDE CLIMATE NEWS (Sept. 17, 2015), https://insideclimatenews.org/news/16092015/exxon-believed-deep-dive-into-climate-research-would-protect-its-business.

[139] Roger W. Cohen, *Exxon Memo to W. Glass about possible "catastrophic" effect of CO_2*, Exxon Inter-Office Correspondence (Aug. 18, 1981), http://www.climatefiles.com/exxonmobil/1981-exxon-memo-on-possible-emission-consequences-of-fossil-fuel-consumption.

[140] *Id.*

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130. In 1981, Exxon's Henry Shaw, the company's lead climate researcher at the time, prepared a summary of Exxon's current position on the greenhouse effect for Edward David Jr., president of Exxon Research and Engineering, stating in relevant part:

- "Atmospheric CO_2 will double in 100 years if fossil fuels grow at 1.4%/a^2.
- 3°C global average temperature rise and 10°C at poles if CO_2 doubles.
  - Major shifts in rainfall/agriculture
  - Polar ice may melt"[141]

131. In 1982, another report prepared for API by scientists at the Lamont-Doherty Geological Observatory at Columbia University recognized that atmospheric CO_2 concentration had risen significantly compared to the beginning of the industrial revolution from about 290 parts per million to about 340 parts per million in 1981 and acknowledged that despite differences in climate modelers' predictions, all models indicated a temperature increase caused by anthropogenic CO_2 within a global mean range of 4°C (7.2°F). The report advised that there was scientific consensus that "a doubling of atmospheric CO_2 from [] pre-industrial revolution value would result in an average global temperature rise of (3.0 ± 1.5)°C [5.4 ± 2.7°F]." It went further, warning that "[s]uch a warming can have serious consequences for man's comfort and survival since patterns of aridity and rainfall can change, the height of the sea level can increase considerably and the world food supply can be affected."[142] Exxon's own modeling research confirmed this, and the company's results were later published in at least three peer-reviewed

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[141] Henry Shaw, *Exxon Memo to E. E. David, Jr. about "CO_2Position Statement"*, Exxon Inter-Office Correspondence (May 15, 1981), https://insideclimatenews.org/sites/default/files/documents/Exxon%20Position%20on%20CO2%20%281981%29.pdf.

[142] American Petroleum Institute, *Climate Models and CO_2 Warming: A Selective Review and Summary*, Lamont-Doherty Geological Observatory (Columbia University) (Mar. 1982), https://assets.documentcloud.org/documents/2805626/1982-API-Climate-Models-and-CO2-Warming-a.pdf.

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scientific papers.[143]

132. Also in 1982, Exxon's Environmental Affairs Manager distributed a primer on climate change to a "wide circulation [of] Exxon management . . . intended to familiarize Exxon personnel with the subject."[144] The primer also was "restricted to Exxon personnel and not to be distributed externally."[145] The primer compiled science on climate change available at the time, and confirmed fossil fuel combustion as a primary anthropogenic contributor to global warming. The report estimated a CO_2 doubling around 2090 based on Exxon's long-range modeled outlook. The author warned that "uneven global distribution of increased rainfall and increased evaporation" were expected to occur, and that "disturbances in the existing global water distribution balance would have dramatic impact on soil moisture, and in turn, on agriculture."[146]

133. Moreover, the melting of the Antarctic ice sheet could result in global sea level rise of five feet which would "cause flooding on much of the U.S. East Coast, including the State of Florida and Washington, D.C."[147] Exxon's primer warned that "there are some potentially catastrophic events that must be considered," including sea level rise from melting polar ice sheets. It noted that some scientific groups were concerned "that once the effects are measurable, they might not be reversible."[148]

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[143] *See* Roger W. Cohen, *Exxon Memo summarizing findings of research in climate modeling*, Exxon Research and Engineering Company (Sept. 2, 1982), https://insideclimatenews.org/sites/default/files/documents/%2522Consensus%2522%20on%20CO2%20Impacts%20(1982).pdf (discussing research articles).

[144] M. B. Glaser, *Exxon Memo to Management about "CO_2 'Greenhouse' Effect"*, Exxon Research and Engineering Company (Nov. 12, 1982), http://insideclimatenews.org/sites/default/files/documents/1982%20Exxon%20Primer%20on%20CO2%20Greenhouse%20Effect.pdf.

[145] *Id.*

[146] *Id.*

[147] *Id.*

[148] *Id.*

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134. In a summary of Exxon's climate modeling research from 1982, Director of Exxon's Theoretical and Mathematical Sciences Laboratory Roger Cohen wrote that "the time required for doubling of atmospheric CO_2 depends on future world consumption of fossil fuels." Cohen concluded that Exxon's own results were "consistent with the published predictions of more complex climate models" and "in accord with the scientific consensus on the effect of increased atmospheric CO_2 on climate."[149]

135. At the fourth biennial Maurice Ewing Symposium at the Lamont-Doherty Geophysical Observatory in October 1982, attended by members of API, Exxon Research and Engineering Company president E.E. David delivered a speech titled: "Inventing the Future: Energy and the CO_2 'Greenhouse Effect.'"[150] His remarks included the following statement: "[F]ew people doubt that the world has entered an energy transition away from dependence upon fossil fuels and toward some mix of renewable resources that will not pose problems of CO_2 accumulation." He went on, discussing the human opportunity to address anthropogenic climate change before the point of no return:

> It is ironic that the biggest uncertainties about the CO_2 buildup are not in predicting what the climate will do, but in predicting what people will do. . . .[It] appears we still have time to generate the wealth and knowledge we will need to invent the transition to a stable energy system.

136. Throughout the early 1980s, at Exxon's direction, Exxon climate scientist Henry Shaw forecasted emissions of CO_2 from fossil fuel use. Those estimates were incorporated into Exxon's 21st century energy projections and were distributed among Exxon's various divisions.

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[149] Roger W. Cohen, *Exxon Memo summarizing findings of research in climate modeling*, *supra* note 143.

[150] E. E. David, Jr., *Inventing the Future: Energy and the CO_2 Greenhouse Effect: Remarks at the Fourth Annual Ewing Symposium, Tenafly, NJ* (1982), http://sites.agu.org/publications/files/2015/09/ch1.pdf.

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Shaw's conclusions included an expectation that atmospheric CO_2 concentrations would double in 2090 per the Exxon model, with an attendant 2.3–5.6°F average global temperature increase. Shaw compared his model results to those of the U.S. EPA, the National Academy of Sciences, and the Massachusetts Institute of Technology, indicating that the Exxon model predicted a longer delay than any of the other models, although its temperature increase prediction was in the mid-range of the four projections.[151]

137. During the 1980s, many Defendants formed their own research units focused on climate modeling. The API, including the API CO_2 Task Force, provided a forum for Defendants to share their research efforts and corroborate their findings related to anthropogenic greenhouse gas emissions.[152]

138. During this time, Defendants' statements express an understanding of their obligation to consider and mitigate the externalities of unabated promotion, marketing, and sale of their fossil fuel products. For example, in 1988, Richard Tucker, the president of Mobil Oil, presented at the American Institute of Chemical Engineers National Meeting, the premier educational forum for chemical engineers, where he stated:

> [H]umanity, which has created the industrial system that has transformed civilities, is also responsible for the environment, which sometimes is at risk because of unintended consequences of industrialization. . . . Maintaining the health of this life-support system is emerging as one of the highest priorities. . . . [W]e must all be environmentalists.
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> The environmental covenant requires action on many fronts . . . the low-atmosphere ozone problem, the upper-atmosphere ozone problem and the

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[151] Neela Banerjee, *More Exxon Documents Show How Much It Knew About Climate 35 Years Ago*, INSIDE CLIMATE NEWS (Dec. 1, 2015), https://insideclimatenews.org/news/01122015/documents-exxons-early-co2-position-senior-executives-engage-and-warming-forecast.

[152] Neela Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, *supra* note 126.

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> greenhouse effect, to name a few. . . . Our strategy must be to reduce pollution before it is ever generated—to prevent problems at the source.
>
> Prevention means engineering a new generation of fuels, lubricants and chemical products. . . . Prevention means designing catalysts and processes that minimize or eliminate the production of unwanted byproducts. . . . Prevention on a global scale may even require a dramatic reduction in our dependence on fossil fuels—and a shift towards solar, hydrogen, and safe nuclear power. It may be possible that—just possible—that the energy industry will transform itself so completely that observers will declare it a new industry. . . . Brute force, low-tech responses and money alone won't meet the challenges we face in the energy industry.[153]

139. Also in 1988, the Shell Greenhouse Effect Working Group issued a confidential internal report, "The Greenhouse Effect," which acknowledged global warming's anthropogenic nature: "Man-made carbon dioxide released into and accumulated in the atmosphere is believed to warm the earth through the so-called greenhouse effect." The authors also noted the burning of fossil fuels as a primary driver of CO_2 buildup and warned that warming could "create significant changes in sea level, ocean currents, precipitation patterns, regional temperature and weather." Taking it a step further, they pointed to the potential for "direct operational consequences" of sea level rise on "offshore installations, coastal facilities and operations (e.g. platforms, harbours, refineries, depots)."[154]

140. Similar to early warnings by Exxon scientists, the Shell report notes that "by the time the global warming becomes detectable it could be too late to take effective countermeasures to reduce the effects or even to stabilize the situation." The authors mention the need to consider policy changes on multiple occasions, noting that "the potential implications for the world are…so

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[153] Richard E. Tucker, *High Tech Frontiers in the Energy Industry: The Challenge Ahead*, AIChE National Meeting (Nov. 30, 1988), https://hdl.handle.net/2027/pur1.32754074119482?urlappend=%3Bseq=522.

[154] Greenhouse Effect Working Group, *The Greenhouse Effect*, Shell Internationale Petroleum, 30 (May 1988), https://www.documentcloud.org/documents/4411090-Document3.html#document/p9/a411239.

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large that policy options need to be considered much earlier" and that research should be "directed more to the analysis of policy and energy options than to studies of what we will be facing exactly."

141. In 1989, Esso Resources Canada (ExxonMobil) commissioned a report on the impacts of climate change on existing and proposed natural gas facilities in the Mackenzie River Valley and Delta, including extraction facilities on the Beaufort Sea and a pipeline crossing Canada's Northwest Territory.[155] It reported that "large zones of the Mackenzie Valley could be affected dramatically by climatic change" and that "the greatest concern in Norman Wells [oil town in North West Territories, Canada] should be the changes in permafrost that are likely to occur under conditions of climate warming." The report concluded that, in light of climate models showing a "general tendency towards warmer and wetter climate," operation of those facilities would be compromised by increased precipitation, increase in air temperature, changes in permafrost conditions, and significantly, sea level rise and erosion damage. The authors recommended factoring these eventualities into future development planning and also warned that "a rise in sea level could cause increased flooding and erosion damage on Richards Island."[156]

142. In 1991, Shell produced a film called "Climate of Concern." The film advises that while "no two [climate change projection] scenarios fully agree, . . . [they] have each prompted the same serious warning. A warning endorsed by a uniquely broad consensus of scientists in their report to the UN at the end of 1990." The warning was of an increasing frequency of abnormal weather and of sea level rise of about one meter over the coming century. Shell specifically described the impacts of anthropogenic sea level rise on tropical islands, "barely afloat even now,

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[155]Stephen Lonergan & Kathy Young, *An Assessment of the Effects of Climate Warming on Energy Developments in the Mackenzie River Valley and Delta, Canadian Arctic*, 7 ENERGY EXPLORATION & EXPLOITATION 359–81 (Oct. 1, 1989), http://journals.sagepub.com/doi/abs/10.1177/014459878900700508.

[156] *Id.*

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. . . [f]irst made uninhabitable and then obliterated beneath the waves. Wetland habitats destroyed by intruding salt. Coastal lowlands suffering pollution of precious groundwater." It warned of "greenhouse refugees," people who abandoned homelands inundated by the sea, or displaced because of catastrophic changes to the environment. The video concludes with a stark admonition: "Global warming is not yet certain, but many think that the wait for final proof would be irresponsible. Action now is seen as the only safe insurance."[157]

143. The fossil fuel industry, including Defendants, was at the forefront of carbon dioxide research for much of the latter half of the 20th century. They developed cutting edge and innovative technology and worked with many of the field's top researchers to produce exceptionally sophisticated studies and models. For instance, in the mid-nineties Shell began using scenarios to plan how the company could respond to various global forces in the future. In one scenario published in a 1998 internal report, Shell paints an eerily prescient scene:

> In 2010, a series of violent storms causes extensive damage to the eastern coast of the U.S. Although it is not clear whether the storms are caused by climate change, people are not willing to take further chances. The insurance industry refuses to accept liability, setting off a fierce debate over who is liable: the insurance industry or the government. After all, two successive IPCC reports since 1993 have reinforced the human connection to climate change"… "Following the storms, a coalition of environmental NGOs brings a class-action suit against the US government and fossil-fuel companies on the grounds of neglecting what scientists (including their own) have been saying for years: that something must be done. A social reaction to the use of fossil fuels grows, and individuals become 'vigilante environmentalists' in the same way, a generation earlier, they had become fiercely anti-tobacco. Direct-action campaigns against companies escalate. Young consumers, especially, demand action[158]

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[157] Jelmer Mommers, *Shell Made a Film About Climate Change in 1991 (Then Neglected To Heed Its Own Warning)*, DE CORRESPONDENT (Feb. 27, 2017), https://thecorrespondent.com/6285/shell-made-a-film-about-climate-change-in-1991-then-neglected-to-heed-its-own-warning/692663565-875331f6.

[158] Royal Dutch/Shell Group, *Group Scenarios 1998–2020*, 115 (1998), http://www.documentcloud.org/documents/4430277-27-1-Compiled.html.

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144. Fossil fuel companies did not just consider climate change impacts in scenarios. In the mid-1990s, ExxonMobil, Shell, and Imperial Oil (ExxonMobil) jointly undertook the Sable Offshore Energy Project in Nova Scotia. The project's own Environmental Impact Statement declared: "The impact of a global warming sea-level rise may be particularly significant in Nova Scotia. The long-term tide gauge records at a number of locations along the N.S. coast have shown sea level has been rising over the past century. . . . For the design of coastal and offshore structures, an estimated rise in water level, due to global warming, of 0.5 m [1.64 feet] may be assumed for the proposed project life (25 years)."[159]

145. Climate change research conducted by Defendants and their industry associations frequently acknowledged uncertainties in their climate modeling—those uncertainties, however, were merely with respect to the magnitude and timing of climate impacts resulting from fossil fuel consumption, not that significant changes would eventually occur. The Defendants' researchers and the researchers at their industry associations harbored little doubt that climate change was occurring and that fossil fuel products were, and are, the primary cause.

146. Despite the overwhelming information about the threats to people and the planet posed by continued unabated use of their fossil fuel products, Defendants failed to act as they reasonably should have to mitigate or avoid those dire adverse impacts. Defendants instead adopted the position, as described below, that the absence of meaningful regulations on the consumption of their fossil fuel products was the equivalent of a license to continue the pursuit of profits from those products. This position was an abdication of Defendants' responsibility to

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[159] ExxonMobil, Sable Project, Development Plan, *Volume 3 – Environmental Impact Statement* Ch 4: Environmental Setting, 4-77, http://soep.com/about-the-project/development-plan-application.

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consumers and the public, including the State, to act on their superior knowledge of the reasonably foreseeable hazards of unabated production and consumption of their fossil fuel products.

I. Defendants Did Not Disclose Known Harms Associated with the Extraction, Promotion, and Consumption of Their Fossil Fuel Products, and Instead Affirmatively Acted to Obscure Those Harms and Engaged in a Concerted Campaign to Evade Regulation.

147. By 1988, Defendants had amassed a compelling body of knowledge, unavailable to the general public and the broader scientific community, about the role of anthropogenic greenhouse gases and specifically those emitted from the normal use of Defendants' fossil fuel products, in causing global warming, disruptions to the hydrologic cycle, extreme precipitation and drought, heatwaves, and associated consequences for human communities and the environment. On notice that their products were causing global climate change and dire effects on the planet, Defendants were faced with the decision and were in control of whether to take steps to limit the damages their fossil fuel products were causing and would continue to cause for virtually every one of Earth's inhabitants, including the State of Rhode Island and its citizens.

148. Defendants at any time before or thereafter could and reasonably should have taken any of a number of steps to mitigate the damages caused by their fossil fuel products, and their own comments reveal an awareness of what some of these steps may have been. Defendants should have made reasonable warnings to consumers, the public, and regulators of the dangers known to Defendants of the unabated consumption of their fossil fuel products, and they should have taken reasonable steps to limit the potential greenhouse gas emissions arising out of their fossil fuel products.

149. But several key events during the period 1988–1992 appear to have prompted Defendants to change their course of action from general research and internal discussion on

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climate change to a public campaign aimed at evading regulation of their fossil fuel products and/or emissions therefrom. These include:

a. In 1988, National Aeronautics and Space Administration ("NASA") scientists confirmed that human activities were actually contributing to global warming.[160] On June 23 of that year, NASA scientist James Hansen's presentation of this information to Congress engendered significant news coverage and publicity for the announcement, including coverage on the front page of the New York Times.

b. On July 28, 1988, Senator Robert Stafford and four bipartisan co-sponsors introduced S. 2666, "The Global Environmental Protection Act," to regulate CO_2 and other greenhouse gases. Four more bipartisan bills to significantly reduce CO_2 pollution were introduced over the following ten weeks, and in August, U.S. Presidential candidate George H.W. Bush pledged that his presidency would "combat the greenhouse effect with the White House effect."[161] Political will in the United States to reduce anthropogenic greenhouse gas emissions and mitigate the harms associated with Defendants' fossil fuel products was gaining momentum.

c. In December 1988, the United Nations formed the Intergovernmental Panel on Climate Change ("IPCC"), a scientific panel dedicated to providing the

[160] *See* Peter C. Frumhoff et al., *The Climate Responsibilities of Industrial Carbon Producers*, 132 CLIMATIC CHANGE 161 (2015).

[161] N.Y. TIMES, *The White House and the Greenhouse* (May 9, 1998), http://www.nytimes.com/1989/05/09/opinion/the-white-house-and-the-greenhouse.html.

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world's governments with an objective, scientific analysis of climate change and its environmental, political, and economic impacts.

d. In 1990, the IPCC published its First Assessment Report on anthropogenic climate change,[162] in which it concluded that (1) "there is a natural greenhouse effect which already keeps the Earth warmer than it would otherwise be," and (2) that

> emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases carbon dioxide, methane, chlorofluorocarbons (CFCs) and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface. The main greenhouse gas, water vapour, will increase in response to global warming and further enhance it.[163]

The IPCC reconfirmed these conclusions in a 1992 supplement to the First Assessment report.[164]

e. The United Nations began preparation for the 1992 Earth Summit in Rio de Janeiro, Brazil, a major, newsworthy gathering of 172 world governments, of which 116 sent their heads of state. The Summit resulted in the United Nations Framework Convention on Climate Change ("UNFCCC"), an international environmental treaty providing protocols for future negotiations aimed at "stabiliz[ing] greenhouse gas concentrations in the atmosphere at a level that

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[162] *See* IPCC, *Reports*, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.

[163] IPCC, *Climate Change: The IPCC Scientific Assessment*, Policymakers Summary (1990), http://www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_spm.pdf.

[164] IPCC, *1992 IPCC Supplement to the First Assessment Report* (1992), http://www.ipcc.ch/publications_and_data/publications_ipcc_90_92_assessments_far.shtml.

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would prevent dangerous anthropogenic interference with the climate system."[165]

150. These world events marked a shift in public discussion of climate change, and the initiation of international efforts to curb anthropogenic greenhouse emissions – developments that had stark implications for, and would have diminished the profitability of, Defendants' fossil fuel products.

151. But rather than collaborating with the international community by acting to forestall, or at least decrease, their fossil fuel products' contributions to global warming, sea level rise, disruptions to the hydrologic cycle, and associated consequences to Rhode Island and other communities, Defendants embarked on a decades-long campaign designed to maximize continued dependence on their products and undermine national and international efforts like the Kyoto Protocol to rein in greenhouse gas emissions.

152. Defendants' campaign, which focused on concealing, discrediting, and/or misrepresenting information that tended to support restricting consumption of (and thereby decreasing demand for) Defendants' fossil fuel products, took several forms. The campaign enabled Defendants to accelerate their business practice of exploiting fossil fuel reserves, and concurrently externalize the social and environmental costs of their fossil fuel products. These activities stood in direct contradiction to Defendants' own prior recognition that the science of anthropogenic climate change was clear and that the greatest uncertainties involved responsive human behavior, not scientific understanding of the issue.

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[165] United Nations, *United Nations Framework Convention on Climate Change*, Article 2 (1992), https://unfccc.int/resource/docs/convkp/conveng.pdf.

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153. Defendants took affirmative steps to conceal, from the State and the general public, the foreseeable impacts of the use of their fossil fuel products on the Earth's climate and associated harms to people and communities. Defendants embarked on a concerted public relations campaign to cast doubt on the science connecting global climate change to fossil fuel products and greenhouse gas emissions, in order to influence public perception of the existence of anthropogenic global warming and sea level rise, disruptions to weather cycles, extreme precipitation and drought, and associated consequences. The effort included promoting their hazardous products through advertising campaigns and the initiation and funding of climate change denialist organizations, designed to influence consumers to continue using Defendants' fossil fuel products irrespective of those products' damage to communities and the environment.

154. For example, in 1988, Joseph Carlson, an Exxon public affairs manager, described the "Exxon Position," which included among others, two important messaging tenets: (1) "[e]mphasize the uncertainty in scientific conclusions regarding the potential enhanced Greenhouse Effect;" and (2) "[r]esist the overstatement and sensationalization [sic] of potential greenhouse effect which could lead to noneconomic development of non-fossil fuel resources."[166]

155. A 1994 Shell report entitled "The Enhanced Greenhouse Effect: A Review of the Scientific Aspects" by Royal Dutch Shell environmental advisor Peter Langcake stands in stark contrast to the company's 1988 report on the same topic. Whereas before, the authors recommended consideration of policy solutions early on, Langcake warned of the potentially dramatic "economic effects of ill-advised policy measures." While the report recognized the IPCC conclusions as the mainstream view, Langcake still emphasized scientific uncertainty, noting, for

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[166] Joseph M. Carlson, *Exxon Memo on "The Greenhouse Effect"* (Aug. 3, 1988), https://assets.documentcloud.org/documents/3024180/1998-Exxon-Memo-on-the-Greenhouse-Effect.pdf.

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example, that "the postulated link between any observed temperature rise and human activities has to be seen in relation to natural variability, which is still largely unpredictable." The Group position is stated clearly in the report: "Scientific uncertainty and the evolution of energy systems indicate that policies to curb greenhouse gas emissions beyond 'no regrets' measures could be premature, divert resources from more pressing needs and further distort markets."[167]

156. In 1991, for example, the Information Council for the Environment ("ICE"), whose members included affiliates, predecessors and/or subsidiaries of Defendants, including Pittsburg and Midway Coal Mining (Chevron) and Island Creek Coal Company (Occidental), launched a national climate change science denial campaign with full-page newspaper ads, radio commercials, a public relations tour schedule, "mailers," and research tools to measure campaign success. Included among the campaign strategies was to "reposition global warming as theory (not fact)." Its target audience included older less-educated males who are "predisposed to favor the ICE agenda, and likely to be even more supportive of that agenda following exposure to new info."[168]

157. An implicit goal of ICE's advertising campaign was to change public opinion and avoid regulation. A memo from Richard Lawson, president of the National Coal Association asked members to contribute to the ICE campaign with the justification that "policymakers are prepared to act [on global warming]. Public opinion polls reveal that 60% of the American people already

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[167] P. Langcake, *The Enhanced Greenhouse Effect: A review of the Scientific Aspects*, (Dec. 1994), https://www.documentcloud.org/documents/4411099-Document11.html#document/p15/a411511.

[168] Union of Concerned Scientists, *Deception Dossier #5: Coal's "Information Council on the Environment" Sham* (1991), http://www.ucsusa.org/sites/default/files/attach/2015/07/Climate-Deception-Dossier-5_ICE.pdf.

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believe global warming is a serious environmental problem. Our industry cannot sit on the sidelines in this debate."[169]

158. The following images are examples of ICE-funded print advertisements challenging the validity of climate science and intended to obscure the scientific consensus on anthropogenic climate change and induce political inertia to address it.[170]

Fig. 7: Information Council for the Environment Advertisements

159. In 1996, Exxon released a publication called "Global Warming: Who's Right? Facts about a debate that's turned up more questions than answers." In the publication's preface, Exxon CEO Lee Raymond stated that "taking drastic action immediately is unnecessary since many scientists agree there's ample time to better understand the climate system." The subsequent article described the greenhouse effect as "unquestionably real and definitely a good thing," while ignoring the severe consequences that would result from the influence of the increased CO_2 concentration on the Earth's climate. Instead, it characterized the greenhouse effect as simply

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[169] Naomi Oreskes, *My Facts Are Better Than Your Facts: Spreading Good News about Global Warming* (2010), in Peter Howlett et al., *How Well Do Facts Travel?: The Dissemination of Reliable Knowledge*, 136–66, Cambridge University Press (2011).

[170] Union of Concerned Scientists, *Deception Dossier #5: Coal's "Information Council on the Environment" Sham*, *supra* note 168, at 47–49.

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"what makes the earth's atmosphere livable." Directly contradicting their own internal reports and peer-reviewed science, the article ascribed the rise in temperature since the late 19th century to "natural fluctuations that occur over long periods of time" rather than to the anthropogenic emissions that Exxon and other scientists had confirmed were responsible. The article also falsely challenged the computer models that projected the future impacts of unabated fossil fuel product consumption, including those developed by Exxon's own employees, as having been "proved to be inaccurate." The article contradicted the numerous reports circulated among Exxon's staff, and by the API, by stating that "the indications are that a warmer world would be far more benign than many imagine . . . moderate warming would reduce mortality rates in the US, so a slightly warmer climate would be more healthful." Raymond concluded his preface by attacking advocates for limiting the use of his company's fossil fuel products as "drawing on bad science, faulty logic, or unrealistic assumptions" – despite the important role that Exxon's own scientists had played in compiling those same scientific underpinnings.[171]

160. API published an extensive report in the same year warning against concern over CO_2 buildup and any need to curb consumption or regulate the industry. The introduction states that "there is no persuasive basis for forcing Americans to dramatically change their lifestyles to use less oil." The authors discourage the further development of certain alternative energy sources, writing that "government agencies have advocated the increased use of ethanol and the electric car, without the facts to support the assertion that either is superior to existing fuels and technologies" and that "policies that mandate replacing oil with specific alternative fuel technologies freeze progress at the current level of technology, and reduce the chance that

[171] Exxon Corp., *Global Warming: Who's Right?*, (1996), https://www.documentcloud.org/documents/2805542-Exxon-Global-Warming-Whos-Right.html.

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innovation will develop better solutions." The paper also denies the human connection to climate change, saying that no "scientific evidence exists that human activities are significantly affecting sea levels, rainfall, surface temperatures or the intensity and frequency of storms." The message the report repeatedly sends is clear: "Facts don't support the arguments for restraining oil use."[172]

161. In a speech presented at the World Petroleum Congress in Beijing in 1997 at which many of the Defendants were present, Exxon CEO Lee Raymond reiterated these views. This time, he presented a false dichotomy between stable energy markets and abatement of the marketing, promotion, and sale of fossil fuel products known to Defendants to be hazardous. He stated:

> Some people who argue that we should drastically curtail our use of fossil fuels for environmental reasons . . . my belief [is] that such proposals are neither prudent nor practical. With no readily available economic alternatives on the horizon, fossil fuels will continue to supply most of the world's and this region's energy for the foreseeable future.
>
> Governments also need to provide a stable investment climate . . . They should avoid the temptation to intervene in energy markets in ways that give advantage to one competitor over another or one fuel over another.
>
> We also have to keep in mind that most of the greenhouse effects comes from natural sources . . . Leaping to radically cut this tiny sliver of the greenhouse pie on the premise that it will affect climate defies common sense and lacks foundation in our current understanding of the climate system.
>
> Let's agree there's a lot we really don't know about how climate will change in the 21st century and beyond . . . It is highly unlikely that the temperature in the middle of the next century will be significantly affected whether policies are enacted now or 20 years from now. It's bad public policy to impose very costly regulations and restrictions when their need has yet to be proven.[173]

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[172] Sally Brain Gentille et al., *Reinventing Energy: Making the Right Choices, American Petroleum Institute*, (1996), http://www.climatefiles.com/trade-group/american-petroleum-institute/1996-reinventing-energy.

[173] Lee R. Raymond, *Energy – Key to growth and a better environment for Asia-Pacific nations,* World Petroleum Congress (Oct. 13, 1997), https://assets.documentcloud.org/documents/2840902/1997-Lee-Raymond-Speech-at-China-World-Petroleum.pdf.

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162. Imperial Oil (ExxonMobil) CEO Robert Peterson falsely denied the established connection between Defendants' fossil fuel products and anthropogenic climate change in the Summer 1998 Imperial Oil Review, "A Cleaner Canada:"

> [T]his issue [referring to climate change] has absolutely nothing to do with pollution and air quality. Carbon dioxide is not a pollutant but an essential ingredient of life on this planet . . . .[T]he question of whether or not the trapping of 'greenhouse gases will result in the planet's getting warmer . . . has no connection whatsoever with our day-to-day weather.
>
> There is absolutely no agreement among climatologists on whether or not the planet is getting warmer, or, if it is, on whether the warming is the result of man-made factors or natural variations in the climate. . . . I feel very safe in saying that the view that burning fossil fuels will result in global climate change remains an unproved hypothesis.[174]

163. Mobil (ExxonMobil) paid for a series of "advertorials," advertisements located in the editorial section of the New York Times and meant to look like editorials rather than paid ads. These ads discussed various aspects of the public discussion of climate change and sought to undermine the justifications for tackling greenhouse gas emissions as unsettled science. The 1997 advertorial below[175] argued that economic analysis of emissions restrictions was faulty and inconclusive and therefore a justification for delaying action on climate change.

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[174] Robert Peterson, *A Cleaner Canada in Imperial Oil Review* (1998), http://www.documentcloud.org/documents/2827818-1998-Imperial-Oil-Robert-Peterson-A-Cleaner-Canada.html.

[175] Mobil, *When Facts Don't Square with the Theory, Throw Out the Facts*, N.Y. TIMES, A31 (Aug. 14, 1997), https://www.documentcloud.org/documents/705550-mob-nyt-1997-aug-14-whenfactsdontsquare.html.

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like race.

But when we no longer allow those choices, both civility and common sense will have been diminished. □

who was dragged from his sister's car by police officers and shot in the face at point-blank range. The cops who have the power to do something about those officers, but choose not to. □

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When facts don't square with the theory, throw out the facts

That seems to characterize the administration's attitude on two of its own studies which show that international efforts to curb global warming could spark a big run-up in energy prices.

For months, the administration—playing its cards close to the vest—has promised to provide details of the emission reduction plan it will put on the table at the climate change meeting in Kyoto, Japan, later this year. It also promised to evaluate the economics of that policy and measure its impact. Those results are important because the proposals submitted by other countries thus far would be disruptive and costly to the U.S. economy.

Yet, when the results from its own economic models were finally generated, the administration started distancing itself from the findings and models that produced them. The administration's top economic advisor said that economic models can't provide a "definitive answer" on the impact of controlling emissions. The effort, she said, was "futile." At best, the models can only provide a "range of potential impacts."

Frankly, we're puzzled. The White House has promised to lay the economic facts before the public. Yet, the administration's top advisor said such an analysis won't be based on models and it will "preclude . . . detailed numbers." If you don't provide numbers and don't rely on models, what kind of rigorous economic examination can Congress and the public expect?

We're also puzzled by ambivalence over models. The administration downplays the utility of economic models to forecast cost impacts 10–15 years from now, yet its negotiators accept as gospel the 50–100-year predictions of global warming that have been generated by climate models—many of which have been criticized as seriously flawed.

The second study, conducted by Argonne National Laboratory under a contract with the Energy Department, examined what would happen if the U.S. had to commit to higher energy prices under the emission reduction plans that several nations had advanced last year. Such increases, the report concluded, would result in "significant reductions in output and employment" in six industries—aluminum, cement, chemical, paper and pulp, petroleum refining and steel.

Hit hardest, the study noted, would be the chemical industry, with estimates that up to 30 percent of U.S. chemical manufacturing capacity would move offshore to developing countries. Job losses could amount to some 200,000 in that industry, with another 100,000 in the steel sector. And despite the substantial loss of U.S. jobs and manufacturing capacity, the net emission reduction could be insignificant since developing countries will not be bound by the emission targets of a global warming treaty.

Downplaying Argonne's findings, the Energy Department noted that the study used outdated energy prices (mid-1996), didn't reflect the gains that would come from international emissions trading and failed to factor in the benefits of accelerated developments in energy efficiency and low-carbon technologies.

What it failed to mention is just what these new technologies are and when we can expect their benefits to kick in. As for emissions trading, many economists have theorized about the role they could play in reducing emissions, but few have grappled with the practicality of implementing and policing such a scheme.

We applaud the goals the U.S. wants to achieve in these upcoming negotiations—namely, that a final agreement must be "flexible, cost-effective, realistic, achievable and ultimately global in scope." But until we see the details of the administration's policy, we are concerned that plans are being developed in the absence of rigorous economic analysis. Too much is at stake to simply ignore facts that don't square with preconceived theories.

Mobil The energy to make a difference.

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164. In 1998, API, on behalf of Defendants, among other fossil fuel companies and organizations supported by fossil fuel corporate grants, developed a Global Climate Science Communications Plan that stated that unless "climate change becomes a non-issue . . . there may be no moment when we can declare victory for our efforts." Rather, API proclaimed that "[v]ictory will be achieved when . . . average citizens 'understand' (recognize) uncertainties in climate science; [and when] recognition of uncertainties becomes part of the 'conventional wisdom.'"[176] The multi-million-dollar, multi-year proposed budget included public outreach and the dissemination of educational materials to schools to "begin to erect a barrier against further efforts to impose Kyoto-like measures in the future"[177] – a blatant attempt to disrupt international efforts, pursuant to the UNFCCC, to negotiate a treaty that curbed greenhouse gas emissions.

165. Soon after, API distributed a memo to its members identifying public agreement on fossil fuel products' role in climate change as its highest priority issue.[178] The memorandum illuminates API's and Defendants' concern over the potential regulation of Defendants' fossil fuel products: "Climate is at the center of the industry's business interests. Policies limiting carbon emissions reduce petroleum product use. That is why it is API's highest priority issue and defined as 'strategic.'"[179] Further, the API memo stresses many of the strategies that Defendants individually and collectively utilized to combat the perception of their fossil fuel products as hazardous. These included:

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[176] Joe Walker, *E-mail to Global Climate Science Team, attaching the Draft Global Science Communications Plan* (Apr. 3, 1998), https://assets.documentcloud.org/documents/784572/api-global-climate-science-communications-plan.pdf.

[177] *Id.*

[178] Committee on Oversight and Government Reform, *Allegations of Political Interference with Government Climate Change Science*, 51 (Mar. 19, 2007), https://ia601904.us.archive.org/25/items/gov.gpo.fdsys.CHRG-110hhrg37415/CHRG-110hhrg37415.pdf.

[179] *Id.*

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a. Influencing the tenor of the climate change "debate" as a means to establish that greenhouse gas reduction policies like the Kyoto Protocol were not necessary to address climate change responsibly;

b. Maintaining strong working relationships between government regulators and communications-oriented organizations like the Global Climate Coalition, the Heartland Institute, and other groups carrying Defendants' message minimizing the hazards of the unabated use of their fossil fuel products and opposing regulation thereof;

c. Building the case for (and falsely dichotomizing) Defendants' positive contributions to a "long-term approach" (ostensibly for regulation of their products) as a reason for society to reject short term fossil fuel emissions regulations, and engaging in climate change science uncertainty research; and

d. Presenting Defendants' positions on climate change in domestic and international forums, including by preparing rebuttals to IPCC reports.

166. Additionally, Defendants mounted a campaign against regulation of their business practices in order to continue placing their fossil fuel products into the stream of commerce, despite their own knowledge and the growing national and international scientific consensus about the hazards of doing so. These efforts came despite Defendants' recent recognition that "risks to nearly every facet of life on Earth . . . could be avoided only if timely steps were taken to address climate change."[180]

[180] Neela Banerjee, *Exxon's Oil Industry Peers Knew About Climate Dangers in the 1970s, Too*, *supra* note 126.

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167. The Global Climate Coalition ("GCC"), on behalf of Defendants and other fossil fuel companies, funded advertising campaigns and distributed material to generate public uncertainty around the climate debate, with the specific purpose of preventing U.S. adoption of the Kyoto Protocol, despite the leading role that the U.S. had played in the Protocol negotiations.[181] Despite an internal primer stating that various "contrarian theories" [i.e., climate change skepticism] do not "offer convincing arguments against the conventional model of greenhouse gas emission-induced climate change," GCC excluded this section from the public version of the backgrounder and instead funded efforts to promote some of those same contrarian theories over subsequent years.[182]

168. A key strategy in Defendants' efforts to discredit scientific consensus on climate change and the IPCC was to bankroll scientists who, although accredited, held fringe opinions that were even more questionable given the sources of their research funding. These scientists obtained part or all of their research budget from Defendants directly or through Defendant-funded organizations like API,[183] but they frequently failed to disclose their fossil fuel industry underwriters.[184]

169. Creating a false sense of disagreement in the scientific community (despite the consensus that its own scientists, experts, and managers had previously acknowledged) has had an

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[181] *Id.*

[182] Gregory J. Dana, *Memo to AIAM Technical Committee Re: Global Climate Coalition (GCC) – Primer on Climate Change Science – Final Draft*, Association of International Automobile Manufacturers (Jan. 18, 1996), http://www.webcitation.org/6FyqHawb9.

[183] *E.g.*, Willie Soon & Sallie Baliunas, *Proxy Climatic and Environmental Changes of the Past 1000 Years*, 23 CLIMATE RESEARCH 88, 105 (Jan. 31, 2003), http://www.int-res.com/articles/cr2003/23/c023p089.pdf.

[184] *E.g.*, Newsdesk, *Smithsonian Statement: Dr. Wei-Hock (Willie) Soon*, SMITHSONIAN (Feb. 26, 2015), http://newsdesk.si.edu/releases/smithsonian-statement-dr-wei-hock-willie-soon.

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evident impact on public opinion. A 2007 Yale University-Gallup poll found that while 71% of Americans personally believed global warming was happening, only 48% believed that there was a consensus among the scientific community, and 40% believed there was a lot of disagreement among scientists over whether global warming was occurring.[185]

170. 2007 was the same year the IPCC published its Fourth Assessment Report, in which it concluded that "there is *very high confidence* that the net effect of human activities since 1750 has been one of warming."[186] The IPCC defined "very high confidence" as at least a 9 out of 10 chance.[187]

171. Defendants borrowed pages out of the playbook of prior denialist campaigns. A "Global Climate Science Team" ("GCST") was created that mirrored a front group created by the tobacco industry, known as The Advancement of Sound Science Coalition, whose purpose was to sow uncertainty about the fact that cigarette smoke is carcinogenic. The GCST's membership included Steve Milloy (a key player on the tobacco industry's front group), Exxon's senior environmental lobbyist; an API public relations representative; and representatives from Chevron and Southern Company that drafted API's 1998 Communications Plan. There were no scientists on the "Global Climate Science Team." GCST developed a strategy to spend millions of dollars manufacturing climate change uncertainty. Between 2000 and 2004, Exxon donated $110,000 to Milloy's efforts and another organization, the Free Enterprise Education Institute and $50,000 to

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[185] *American Opinions on Global Warming: A Yale/Gallup/Clearvision Poll*, Yale Program on Climate Change Communication (July 31, 2007), http://climatecommunication.yale.edu/publications/american-opinions-on-global-warming.

[186] IPCC, *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007), https://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf.

[187] *Id.*

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the Free Enterprise Action Institute, both registered to Milloy's home address.[188]

172. Defendants by and through their trade association memberships, worked directly, and often in a deliberately obscured manner, to evade regulation of the emissions resulting from use of their fossil fuel products.

173. Defendants have funded dozens of think tanks, front groups, and industry-controlled foundations pushing climate change denial. These include the Competitive Enterprise Institute, the Heartland Institute, Frontiers for Freedom, Committee for a Constructive Tomorrow, and Heritage Foundation. From 1998 to 2014 ExxonMobil spent almost $31 million funding numerous organizations misrepresenting the scientific consensus that Defendants' fossil fuel products were causing climate change, sea level rise, and injuries to coastal communities, including Rhode Island.[189] Several Defendants have been linked to other groups that undermine the scientific basis linking Defendants' fossil fuel products to climate change and sea level rise, including the Frontiers of Freedom Institute and the George C. Marshall Institute.

174. Exxon acknowledged its own previous success in sowing uncertainty and slowing mitigation through funding of climate denial groups. In its 2007 Corporate Citizenship Report, Exxon declared: "In 2008, we will discontinue contributions to several public policy research groups whose position on climate change could divert attention from the important discussion on how the world will secure the energy required for economic growth in an environmentally

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[188] Seth Shulman et al., *Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco's Tactics to Manufacture Uncertainty on Climate Science*, Union of Concerned Scientists, 19 (Jan. 2007), http://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/exxon_report.pdf.

[189] ExxonSecrets.org, *ExxonMobil Climate Denial Funding 1998–2014* (accessed June 27, 2018), http://exxonsecrets.org/html/index.php.

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responsible manner."[190] Despite this pronouncement, Exxon remained financially associated with several such groups after the report's publication.

175. Today, Defendants, including Exxon, Chevron, BP, Shell, and ConocoPhillips publicly purport to accept the consensus embodied in the most recent IPCC reports, that global warming is occurring, and that human activity has been the dominant cause of global warming and related climactic changes since the beginning of the Great Acceleration. At the same time, however, Defendants continue to play up the uncertainty of future climate modeling, and the purported historic uncertainty, imprecision, and inconsistency of climate science to disguise and distract from their own knowledge and intensive research dating back to at least 1960s. While Defendants claim to accept the scientific consensus on climate change, moreover, they still continue to promote and expand their exploration, production, promotion, marketing, and sale of fossil fuels that are the dominant cause of anthropogenic global warming.

176. Defendants could have contributed to the global effort to mitigate the impacts of greenhouse gas emissions by, for example delineating practical technical strategies, policy goals, and regulatory structures that would have allowed them to continue their business ventures while reducing greenhouse gas emissions and supporting a transition to a lower carbon future. Instead, Defendants undertook a momentous effort to evade international and national regulation of greenhouse gas emissions to enable them to continue unabated fossil fuel production.

177. As a result of Defendants' tortious, misleading conduct, reasonable consumers of Defendants' fossil fuel products and policy-makers, have been deliberately and unnecessarily deceived about: the role of fossil fuel products in causing global warming, sea level rise, disruptions to the hydrologic cycle, and increased extreme precipitation, extreme temperatures,

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[190] ExxonMobil, *2007 Corporate Citizenship Report* (Dec. 31, 2007).

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and drought; the acceleration of global warming since the mid-20th century and the continuation thereof; and about the fact that the continued increase in fossil fuel product consumption that creates severe environmental threats and significant economic costs for coastal communities, including Rhode Island. Reasonable consumers and policy makers have also been deceived about the depth and breadth of the state of the scientific evidence on anthropogenic climate change, and in particular, about the strength of the scientific consensus demonstrating the role of fossil fuels in causing both climate change and a wide range of potentially destructive impacts, including sea level rise, disruptions to the hydrologic cycle, extreme precipitation, heatwaves, drought, and associated consequences.

J. In Contrast to Their Public Statements, Defendants' Internal Actions Demonstrate Their Awareness of and Intent to Profit from the Unabated Use of Fossil Fuel Products.

178. In contrast to their public-facing efforts challenging the validity of the scientific consensus about anthropogenic climate change, Defendants' acts and omissions evidence their internal acknowledgement of the reality of climate change and its likely consequences. These actions include, but are not limited to, making multi-billion-dollar infrastructure investments for their own operations that acknowledge the reality of coming anthropogenic climate-related change. These investments include (among others), raising offshore oil platforms to protect against sea level rise; reinforcing offshore oil platforms to withstand increased wave strength and storm severity; and developing and patenting designs for equipment intended to extract crude oil and/or natural gas in areas previously unreachable because of the presence of polar ice sheets.[191]

[191] Amy Lieberman & Suzanne Rust, *Big Oil braced for global warming while it fought regulations*, L.A. TIMES (Dec. 31, 2015), http://graphics.latimes.com/oil-operations.

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179. For example, in 1973 Exxon obtained a patent for a cargo ship capable of breaking through sea ice[192] and for an oil tanker[193] designed specifically for use in previously unreachable areas of the Arctic.

180. In 1974, Chevron obtained a patent for a mobile arctic drilling platform designed to withstand significant interference from lateral ice masses,[194] allowing for drilling in areas with increased ice floe movement due to elevated temperature.

181. That same year, Texaco (Chevron) worked toward obtaining a patent for a method and apparatus for reducing ice forces on a marine structure prone to being frozen in ice through natural weather conditions,[195] allowing for drilling in previously unreachable Arctic areas that would become seasonally accessible.

182. Shell obtained a patent similar to Texaco's (Chevron) in 1984.[196]

183. In 1989, Norske Shell, Royal Dutch Shell's Norwegian subsidiary, altered designs for a natural gas platform planned for construction in the North Sea to account for anticipated sea level rise. Those design changes were ultimately carried out by Shell's contractors, adding substantial costs to the project.[197]

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[192] Patents, *Icebreaking cargo vessel*, Exxon Research Engineering Co. (Apr. 17, 1973), https://www.google.com/patents/US3727571.

[193] Patents, *Tanker vessel*, Exxon Research Engineering Co. (July 17, 1973), https://www.google.com/patents/US3745960.

[194] Patents, *Arctic offshore platform*, Chevron Res (Aug. 27, 1974), https://www.google.com/patents/US3831385.

[195] Patents, *Mobile, arctic drilling and production platform*, Texaco Inc. (Feb. 26, 1974), https://www.google.com/patents/US3793840.

[196] Patents, *Arctic offshore platform*, Shell Oil Company (Jan. 24, 1984), https://www.google.com/patents/US4427320.

[197] *Greenhouse Effect: Shell Anticipates a Sea Change*, N.Y. TIMES (Dec. 20, 1989), http://www.nytimes.com/1989/12/20/business/greenhouse-effect-shell-anticipates-a-sea-change.html.

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a. The Troll field, off the Norwegian coast in the North Sea, was proven to contain large natural oil and gas deposits in 1979, shortly after Norwegian oil and gas regulators approved Norske Shell to operate a portion of the field.

b. In 1986, the Norwegian parliament granted Norske Shell authority to complete the first development phase of the Troll field gas deposits, and Norske Shell began designing the "Troll A" gas platform, with the intent to begin operation of the platform in approximately 1995. Based on the very large size of the gas deposits in the Troll field, the Troll A platform was projected to operate for approximately 70 years.

c. The platform was originally designed to stand approximately 100 feet above sea level—the amount necessary to stay above waves in a once-in-a-century strength storm.

d. In 1989, Shell engineers revised their plans to increase the above-water height of the platform by 3–6 feet, specifically to account for higher anticipated average sea levels and increased storm intensity due to global warming over the platform's 70-year operational life.[198]

e. Shell projected that the additional 3–6 feet of above-water construction would increase the cost of the Troll A platform by as much as $40 million.

K. Defendants' Actions Prevented the Development of Alternatives That Would Have Eased the Transition to a Less Fossil Fuel Dependent Economy.

184. The harms and benefits of Defendants' conduct can be balanced in part by weighing the social benefit of extracting and burning a unit of fossil fuels against the costs that a unit of fuel

[198] *Id.*; Amy Lieberman & Suzanne Rust, *Big Oil Braced for Global Warming While It Fought Regulations*, L.A. TIMES (Dec. 31, 2015), http://graphics.latimes.com/oil-operations.

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imposes on society, known as the "social cost of carbon" or "SCC."

185. Because climatic responses to atmospheric temperature increases are non-linear, and because greenhouse gas pollution accumulates in the atmosphere, some of which does not dissipate for potentially thousands of years (namely CO_2), there is broad agreement that SCC increases as emissions rise, and as the climate warms. Relatedly, as atmospheric CO_2 levels and surface temperature increase, the costs of remediating any individual environmental injury—for example, infrastructure to mitigate sea level rise, and changes to agricultural processes—also increase. In short, each additional ton of CO_2 emitted into the atmosphere will have a greater net social cost as emissions increase, and each additional ton of CO_2 will have a greater net social cost as global warming accelerates.

186. A critical corollary of the non-linear relationship between atmospheric CO_2 concentrations and SCC is that delayed efforts to curb those emissions have increased environmental harms and increased the magnitude and cost to remediate harms that have already occurred or are locked in by previous emissions. Therefore, Defendants' campaign to obscure the science of climate change and to expand the extraction and use of fossil fuels greatly increased and continues to increase the harms and rate of harms suffered by the State and the People.

187. The consequences of delayed action on climate change, exacerbated by Defendants' actions, already have drastically increased the cost of mitigating further harm. Had concerted action begun even as late as 2005, an annual 3.5% reduction in CO_2 emissions to lower atmospheric CO_2 to 350 ppm by the year 2100 would have restored earth's energy balance[199] and halted future

[199] "Climate equilibrium" is the balance between Earth's absorption of solar energy and its own energy radiation. Earth is currently out of equilibrium due to the influence of anthropogenic greenhouse gases, which prevent radiation of energy into space. Earth therefore warms and move back toward energy balance. Reduction of global CO_2 concentrations to 350 ppm is necessary to

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global warming, although such efforts would not forestall committed sea level rise already locked in.[200] If efforts do not begin until 2020, however, a 15% annual reduction will be required to restore the Earth's energy balance by the end of the century.[201] Earlier steps to reduce emissions would have led to smaller—and less disruptive—measures needed to mitigate the impacts of fossil fuel production.

188. The costs of inaction and the opportunities to confront anthropogenic climate change and sea level rise caused by normal consumption of their fossil fuel products, were not lost on Defendants. In a 1997 speech by John Browne, Group Executive for BP America, at Stanford University, Browne described Defendants' and the entire fossil fuel industry's responsibility and opportunities to reduce use of fossil fuel products, reduce global CO_2 emissions, and mitigate the harms associated with the use and consumption of such products:

> A new age demands a fresh perspective of the nature of society and responsibility.
>
> We need to go beyond analysis and to take action. It is a moment for change and for a rethinking of corporate responsibility. . . .
>
> [T]here is now an effective consensus among the world's leading scientists and serious and well informed people outside the scientific community that there is a discernible human influence on the climate, and a link between the concentration of carbon dioxide and the increase in temperature.
>
> The prediction of the IPCC is that over the next century temperatures might rise by a further 1 to 3.5 degrees centigrade [1.8° – 6.3° F], and that sea levels might rise by between 15 and 95 centimeters [5.9 and 37.4 inches]. Some of that impact is probably unavoidable, because it results from current emissions. . . .

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re-achieve energy balance, if the aim is to stabilize climate without further global warming and attendant sea level rise. *See* James Hansen et al., *Assessing "Dangerous Climate Change:" Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, 8 PLOS ONE 1, 4–5 (Dec. 3, 2013), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648.

[200] James Hansen et al., *Assessing "Dangerous Climate Change:" Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, 8 PLOS ONE 1, 10 (Dec. 3, 2013), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0081648.

[201] *Id.*

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> [I]t would be unwise and potentially dangerous to ignore the mounting concern.
>
> The time to consider the policy dimensions of climate change is not when the link between greenhouse gases and climate change is conclusively proven … but when the possibility cannot be discounted and is taken seriously by the society of which we are part. . . .
>
> We [the fossil fuel industry] have a responsibility to act, and I hope that through our actions we can contribute to the much wider process which is desirable and necessary.
>
> BP accepts that responsibility and we're therefore taking some specific steps.
>
> To control our own emissions.
>
> To fund continuing scientific research.
>
> To take initiatives for joint implementation.
>
> To develop alternative fuels for the long term.
>
> And to contribute to the public policy debate in search of the wider global answers to the problem."[202]

189. Despite Defendants' knowledge of the foreseeable, measurable harms associated with the unabated consumption and use of their fossil fuel products, and despite the existence and Defendants' knowledge of technologies and practices that could have helped to reduce the foreseeable dangers associated with their fossil fuel products, Defendants continued to market and promote heavy fossil fuel use, dramatically increasing the cost of abatement. At all relevant times, Defendants were deeply familiar with opportunities to reduce the use of their fossil fuel products, reduce global CO_2 emissions associated therewith, and mitigate the harms associated with the use and consumption of such products. Examples of that recognition include, but are not limited to

[202] John Browne, *BP Climate Change Speech to Stanford*, Climate Files (May 19, 1997), http://www.climatefiles.com/bp/bp-climate-change-speech-to-stanford.

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the following:

a. In 1963, Esso (Exxon) obtained multiple patents on technologies for fuel cells, including on the design of a fuel cell and necessary electrodes,[203] and on a process for increasing the oxidation of a fuel, specifically methanol, to produce electricity in a fuel cell.[204]

b. In 1970, Esso (ExxonMobil) obtained a patent for a "low-polluting engine and drive system" that used an interburner and air compressor to reduce pollutant emissions, including CO_2 emissions, from gasoline combustion engines (the system also increased the efficiency of the fossil fuel products used in such engines, thereby lowering the amount of fossil fuel product necessary to operate engines equipped with this technology).[205]

190. Defendants could have made major inroads to mitigate the State's injuries through technology by developing and employing technologies to capture and sequester greenhouse gases emissions associated with conventional use of their fossil fuel products. Defendants had knowledge dating at least back to the 1960s, and indeed, internally researched and perfected many such technologies. For instance:

a. The first patent for enhanced oil recovery technology, a process by which CO_2 is captured and reinjected into oil deposits, was granted to an ARCO (BP)

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[203] Patents, *Fuel cell and fuel cell electrodes*, Exxon Research Engineering Co. (Dec. 31, 1963), https://www.google.com/patents/US3116169.

[204] Patents, *Direct production of electrical energy from liquid fuels*, Exxon Research Engineering Co. (Dec. 3, 1963), https://www.google.com/patents/US3113049.

[205] Patents, *Low-polluting engine and drive system*, Exxon Research Engineering Co. (May 16, 1970), https://www.google.com/patents/US3513929.

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subsidiary in 1952.[206] This technology could have been further developed as a carbon capture and sequestration technique;

b. Phillips Petroleum Company (ConocoPhillips) obtained a patent in 1966 for a "Method for recovering a purified component from a gas" outlining a process to remove carbon from natural gas and gasoline streams;[207] and

c. In 1973, Shell was granted a patent for a process to remove acidic gases, including CO_2, from gaseous mixtures.

191. Despite this knowledge, Defendants did not commit to or follow through on later forays into the alternative energy sector. For instance, in 2001, Chevron developed and shared a sophisticated information management system to gather greenhouse gas emissions data from its explorations and production to help regulate and set reduction goals.[208] Beyond this technological breakthrough, Chevron touted "profitable renewable energy" as part of its business plan for several years and launched a 2010 advertising campaign promoting the company's move towards renewable energy. Despite all this, Chevron rolled back its renewable and alternative energy projects in 2014.[209]

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[206] James P. Meyer, *Summary of Carbon Dioxide Enhanced Oil Recovery (CO_2EOR) Injection Well Technology*, American Petroleum Institute, 1, http://www.api.org/~/media/Files/EHS/climate-change/Summary-carbon-dioxide-enhanced-oil-recovery-well-tech.pdf.

[207] Patents, *Method for recovering a purified component from a gas*, Phillips Petroleum Co (Jan. 11, 1966), https://www.google.com/patents/US3228874.

[208] Chevron, Chevron Press Release – *Chevron Introduces New System to Manage Energy Use* (Sept. 25, 2001).

[209] Benjamin Elgin, *Chevron Dims the Lights on Green Power*, BLOOMBERG (May 29, 2014), https://www.bloomberg.com/news/articles/2014-05-29/chevron-dims-the-lights-on-renewable-energy-projects.

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192. Likewise, while Shell orchestrated an entire public relations campaign around energy transitions towards net zero emissions, a fine-print disclaimer in its 2016 net-zero pathways report reads: "We have no immediate plans to move to a net-zero emissions portfolio over our investment horizon of 10–20 years."[210]

193. BP, appearing to abide by the representations Lord Browne made in his speech described in paragraph 188, above, engaged in a rebranding campaign to convey an air of environmental stewardship and renewable energy to its consumers. This included renouncing its membership in the GCC in 2007, changing its name from "British Petroleum" to "BP" while adopting the slogan "Beyond Petroleum," and adopting a conspicuously green corporate logo. However, BP's self-touted "alternative energy" investments during this turnaround included investments in natural gas, a fossil fuel, and in 2007 the company reinvested in Canadian tar sands, a particularly high-carbon source of oil.[211] The company ultimately abandoned its wind and solar assets in 2011 and 2013, respectively, and even the "Beyond Petroleum" moniker in 2013.[212]

194. After posting a $10 billion quarterly profit, Exxon in 2005 stated that "We're an oil and gas company. In times past, when we tried to get into other businesses, we didn't do it well. We'd rather re-invest in what we know."[213]

195. Even if Defendants did not adopt technological or energy source alternatives that would have reduced use of fossil fuel products, reduced global greenhouse gas pollution, and/or mitigated the harms associated with the use and consumption of such products, Defendants could

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[210] *Energy Transitions Towards Net Zero Emissions* (NZE), Shell (2016).

[211] Fred Pearce, *Greenwash: BP and the Myth of a World 'Beyond Petroleum'*, THE GUARDIAN, (Nov. 20, 2008), https://www.theguardian.com/environment/2008/nov/20/fossilfuels-energy.

[212] Javier E. David, *'Beyond Petroleum' No More? BP Goes Back to Basics*, CNBC (Apr. 20, 2013), http://www.cnbc.com/id/100647034.

[213] James R. Healy, *Alternate Energy Not in Cards at ExxonMobil* (Oct. 28, 2005), https://usatoday30.usatoday.com/money/industries/energy/2005-10-27-oil-invest-usat_x.htm.

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have taken other practical, cost-effective steps to reduce the use of their fossil fuel products, reduce global greenhouse gas pollution associated therewith, and mitigate the harms associated with the use and consumption of such products. These alternatives could have included, among other measures:

a. Accepting scientific evidence on the validity of anthropogenic climate change and the damages it will cause people and communities, including Plaintiff, and the environment. Mere acceptance of that information would have altered the debate from *whether* to combat climate change and sea level rise to *how* to combat it; and avoided much of the public confusion that has ensued over nearly 30 years, since at least 1988;

b. Forthrightly communicating with Defendants' shareholders, banks, insurers, the public, regulators and Plaintiff about the global warming and sea level rise hazards of Defendants' fossil fuel products that were known to Defendants, would have enabled those groups to make material, informed decisions about whether and how to address climate change and sea level rise vis-à-vis Defendants' products;

c. Refraining from affirmative efforts, whether directly, through coalitions, or through front groups, to distort public debate, and to cause many consumers and business and political leaders to think the relevant science was far less certain than it actually was;

d. Sharing their internal scientific research with the public, and with other scientists and business leaders, so as to increase public understanding of the

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scientific underpinnings of climate change and its relation to Defendants' fossil fuel products;

e. Supporting and encouraging policies to avoid dangerous climate change, and demonstrating corporate leadership in addressing the challenges of transitioning to a low-carbon economy;

f. Prioritizing alternative sources of energy through sustained investment and research on renewable energy sources to replace dependence on Defendants' inherently hazardous fossil fuel products;

g. Adopting their shareholders' concerns about Defendants' need to protect their businesses from the inevitable consequences of profiting from their fossil fuel products. Over the period of 1990-2015, Defendants' shareholders proposed hundreds of resolutions to change Defendants' policies and business practices regarding climate change. These included increasing renewable energy investment, cutting emissions, and performing carbon risk assessments, among others.

196. Despite their knowledge of the foreseeable harms associated with the consumption of Defendants' fossil fuel products, and despite the existence and fossil fuel industry knowledge of opportunities that would have reduced the foreseeable dangers associated with those products, Defendants wrongfully promoted, campaigned against regulation of, and concealed the hazards of use of their fossil fuel products.

L. Defendants Caused Rhode Island's Injuries.

197. Defendants, individually and collectively, extracted a substantial percentage of all raw fossil fuels recovered globally since 1965. Defendants also individually and collectively manufactured, promoted, marketed, and sold a substantial percentage of all fossil fuel products

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used and combusted during that period. Defendants further played leadership roles in campaigns to deny the link between their products and the adverse effects of global warming, to avoid regulation, and to stifle transition away from fossil fuels that would reduce the carbon footprint affecting the world climate system.

198. CO_2 emissions attributable to fossil fuels that Defendants extracted from the Earth and injected into the market are responsible for a substantial percentage of greenhouse gas pollution since 1965.

199. Defendants' individual and collective conduct, including, but not limited to, their extraction, refining, and/or formulation of fossil fuel products; their introduction of fossil fuel products into the stream of commerce; their wrongful promotion of their fossil fuel products and concealment of known hazards associated with use of those products; and their failure to pursue less hazardous alternatives available to them; is a substantial factor in causing the increase in global mean temperature and consequent increase in global mean sea surface height and disruptions to the hydrologic cycle, including, but not limited to, more frequent and extreme droughts, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes, since 1965.

200. Defendants have actually and proximately caused sea levels to rise, increased the destructive impacts of storm surges, increased coastal erosion, exacerbated the onshore impact of regular tidal ebb and flow, caused saltwater intrusion, disrupted the hydrologic cycle, caused increased frequency and severity of drought, caused increased frequency and severity of extreme precipitation events, caused increased frequency and severity of heat waves, and caused consequent social and economic injuries associated with the aforementioned physical and

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environmental impacts, among other impacts, resulting in inundation, destruction, and/or other interference with the State's property and citizenry.

201. Rhode Island has already incurred, and will foreseeably continue to incur, injuries and harms from sea level rise; increased ambient temperatures and extreme heat days; disruptions to the hydrologic cycle including increased frequency and severity of drought; increased frequency and severity of extreme precipitation events; and social and economic harms associated with those physical and environmental changes, all of which have been caused and/or exacerbated by Defendants' conduct.

202. Sea level rise has created and will continue to create significant impacts attributable to Defendants' conduct.

203. The State of Rhode Island is particularly vulnerable to the impacts of sea level rise because of its long coastline, substantial low-lying land area, and extensive coastal development.

204. Under a seven-feet sea level rise scenario, ocean water will inundate approximately seventeen square miles of land along Rhode Island's Narragansett Bay coastline, encompassing 3,765 buildings and the residences of over 10,000 people.[214] The figure below depicts inundated structures during a 100-year storm event with seven feet of sea level rise.

[214] Narragansett Bay Estuary Program, *supra* note 81, at 22; *see also* STORMTOOLS, http://www.beachsamp.org/stormtools.

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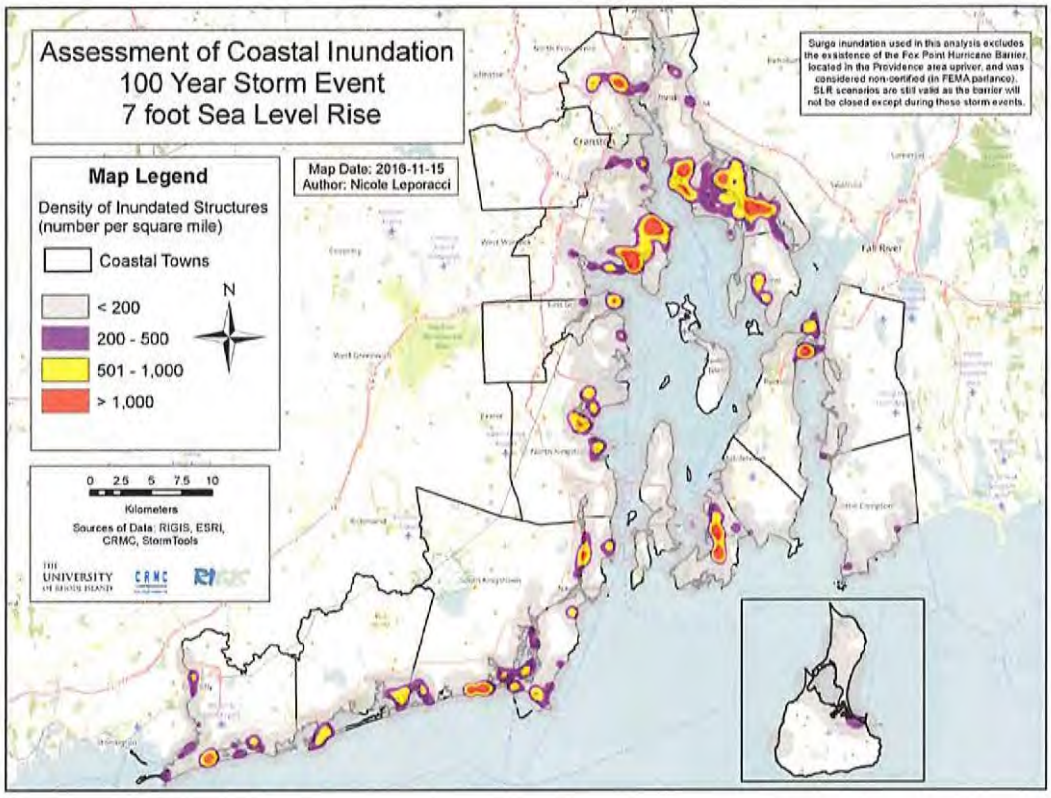
Fig. 8: Rhode Island Coastal Inundation Projection



205. The impacts of sea level rise will occur unevenly across the state depending on local factors including location, natural features, and development. The lower Taunton River watershed is especially vulnerable to sea level rise, for example, because of its shallow slopes.

206. Sea level rise endangers major public and private property and infrastructure by causing coastal flooding of low-lying areas, erosion, salinity intrusion, and storm surges. Critical facilities, existing roadways, wastewater treatment facilities, residential neighborhoods, industrial areas including ports, highways, rail lines, emergency response routes and facilities, beaches, and parks have suffered and/or will suffer injuries due to sea level rise expected by the end of this century.

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207. The State will experience continuing significant and dangerous sea level rise through at least the end of this century,[215] and those increases in sea level will accelerate over time. The State will suffer greater overall sea level rise than the global average,[216] and even if all carbon emissions ceased, Rhode Island would still experience greater committed sea level rise in the future due to the "locked in" greenhouse gases already emitted.[217]

208. In addition to direct damage to State property, infrastructure, and natural resources, sea level rise will require the State to expend resources to disseminate flood risk information to communities; set new policies, such as building regulations to account for increased risks; to invest in adaptive measures such as raising or relocating coastal roads and structures; and/or to invest in defensive measures such as seawalls or levees to prevent property damage.[218] By the end of the century, 6,660 Rhode Island coastal properties, worth roughly $3.6 billion, will be at risk under a high-sea level rise scenario, reducing property tax revenue by as much as $47.8 million.[219] That lost tax revenue could in turn reduce resources available to the State to prevent and mitigate further the harms suffered by Rhode Island municipalities. Even with resiliency measures in place under a low emissions scenario, coastal properties will face increased flooding risk and associated harms, and depression in property value.[220]

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[215] Erika Spanger-Siegfried et al., Union of Concerned Scientists, *supra* note 9, at 10–11.

[216] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, *supra* note 55, at 10.

[217] Peter U. Clark et al., *supra* note 44, at 363–65.

[218] Union of Concerned Scientists, *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate*, 16–17 (June 2018), https://www.ucsusa.org/underwater.

[219] Union of Concerned Scientists, *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate, "Complete data by state"* (June 2018), https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-data-by-state.xlsx.

[220] *See id.*

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209. Furthermore, Rhode Island has experienced and will continue to experience injuries due to changes in the hydrologic cycle caused by Defendants' conduct. Increased intensity and frequency of storms results in flooding and erosion and impacts transportation, infrastructure, businesses, homes, and public health. Dry extremes impact water supply, infrastructure and public health.

210. More frequent and intense storms, including Nor'easters (extra-tropical storms), and "bomb cyclones" riding on top of rising seas, are contributing to coastal flooding that is as damaging as flooding typically associated with hurricanes.[221] Under a 3-foot rise in sea level, even a Nor'easter could submerge coastal areas of the state, including areas sufficient to cut off the southwestern peninsula of Newport, RI from the mainland.[222]

211. The state's coastline is highly vulnerable to flood damage from winter storms and hurricanes. In October 2012, Superstorm Sandy (a post-tropical storm) caused a storm surge 9.4 feet above normal high tide in Providence, resulting in extensive flooding.[223] One year earlier, heavy rainfall and strong southeast winds—up to 70 mph—from Hurricane Irene knocked down power lines, leaving half of Rhode Island's one million residents without power.[224]

212. Sea level rise, changes to the hydrologic cycle, and increased air and ocean temperatures resulting from anthropogenic climate change have and will result in injury to public, industrial, commercial, and residential assets within the State either directly, or through secondary and tertiary impacts that cause the State to expend resources in resiliency planning, responding to these impacts, and repairing infrastructure damage; lost revenue due to decreased economic

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[221] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 15.
[222] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, *supra* note 55, at 10.
[223] NOAA National Centers for Environmental Information, *supra* note 83, at 2.
[224] *Id.*

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activity in the State; injury to natural resources which the State holds in trust for the use and enjoyment of the people of the State; and cause the State to suffer other injuries. Among the properties and natural resources in the State that have and/or will be injured as a result of anthropogenic climate change are:

a. **Roads and Bridges:** With over 400 miles of coastline and large inland watersheds, Rhode Island's transportation and transit infrastructure (roads, bridges, intermodal facilities, culverts, etc.) is vulnerable to sea level rise and flooding.[225] Much of the State's extensive network of roads, bridges, and parking areas are state owned or maintained. Rhode Island's transportation system Federal regulations require the state to engage in asset management to weigh climate change risks (among others).[226] According to an analysis conducted in 2016 (that excluded riverine flooding), 175 miles of roadway will be exposed with seven feet of sea level rise. In a storm surge event with seven feet of sea level rise, 573 miles of roadway will be exposed, over 200 additional miles of roadway over a similar surge at today's sea level.[227] Riverine inundation will present additional challenge to the State's transportation infrastructure.[228] Ten of the most vulnerable segments of roads under state jurisdiction are projected to experience daily high tide flooding at either one or three feet of sea level rise, and all but one are hurricane evacuation routes.[229] In

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[225] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 32.
[226] *Id.*
[227] *Id.* at 33
[228] *Id.*
[229] Rhode Island Statewide Planning Program, *Vulnerability of Transportation Assets to Sea Level Rise*, 11–12 (Jan. 2015).

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addition, 90 bridges are vulnerable to sea level rise, and 148 bridges vulnerable to storm surge.[230] Increased flooding of coastal roads, evacuation routes, and bridges creates the risk of coastal populations becoming trapped with no means of accessing emergency services during high tides and storm surge events.[231] Rising temperatures and more frequent extreme weather events also contribute to degradation of roads and bridges increasing maintenance and repair costs.

b. **Other Transportation Infrastructure**. Sea level rise will also impact railroad systems. Several rail segments will be flooded under three- and five-foot sea level rise scenarios, including portions of the Newport Secondary, a state-owned track.[232] Sea level rise and increased flooding will also impact the State's statewide bus network, both disrupting service and requiring relocation of a number of stops and the Newport Gateway hub to upland locations.[233]

c. **Energy Infrastructure:** Rhode Island has experienced many severe weather-related events over the last eight years, including floods, blizzards, extended heat waves, extreme cold snaps and hurricanes. One of the most direct energy security impacts of major storm events is power outages. Power outages result in direct costs to repair damaged or flooded infrastructure or downed poles and wires and to restore service, indirect costs such as lost business and tax revenue, and health

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[230] Rhode Island Statewide Planning Program, *Vulnerability of Municipal Transportation Assets to Sea Level Rise and Storm Surge*, 21 (Sept. 28, 2016).

[231] Rhode Island Sea Grant et al., *Sea Level Rise in Rhode Island: Trends and Impacts*, 4 (Jan. 2013), http://www.beachsamp.org/wp-content/uploads/2016/09/climate_SLR_factsheet2013.pdf.

[232] Rhode Island Statewide Planning Program, *Vulnerability of Transportation Assets to Sea Level Rise*, 12 (Jan. 2015).

[233] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 35–36.

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impacts from loss of electricity and air conditioning.[234] Increased extreme heat days also put stress on the state's electricity grid, by requiring increased air conditioning. State agencies are playing key roles in overseeing energy assurance and resiliency in Rhode Island.[235]

d. **Dams:** The state has 668 inventoried dams, 96 of which are classified as "high hazard" (meaning that failure or mis-operation will result in probable loss of human life) and 81 of which are classified as "significant hazard" (meaning failure can cause major economic loss, disrupt critical facilities or infrastructure, or detriment public's health, safety or welfare).[236] The Rhode Island Department of Environmental Management (RIDEM) has the statutory duty to inspect dams and to take necessary action to make dams safe. RIDEM is in the process of studying hazardous dams to determine what actions are necessary to withstand a 500-year storm event.[237]

e. **Ports:** Maritime transportation, including through the Port of Providence and Port of Galilee, serves a critical role in the Rhode Island economy by providing access to products, raw materials, and export revenue. Numerous ancillary businesses depend on the ports' functionality. The Port of Providence alone generated more than $200 million in economic benefits for the region and over 2,400 jobs. The State's commercial fishing industry generates approximately $200 million in annual sales and supports about 7,000 jobs. Impacts of climate change on fishing

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[234] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 28–29.
[235] *Id.* at 29.
[236] *Id.* at 23.
[237] *Id.*

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resources, including flooding from major storms and associated damage and closure of fisheries and loss of profitable aquatic species, have caused and will cause both short and long-term disruptions in the Rhode Island economy, causing the State to lose revenue. The State is actively engaged in studying resilience of its ports and informing the public to encourage long-term planning.[238]

f. **Beaches:** Coastal beaches and barriers are dynamic systems that define much of Rhode Island's south-facing shore and are popular recreational destinations for both residents and out-of-state visitors. Climate change has and will subject beaches to increased storm surge, erosion, coastal flooding and sea level rise. The State owns numerous beaches open for public use and enjoyment. Beaches will migrate landward and if impeded by development will narrow or disappear altogether, reducing the area available for public recreation and tourism, and affecting habitats for plants and for birds migrating or nesting on shore.[239] Because bacteria grows more quickly in warm water, warming ocean temperatures will result in increased beach closures.[240] As a result of climate change the State will lose real property to inundation and flooding and revenue from decreased tourism and use of Rhode Island beaches. The State is expending resources to analysis coastal adaptations strategies to protect beaches and dunes.

g. **Water Supply:** Sea level rise and increased summer and fall droughts will stress Rhode Island's water supply.[241] Reduced seasonal precipitation will increase public

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[238] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 26–27.

[239] Rhode Island Sea Grant et al., *Sea Level Rise in Rhode Island: Trends and Impacts*, 4 (Jan. 2013), http://www.beachsamp.org/wp-content/uploads/2016/09/climate_SLR_factsheet2013.pdf.

[240] Narragansett Bay Estuary Program, *supra* note 81, at 20.

[241] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 20.

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reliance on groundwater sources to provide drinking water, and simultaneously slow replenishment of groundwater aquifers. At the same time, sea level rise will result in saltwater intruding into coastal groundwater aquifers and wells, contaminating drinking water resources.[242] This is a large concern for southern Rhode Island, which relies heavily on coastal ground water supplies.[243] For example, Aquidneck Island's primary reservoir is highly vulnerable to storm surge from hurricanes and coastal storm events.[244] Sea level rise and storm events can also result in or exacerbate intrusion into drinking water systems by toxic and hazardous substances that are dangerous to human health. Many brownfield and superfund sites within the State susceptible to climate impacts are located next to water bodies which they may contaminate if disturbed.[245]

h. **Wastewater Management:** The State is home to nineteen major wastewater treatment facilities and over 250 pumping stations to transport sewage to these systems. Most of these wastewater systems are located in floodplains to take advantage of gravity fed flows.[246] Sea level rise, and increased flooding and storms associated with climate change will exceed infrastructure capacity, overwhelming and submerging infrastructure, including pipelines, wastewater pumping stations and treatment systems.[247] Treatment systems and pumping stations will require upgrades to withstand future conditions, and the State has already begun requiring

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[242] *Id.*

[243] SafeWater RI, *Ensuring Water for Rhode Island's Future*, *supra* note 78, at 11.

[244] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 19.

[245] *Id.* at 63.

[246] *Id.* at 21.

[247] SafeWater RI, *Ensuring Water for Rhode Island's Future*, *supra* note 78, at 14.

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resiliency analysis as part of major wastewater treatment facility permit reissuances. Local authorities will need to assess local conditions and take necessary steps to improve resilience of wastewater treatment infrastructure.

i. **Stormwater/Flood Management Infrastructure:** More frequent and more intense extreme weather events and flooding will damage the States' stormwater infrastructure, which was not designed to withstand the intense storms and floods that will become more common with climate change. Climate change is already challenging capacity and performance of these drainage systems.[248] As storm patterns change, they will exceed existing capacity of local stormwater infrastructure. Overburdened and inadequate stormwater infrastructure will result likely release pathogens and other pollutants during storm events, causing property damage, water quality impairments, beach closures, closure of shellfish growing areas, and other public health risks.[249] Given the extensive network of State-owned or maintained roads, bridges, and parking areas within Rhode Island, the Rhode Island Department of Transportation ("RIDOT") has significant responsibilities for stormwater management. RIDOT manages stormwater infrastructure that includes an estimated 25,000 catch basins and 3,800 outfalls. RIDOT has recently embarked on a ten-year strategic program to improve stormwater management consistent with a federal consent decree issued in 2015.[250] The State lacks adequate funding to

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[248] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 24.

[249] *Id.*

[250] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 25.

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support necessary retrofitting and ongoing maintenance of the stormwater infrastructure, in particular under a high-emission scenario.[251]

j. **Residential and Commercial Property:** Sea level rise and extreme weather events have harmed and will harm residential and commercial property. A study evaluating the State's 21 coastal communities found that with 3 feet of sea level rise, over 300 homes will be in the inundation zone.[252] With 7 feet of sea level rise, over 4,000 occupied residential units and 800 commercial units would be within the inundation zone.[253] Indeed, over fifty percent of the State's parcels lie within or touch the flood plain.[254] These properties are particularly vulnerable to inundation and flooding due to extreme weather events and sea level rise. The city of Newport alone contains hundreds of businesses and historic properties lining its waterfront. Like many older cities in the State, Newport was built on landfill placed into large portions of Narragansett Bay, placing it only slightly above sea-level.

k. **Aquatic Resources:** Laboratory studies have already shown ocean acidification reduces the survival of larval finfish and shellfish. Ocean acidification will impact ocean food webs and economically important organisms such as shellfish in the

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[251] *Id.*

[252] Rhode Island State Planning Program, *Socioeconomics of Sea Level Rise Technical Paper 168*, 15 & 18 (Sept. 2015), http://www.planning.ri.gov/documents/sea_level/socio/Technical%20Paper%20168.pdf.

[253] *Id.*

[254] Final Report: *Special House Commission to Study Economic Risk Due to Flooding and Sea Level Rise,* 31 (May 12, 2016), http://www.rilin.state.ri.us/commissions/fsrcomm/commdocs/20160512%20Economic%20Risk%20Due%20to%20Flooding%20and%20Sea%20Level%20Rise%20-%20final.pdf.

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coastal environment.[255] In addition, shellfish perform important ecological functions, such as removing nutrients and bacteria from the water. Consequently, decreased shellfish populations may result in a positive feedback loop, further decreasing marine water quality in Rhode Island. Warmer ocean temperatures associated with climate change are also harming ocean ecosystems. The fisheries of Narragansett Bay are changing from being dominated by bottom dwelling fish and invertebrates to being dominated by fish that occur throughout the water column.[256] Warmer ocean temperatures also impact the abundance and diversity of phytoplankton, resulting in changes across the food web, including reduction in seagrass that helps cycle nutrients, stabilize marine sediment and provides critical habitat to ecologically and economically valuable species.[257] Warming temperatures and acidification not only harm natural resources, but also harm the industries that rely on them, including fishing and tourism, thus injuring the State's economy and reducing tax revenue. Rhode Island is ranked seventh in the nation in economic dependence on shellfishing.

l. **Marshes and Coastal Wetlands**: Sea level rise will cause changes in coastal habitats that are important centers of biodiversity. Salt marshes provide critical habitat for fish and shellfish. Vegetated coastal wetlands perform critical ecosystem functions and have been shown to reduce storm surge duration and height by

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[255] Stephanie C. Talmage & Christopher J. Gobler, "*Effects of past, present, and future ocean carbon dioxide concentrations on the growth and survival of larval shellfish*," 107 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES 17246–17251 (Oct. 2010), http://www.pnas.org/content/107/40/17246.

[256] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 15.

[257] Narragansett Bay Estuary Program, *supra* note 81, at 20.

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providing a storage reservoir for encroaching water. For example, areas that contained wetlands had an average of 10% reduction in damages from Hurricane Sandy when compared to those without wetlands, and coastal wetlands were predicted to have reduced wave heights during the storm across 80% of the Northeastern coastal floodplain.[258] Salt marshes will either drown or migrate landward as a consequence of sea level rise.[259] With only one foot of sea level rise in Rhode Island, 13% of the state's remaining salt marshes will be lost. At five feet, lost salt marsh ecosystems will increase to 83% resulting in substantial loss of critical ecosystem functions and increased threats from storms to coastal property.[260]

m. **Terrestrial Natural Resources**: Warmer temperatures also impact terrestrial species. In southern New England, including Rhode Island, spring is arriving sooner and leaf-out (the period when trees produce new leaves) and flowering is occurring earlier each year. Changes in the timing of leaf-out, flowering, and fruiting in plants can be very disruptive to plant pollinators and seed dispersers.[261] Warmer temperatures are also impacting the timing of migratory cycles in birds.[262]

213. The State has incurred and will continue to incur expenses in planning, preparing for, and treating the public health impacts associated with anthropogenic global warming. Rhode

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[258] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 42.
[259] *Id.* at 15.
[260] Frank Carini ,*Rhode Island Losing Ground in Battle Against Sea-Level Rise,* Ecori News (Feb. 17, 2018), https://www.ecori.org/climate-change/2018/2/16/rhode-island-losing-ground-in-battle-against-sea-level-rise.
[261] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 15.
[262] *Id.*

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Islanders are more likely to seek emergency on hotter days. On days when the temperatures reach 90°F, hospitalizations in the State for heat and dehydration increase 60% amongst those aged between 18 and 64, compared to the hospitalization rate on 80°F days.[263] Climate models predict that ambient surface temperature will increase by an average of 1.6°F by 2022, resulting in 378 more emergency department visits due to extreme heat in the months of April through October.[264] Vulnerable populations such as the disabled, elderly, children, communities of color, and low income are more likely to suffer health effects from high air temperatures.[265] Increased prevalence of vector-borne diseases, increased pollution, and increased airborne allergens caused by increased surface temperatures will further contribute to increased hospitalizations in the State.

214. Rhode Island will shoulder a portion of the costs for increased hospitalizations to treat recipients of State-funded medical insurance.

215. To address heat-related illnesses, the State is incurring expenses planting and maintaining trees in urban centers as an adaptive strategy to provide cooling and shade.[266] Climate change complicates the care for urban forests by increasing extreme weather events and invasive plants and pests.[267]

216. Increased incidents of extreme weather have still more public health consequences, including danger to personal safety, economic disruption, and population displacement.[268] As climate change impacts and severe weather events increase, they will place greater demands on

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[263] Rhode Island Department of Health, *Rhode Island Climate Change and Resiliency Report*, *supra* note 55, at 20.
[264] *Id.* at 10.
[265] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 13.
[266] *Resilient Rhody: Statewide Climate Resilience Action Strategy*, *supra* note 56, at 47.
[267] *Id.*
[268] *Id.* at 62–63.

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emergency response and sheltering services. The Rhode Island Emergency Management Agency ("RIEMA") has already incurred costs to improve the State's resiliency to future disasters through planning and preparedness activities, trainings, and adaptation programs.[269]

217. Rhode Island is undertaking extensive planning efforts across State agencies, as well as funding independent research efforts, to assess the State's vulnerability to a broad range of anticipated climate change related impacts, and to develop adaptation and resilience strategies. For example, the State has conducted studies to ensure drinking water supplies will be adequate to meet the State's future needs.[270] RIDOT has also funded researchers to conduct a vulnerability and resilience strategy assessment of maritime infrastructure.[271] Execution of these research and planning projects have come at a substantial cost to the State, and State will continue to incur substantial costs for these and similar projects.

218. The State has incurred significant expenses educating and engaging the public to better understand climate change, and promoting community involvement in actions to reduce climate change risks. These efforts include by educating vulnerable populations about the public health impacts of extreme heat waves (such as heat stroke), drought (diminished water supply), and other climate change-related impacts. Implementation of these planning and public outreach processes represent substantial cost to the State.

219. As a direct and proximate result of Defendants' acts and omissions alleged herein, Rhode Island has incurred significant expenses related to predicting and planning for future climate change-related injuries to its real property, natural resources, and improvements thereon; State-

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[269] *Id.* at 53.

[270] *Id.* at 20.

[271] *Hurricane Resilience: Long Range Planning for the Port of Providence*, The University of Rhode Island, https://www.portofprovidenceresilience.org.

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owned or operated infrastructure; citizens; and other community assets, to preemptively mitigate and/or prevent injuries to itself and the public.

220. As a direct and proximate result of Defendants' acts and omissions alleged herein, Rhode Island has incurred sea level rise-related, extreme heat-related, and hydrologic regime change-related injuries and harms. These include, but are not limited to, infrastructural repair, planning costs, and response costs to flooding and other acute incidents.

221. As a direct and proximate result of Defendants' acts and omissions alleged herein, Rhode Island has been inundated by sea water, and extreme precipitation, among other climate-change related intrusions, which has caused injury and harms to its real property and to improvements thereon, and has prevented free passage on, use of, and normal enjoyment of that real property, or permanently destroying it.

222. As a direct and proximate result of Defendants' acts and omissions alleged herein, natural resources held in trust by Rhode Island for the benefit of the people of the State, including the State's fisheries, shores, groundwater, and terrestrial plant and animal life, have been threatened and damaged to the public's detriment.

223. But for Defendants' conduct, Rhode Island would have suffered no or far less injuries and damages than they have endured, and foreseeably will endure, due to increased air and ocean temperatures, anthropogenic sea level rise, disruption of the hydrologic cycle, and associated consequences of those physical and environmental changes.

224. Defendants' conduct as described herein is therefore an actual, substantial, and proximate cause of Rhode Island's climate change-related injuries.

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VI. CAUSES OF ACTION

FIRST CAUSE OF ACTION

Public Nuisance

(Against All Defendants)

225. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

226. In Rhode Island, the public is entitled by right to the protection, preservation, and enhancement of the air, water, land, and other natural resources located within the State, and it is the policy of the State to create and maintain within the State conditions under which man and nature can exist in productive harmony in order that present and future generations may enjoy clean air and water, productive land, and other natural resources with which this State has been endowed.

227. Defendants, and each of them, by their affirmative acts and omissions, have created, contributed to, and assisted in creating, conditions in the State of Rhode Island that constitute a nuisance, and has permitted those conditions to persist, by, *inter alia*, increasing local sea level, and associated flooding, inundation, erosion, and other impacts within the State; increasing the frequency and intensity of drought in the State; increasing the frequency and intensity of extreme heat days in the State; and increasing the frequency and intensity of extreme precipitation events in the State.

228. The nuisance created and contributed to by Defendants unreasonably endangers and injures the property, health, peace, comfort, safety, and welfare of the general public and the natural resources of State of Rhode Island, interfering with the comfort and convenience of communities state-wide, as well as with the State's *parens patriae* ability to protect, conserve, and

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manage the water, land, and wildlife of the State, which are by law precious and invaluable public resources.

229. Defendants specifically created, contributed to, assisted in creating, and/or were a substantial contributing factor in the creation of the public nuisance by, *inter alia*:

a. Controlling every step of the fossil fuel product supply chain, including the extraction of raw fossil fuel products, including crude oil, coal, and natural gas from the Earth; the refining and marketing of those fossil fuel products, and the placement of those fossil fuel products into the stream of commerce;

b. Affirmatively and knowingly promoting the sale and use of fossil fuel products which Defendants knew to be hazardous and knew would cause or exacerbate global warming and related consequences, including, but not limited to, sea level rise, drought, extreme precipitation events, and extreme heat events;

c. Affirmatively and knowingly concealing the hazards that Defendants knew would result from the normal use of their fossil fuel products by misrepresenting and casting doubt on the integrity of scientific information related to climate change;

d. Disseminating and funding the dissemination of information intended to mislead customers, consumers, and regulators regarding known and foreseeable risk of climate change and its consequences, which follow from the normal, use of Defendants' fossil fuel products;

e. Affirmatively and knowingly campaigning against the regulation of their fossil fuel products, despite knowing the hazards associated with the normal

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use of those products, in order to continue profiting from use of those products by externalizing those known costs onto the public, the environment, and communities; and failing to warn the public about the hazards associated with the use of fossil fuel products.

230. Because of their superior knowledge of fossil fuel products, and their position controlling the extraction, refining, development, marketing, and sale of fossil fuel products, Defendants were in the best position to prevent the nuisance as the harm occurred and continues to occur, but failed to do so, including by failing to warn customers, retailers, regulators, public officials, or the State of the risks posed by their fossil fuel products, and failing to take any other precautionary measures to prevent or mitigate those known harms.

231. The public nuisance caused, contributed to, maintained, and/or participated in by Defendants has caused and/or imminently threatens to cause substantial injury to the environment of the State, in which the public has interests represented by and protected by the State in its *parens patriae* capacity. The public nuisance has also caused and/or imminently threatens to cause substantial injury to property directly owned by the State. In particular, higher sea level, more frequent and extreme droughts, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes: (1) are harmful and dangerous to human health; (2) are indecent and offensive to the senses of the ordinary person; (3) obstruct and threaten to obstruct the free use of public property within the State so as to interfere with the comfortable enjoyment of life and property; and (4) obstruct and threaten to obstruct the free passage and use of navigable lakes, rivers, bays, streams, canals, basins, public parks, squares, streets, and/or highways within the State.

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232. The seriousness of rising sea levels, higher sea level, more frequent and extreme drought, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes, is extremely grave and outweighs the social utility of Defendants' conduct because, *inter alia*,

a. interference with the public's rights due to sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes as described above, is expected to become so regular and severe that it will cause material deprivation of and/or interference with the use and enjoyment of public and private property in the State;

b. the ultimate nature of the harm is the destruction of real and personal property, and loss of natural resources, rather than mere annoyance;

c. the interference borne is the loss of property, infrastructure, and natural resources within the State, which will actually be borne by the public as loss of use of public and private property and infrastructure and diversion of tax dollars away from other public services to the mitigation of and/or adaptation to climate change impacts;

d. Rhode Island's property, which serves myriad uses including residential, infrastructural, commercial, and ecological, is not suitable for regular inundation, flooding, landslides, and/or other physical or environmental consequences of anthropogenic global warming;

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e. the social benefit of placing fossil fuels into the stream of commerce is outweighed by the availability of other sources of energy that could have been placed into the stream of commerce that would not have caused anthropogenic climate change and its physical and environmental consequences as described herein; Defendants, and each of them, knew of the external costs of placing their fossil fuel products into the stream of commerce, and rather than striving to mitigate those externalities, Defendants instead acted affirmatively to obscure them from public consciousness;

f. the cost to society of each ton of greenhouse gases emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and

g. it was practical for Defendants, and each of them, considering their extensive knowledge of the hazards of placing fossil fuel products into the stream of commerce and extensive scientific engineering expertise, to develop better technologies and to pursue and adopt known, practical, and available technologies, energy sources, and business practices that would have mitigated greenhouse gas pollution and eased the transition to a lower carbon economy.

233. As a direct and proximate result of Defendants' conduct, as set forth above, the common rights enjoyed by the citizens of the State of Rhode Island have been unreasonably interfered with because Defendants knew or should have known that their conduct would create a continuing problem with long-lasting significant negative effects on the rights of the public.

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234. Defendants' acts and omissions as alleged herein are an actual and legal cause of the public nuisance.

235. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

236. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

237. Wherefore, the State of Rhode Island prays for relief as set forth below.

SECOND CAUSE OF ACTION

Strict Liability for Failure to Warn

(Against All Defendants)

238. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

239. Defendants, and each of them, extracted raw fossil fuel products, including crude oil, coal, and natural gas from the Earth, and placed those fossil fuel products into the stream of commerce; and at all times had a duty to issue adequate warnings to Plaintiff, the public,

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consumers, and public officials of the reasonably foreseeable or knowable risks posed by their fossil fuel products.

240. Defendants, and each of them, extracted, refined, formulated, designed, packaged, distributed, tested, constructed, fabricated, analyzed, recommended, merchandised, advertised, promoted, and/or sold fossil fuel products, which were intended by Defendants, and each of them, to be combusted for energy, refined into petrochemicals, and refined and/or incorporated into petrochemical products including fuels and plastics.

241. Defendants, and each of them, heavily marketed, promoted, and advertised fossil fuel products and their derivatives, which were sold or used by their respective affiliates and subsidiaries. Defendants received direct financial benefit from their affiliates' and subsidiaries' sales of fossil fuel products. Defendants' roles as promoters and marketers were integral to their respective businesses and a necessary factor in bringing fossil fuel products and their derivatives to the consumer market, such that Defendants had control over, and a substantial ability to influence, the manufacturing and distribution processes of their affiliates and subsidiaries.

242. Throughout the times at issue, Defendants individually and collectively had actual and/or constructive knowledge, in light of the scientific knowledge generally accepted at the time, that fossil fuel products release greenhouse gases into the atmosphere that inevitably cause, *inter alia*, global warming, sea level rise, more frequent and extreme droughts, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes.

243. Throughout the times at issue and continuing today, fossil fuel products presented and still present a substantial risk of injury to Plaintiff and its citizens and natural resources through the climate effects described above.

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244. Throughout the times at issue, the ordinary consumer would not recognize that the use of fossil fuel products causes global and localized changes in climate, including those effects described herein, and could not ordinarily discover or protect themselves against those dangers in the absence of adequate warnings.

245. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the scientific knowledge generally accepted at the time, advanced pseudo-scientific theories of their own, and developed public relations campaigns and materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, including those described herein.

246. Defendants, and each of them, breached their duty to warn by failing to adequately warn customers, consumers, regulators, and the general public of the known and foreseeable risks posed by their fossil fuel products, and the consequences that inevitably follow from their use.

247. As a direct and proximate result of the defects previously described, fossil fuel products, Plaintiff State of Rhode Island has sustained and will sustain other substantial expenses and damages set forth in this Complaint within the jurisdictional limits of this Court, including damage to publicly owned infrastructure and real property, and injuries to public trust resources that interfere with the rights of the State and its citizens.

248. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

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249. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

250. Wherefore, the State of Rhode Island prays for relief as set forth below.

THIRD CAUSE OF ACTION

Strict Liability for Design Defect

(Against All Defendants)

251. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

252. Defendants, and each of them, extracted raw fossil fuel products, including crude oil, coal, and natural gas from the Earth and placed those fossil fuel products into the stream of commerce; and owed a duty to all persons whom Defendants' fossil fuel products might foreseeably harm, including Plaintiff, not to market any product which is unreasonably dangerous for its intended use.

253. Defendants, and each of them, extracted, refined, formulated, designed, packaged, distributed, tested, constructed, fabricated, analyzed, recommended, merchandised, advertised, promoted, and/or sold fossil fuel products, which were intended by Defendants, and each of them, to be burned for energy, refined into petrochemicals, and refined and/or incorporated into petrochemical products including but not limited to fuels and plastics.

254. Defendants, and each of them, heavily marketed, promoted, and advertised fossil fuel products and their derivatives, which were sold or used by their respective affiliates and

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subsidiaries. Defendants' received direct financial benefit from their affiliates' and subsidiaries' sales of fossil fuel products. Defendants' roles as promoters and marketers were integral to their respective businesses and a necessary factor in bringing fossil fuel products and their derivatives to the consumer market, such that Defendants had control over, and a substantial ability to influence, the manufacturing and distribution processes of their affiliates and subsidiaries.

255. Throughout the time at issue, fossil fuel products have not performed as safely as an ordinary consumer would expect them to, and have been unreasonably dangerous for their intended, foreseeable, and ordinary use, because greenhouse gas emissions from their use cause numerous global and local changes to Earth's climate. In particular, ordinary consumers did not expect that:

a. fossil fuel products are the primary cause of global warming since the dawn of the Industrial Revolution, and by far the primary cause of global warming acceleration in the 20th and 21st centuries;
b. fossil fuel products would cause acceleration of sea level rise since the beginning of the 20th century;
c. normal use of fossil fuel products would cause more frequent and extreme drought;
d. normal use of fossil fuel products would cause more frequent and extreme precipitation events;
e. normal use of fossil fuel products would cause more frequent and extreme heat waves;
f. normal use of fossil fuel products would cause other injurious changes to the environment as alleged herein;

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g. by increasing sea level rise and increasing the severity and intensity of droughts, extreme precipitation events, heat waves, and the associated consequences of those physical and environmental changes, fossil fuel products cause damage to publicly and privately-owned infrastructure and buildings, including homes;

h. the social cost of each ton of CO_2 emitted into the atmosphere increases as total global emissions increase, so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and

i. for these reasons and others, the unmitigated use of fossil fuel products present significant threats to the environment and human health and welfare.

256. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the scientific knowledge generally accepted at the time, advanced pseudo-scientific theories of their own, and developed public relations materials, among other public messaging efforts, that prevented reasonable consumers from forming an expectation that fossil fuel products would cause grave climate changes, including those described herein.

257. The risks posed to consumers and the general public, including and especially to Rhode Island and its citizens, by Defendants' defective fossil fuel products outweigh those products' benefits, because, *inter alia*:

a. the gravity of the potential harms caused by fossil fuel products is extreme; global warming and its attendant consequences are guaranteed to occur following the use of fossil fuel products because such use inherently releases greenhouse gases into the atmosphere; and global warming would continue to occur for decades even if all greenhouse gas emissions ceased;

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b. the social benefit of the purpose of placing fossil fuels into the stream of commerce is overshadowed by the availability of other sources of energy that could have been placed into the stream of commerce that would not have caused global warming, its associated consequences including those described herein, and accordingly Plaintiff's injuries; Defendants, and each of them, knew of the external costs of placing their fossil fuel products into the stream of commerce, and rather than striving to mitigate those externalities, instead acted affirmatively to obscure them from public consciousness;

c. Defendants' campaign of disinformation regarding global warming and the climatic effects of fossil fuel products prevented customers, consumers, regulators, and the general public from taking steps to mitigate the inevitable consequences of fossil fuel consumption, and incorporating those consequences into either short-term decisions or long-term planning;

d. the cost to society of each ton of CO_2 emitted into the atmosphere increases as total global emissions increase so that unchecked extraction and consumption of fossil fuel products is more harmful and costly than moderated extraction and consumption; and

e. it was practical for Defendants, and each of them, in light of their extensive knowledge of the hazards of placing fossil fuel products into the stream of commerce, to pursue and adopt known, practical, and available technologies, energy sources, and business practices that would have mitigated their greenhouse gas pollution and eased the transition to a lower carbon economy,

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reduced global CO_2 emissions, and mitigated the harms associated with the use and consumption of such products.

258. The above-described defects were beyond the knowledge of an ordinary consumer, and neither Plaintiff nor any ordinary consumer could have avoided the harm caused by Defendants' defective fossil fuel products by the exercise of reasonable care.

259. Defendants' individual and aggregate fossil fuel products reached the consumer in a condition substantially unchanged from that in which it left Defendants' control; and were used in the manner in which they were intended to be used by individual and corporate consumers; the result of which was the addition of CO_2 emissions to the global atmosphere with attendant global and local consequences.

260. As a direct and proximate result of the defects previously described, fossil fuel products, Plaintiff State of Rhode Island has sustained and will sustain other substantial expenses and damages set forth in this Complaint within the jurisdictional limits of this Court, including damage to publicly owned infrastructure and real property, and injuries to public trust resources that interfere with the rights of the State and its citizens.

261. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

262. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon

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the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

263. Wherefore, the State of Rhode Island prays for relief as set forth below.

FOURTH CAUSE OF ACTION

Negligent Design Defect

(Against All Defendants)

264. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

265. Defendants knew or should have known of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including the likelihood and likely severity of global and local sea level rise and its consequences, and including injuries to Plaintiff, its citizens, and its natural resources, as described herein.

266. Defendants, collectively and individually, had a duty to use due care in developing, designing, testing, inspecting, and distributing their fossil fuel products. That duty obligated Defendants collectively and individually to, *inter alia*, prevent defective products from entering the stream of commerce, and prevent reasonably foreseeable harm that could have resulted from the ordinary use of Defendants' products.

267. Defendants, and each of them, breached their duty of due care by, *inter alia*:

a. allowing fossil fuel products to enter the stream of commerce, despite knowing them to be defective due to their inevitable propensity to cause sea level rise, more frequent and extreme drought, more frequent and extreme

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precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes;

b. failing to act on the information and warnings they received from their own internal research staff, as well as from the international scientific community, that the unabated extraction, promotion, and sale of their fossil fuel products would result in material dangers to the public, including the State of Rhode Island and its citizens and natural resources;

c. failing to take actions including, but not limited to, pursuing and adopting known, practical, and available technologies, energy sources, and business practices that would have mitigated greenhouse gas pollution caused by Defendants' fossil fuel products and eased the transition to a lower carbon economy; shifting to non-fossil fuel products, and researching and/or offering technologies to mitigate CO_2 emissions in conjunction with sale and distribution of their fossil fuel products; and pursuing other available alternatives that would have prevented or mitigated the injuries to Plaintiff, its citizens, and its natural resources caused by sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes, that Defendants, and each of them, knew or should have foreseen would inevitably result from use of Defendants' fossil fuel products;

d. engaging in a campaign of disinformation regarding global warming and the climatic effects of fossil fuel products that prevented customers, consumers,

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regulators, and the general public from staking steps to mitigate the inevitable consequences of fossil fuel consumption, and incorporating those consequences into either short-term decisions or long-term planning.

268. Defendants' individual and collective acts and omissions were actual, substantial causes of sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes, including injuries and damages set forth herein to Plaintiff, its citizens, and its natural resources, as sea levels would not have risen to the levels that caused those injuries, and prevailing climatic and meteorological regimes would not have been disrupted to a magnitude that caused those injuries, but for Defendants' introduction of their fossil fuel products into the stream of commerce.

269. As a direct and proximate result of Defendants' and each of their acts and omissions, Plaintiff State of Rhode Island has sustained and will sustain other substantial expenses and damages set forth in this Complaint within the jurisdictional limits of this Court, including damage to publicly owned infrastructure and real property, and injuries to public trust resources that interfere with the rights of the State and its citizens.

270. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

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271. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

272. Wherefore, the State of Rhode Island prays for relief as set forth below.

FIFTH CAUSE OF ACTION

Negligent Failure to Warn

(Against All Defendants)

273. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

274. Defendants, and each of them, at all times had a duty to issue adequate warnings to Plaintiff, the public, consumers, and public officials of the reasonably foreseeable or knowable risks posed by their fossil fuel products.

275. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community, of the climate effects inherently caused by the normal use and operation of their fossil fuel products, including the likelihood and likely severity of global warming, global and local sea level rise, more frequent and extreme drought, more frequent and extreme precipitation events, more frequent and extreme heat waves, and the associated consequences of those physical and environmental changes, including Plaintiff's injuries and damages described herein.

276. Defendants knew or should have known, based on information passed to them from their internal research divisions and affiliates and/or from the international scientific community,

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that the climate effects described herein rendered their fossil fuel products dangerous, or likely to be dangerous, when used as intended.

277. Throughout the times at issue, Defendants breached their duty of care by failing to adequately warn any consumers or any other party of the climate effects that inevitably flow from the intended use of their fossil fuel products.

278. Throughout the times at issue, Defendants individually and in concert widely disseminated marketing materials, refuted the scientific knowledge generally accepted at the time, advanced pseudo-scientific theories of their own, and developed public relations materials that prevented reasonable consumers from recognizing the risk that fossil fuel products would cause grave climate changes, undermining and rendering ineffective any warnings that Defendants may have also disseminated.

279. Given the grave dangers presented by the climate effects that inevitably flow from the normal use of fossil fuel products, a reasonable extractor, manufacturer, formulator, seller, or other participant responsible for introducing fossil fuel products into the stream of commerce, would have warned of those known, inevitable climate effects.

280. Defendants' conduct was a direct and proximate cause of Plaintiff's injuries and a substantial factor in the harms suffered by Plaintiff as alleged herein.

281. As a direct and proximate result of Defendants' and each of their acts and omissions, Plaintiff State of Rhode Island has sustained and will sustain other substantial expenses and damages set forth in this Complaint within the jurisdictional limits of this Court, including damage to publicly owned infrastructure and real property, and injuries to public trust resources that interfere with the rights of the State and its citizens.

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282. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

283. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

284. Wherefore, the State of Rhode Island prays for relief as set forth below.

SIXTH CAUSE OF ACTION

Trespass

(Against All Defendants)

285. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

286. Plaintiff owns, leases, occupies, and/or controls real property throughout the State.

287. Defendants, and each of them, have intentionally, recklessly, or negligently caused flood waters, extreme precipitation, landslides, saltwater, and other materials, to enter Plaintiff's property, by extracting, refining, formulating, designing, packaging, distributing, testing, constructing, fabricating, analyzing, recommending, merchandising, advertising, promoting, marketing, and/or selling fossil fuel products, knowing those products in their normal operation

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and use would cause global and local sea levels to rise, more frequent and extreme droughts to occur, more frequent and extreme precipitation events to occur, more frequent and extreme heat waves to occur, and the associated consequences of those physical and environmental changes.

288. The State of Rhode Island did not give permission for Defendants, or any of them, to cause floodwaters, extreme precipitation, landslides, saltwater, and other materials to enter its property as a result of the use of Defendants' fossil fuel products.

289. The State of Rhode Island has been and continues to be actually injured and continues to suffer damages within the jurisdictional limits of this Court as a result of Defendants and each of their having caused flood waters, extreme precipitation, landslides, saltwater, and other materials, to enter its real property, by *inter alia* submerging real property owned by Rhode Island and causing flooding which has invaded and threatens to invade real property owned by Rhode Island and rendered it unusable, causing storm surges and heightened waves which have invaded and threatened to invade real property owned by Rhode Island, and causing landslides to enter the State's property, and in so doing, rendering the property unusable.

290. Defendants' and each Defendant's introduction of their fossil fuel products into the stream of commerce was a substantial factor in causing the injuries and harms to Rhode Island's public and private real property as alleged herein.

291. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

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292. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

293. Wherefore, the State of Rhode Island prays for relief as set forth below.

SEVENTH CAUSE OF ACTION

Impairment of Public Trust Resources

(Against All Defendants)

294. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

295. The Rhode Island Constitution has enshrined common law to provide for broad protection of the State's natural resources, and guarantees that its citizens "shall continue to enjoy and freely exercise all the rights of fishery, and the privileges of the shore, to which they have been heretofore entitled under the charter and usages of this state, including but not limited to fishing from the shore, the gathering of seaweed, leaving the shore to swim in the sea and passage along the shore; and they shall be secure in their rights to the use and enjoyment of the natural resources of the state with due regard for the preservation of their values." R.I. Const. art. I, § 17.

296. The Rhode Island Constitution provides that the "powers of the state" to "regulate and control the use of land and waters in the furtherance of the preservation, regeneration, and restoration of the natural environment . . . as those rights and duties are set forth in Section 17, shall be an exercise of the police powers of the state, [and] shall be liberally construed." R.I. Const. art. I, § 16.

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297. The General Assembly has repeatedly declared that coastal resources of the State, plant and animal life within the State, and the State's watershed are critical natural resources inuring to the benefit of the public. The General Assembly has thus found and declared that "the coastal resources of Rhode Island, a rich variety of natural, commercial, industrial, recreational, and aesthetic assets, are of immediate and potential value to the present and future development of this state," and that "it shall be the policy of this state to preserve, protect, develop, and, where possible, restore the coastal resources of the state for this and succeeding generations." R.I. Gen. Laws §§ 46-6.1-2(5); 46-23-1(a)(2).

298. The General Assembly has further found and declared that "Narragansett Bay may be the greatest natural resource of the state of Rhode Island," and that failure to protect the environmental integrity of the Narragansett Bay will create "severe and detrimental ecological and economic impact upon the people of the state of Rhode Island." R.I. Gen. Laws § 46-5-2(a)(2).

299. The General Assembly has further found and declared that "the bays, rivers, and associated watersheds of Rhode Island are unique and unparalleled natural resources that provide significant cultural, ecological, and economic benefit to the state," and that "it is in the best interest of the state and its citizens to preserve, protect, and restore our bays, rivers, and associated watersheds." R.I. Gen. Laws § 46-31-.1-1(1),(3).

300. The General Assembly has further found and declared that "animal life inhabiting the lands of the state, its lakes, ponds, streams, and rivers, and the marine waters within its territorial jurisdiction, are a precious, renewable, natural resource of the state." R.I. Gen. Laws § 20-1-1(a).

301. As alleged above, Defendants, through their affirmative acts and omissions have interfered with the use and enjoyment of public trust resources within Rhode Island including the

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fisheries, shores, and other coastal resources of the State; plant and animal life within the State; and the State's watershed by, *inter alia*, increasing local sea level, and associated flooding, inundation, erosion, and other impacts within the State; increasing the frequency and intensity of drought in the State; altering and harming the diversity of wildlife in the State's coastal waters and fisheries; harming salt marsh ecosystems within the State; increasing the frequency and intensity of extreme heat days in the State; and increasing the frequency and intensity of extreme precipitation events in the State.

302. As a direct and proximate result of the defects previously described, fossil fuel products, the public trust resources over which the State serves as trustee have been injured, and the use and enjoyment of those resources by Rhode Island and its citizens has been impaired. As a result, the State of Rhode Island has incurred and will continue to incur substantial expenses and damages set forth in this Complaint within the jurisdictional limits of this Court to investigate, remediate, prevent, and restore injuries to public trust resources, for which Defendants are jointly and severally liable.

303. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

304. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon the rights of others, including the State of Rhode Island. Therefore, the State requests an award of

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punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

305. Wherefore, the State of Rhode Island prays for relief as set forth below.

EIGHTH CAUSE OF ACTION

State Environmental Rights Act, Equitable Relief Action

(Against All Defendants)

306. Plaintiff State of Rhode Island realleges each and every allegation contained above, as though set forth herein in full.

307. The General Assembly has further found and declared that "each person is entitled by right to the protection, preservation, and enhancement of air, water, land, and other natural resources located within the state," and that "it is in the public interest to provide an adequate civil remedy to protect air, water, land and other natural resources located within the state from pollution, impairment, or destruction." R.I. Gen. Laws § 10-20-1.

308. The General Assembly has defined "pollution, impairment, or destruction" to include "any conduct which materially adversely affects or is likely to materially adversely affect the environment." R.I. Gen. Laws § 10-20-2(6).

309. The Attorney General "may maintain an action in any court of competent jurisdiction for declaratory and equitable relief against any other person for the protection of the environment, or the interest of the public therein, from pollution, impairment, or destruction," and may "take all possible action, including . . . formal legal action, to secure and insure compliance with the provisions of this chapter." R.I. Gen. Laws § 10-20-3(b), (d)(1), (d)(5).

310. In such an action maintained by the Attorney General, "[t]he court may grant declaratory relief, temporary and permanent equitable relief, or may impose such conditions upon

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a party as are necessary or appropriate to protect the air, water, land, or other natural resources located within the state from pollution, impairment, or destruction, considering the health, safety, and welfare of the public, and the availability of feasible, prudent, and economically viable alternatives." R.I. Gen. Laws § 10-20-6.

311. As alleged above, Defendants, through their affirmative acts and omissions have polluted, impaired, and/or destroyed natural resources of the state by, *inter alia*, increasing local sea level, and associated flooding, inundation, erosion, and other impacts within the State; increasing the frequency and intensity of drought in the State; increasing the frequency and intensity of extreme heat days in the State; and increasing the frequency and intensity of extreme precipitation events in the State.

312. As a direct and proximate result of Defendants' fossil fuel products, Defendants have polluted, impaired, and/or destroyed natural resources of the state. Rhode Island has incurred and will continue to incur substantial expenses and damages set forth in this Complaint within the jurisdictional limits of this Court to investigate, remediate, prevent, and restore injuries to public trust resources, for which Defendants are jointly and severally liable.

313. Defendants' acts and omissions as alleged herein are indivisible causes of Plaintiff State of Rhode Island's injuries and damage as alleged herein, because, *inter alia*, it is not possible to determine the source of any particular individual molecule of CO_2 in the atmosphere attributable to anthropogenic sources because such greenhouse gas molecules do not bear markers that permit tracing them to their source, and because greenhouse gasses quickly diffuse and comingle in the atmosphere.

314. Defendants' wrongful conduct was willful, reckless, or wicked, with conscious disregard for the probable dangerous consequences of that conduct and its foreseeable impact upon

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the rights of others, including the State of Rhode Island. Therefore, the State requests an award of punitive damages in an amount reasonable, appropriate, and sufficient to punish these Defendants for the good of society and deter Defendants from ever committing the same or similar acts.

315. Wherefore, the State of Rhode Island prays for relief as set forth below.

VII. PRAYER FOR RELIEF

The Plaintiff, **STATE OF RHODE ISLAND**, seeks judgment against these Defendants for:

1. Compensatory damages in an amount according to proof;
2. Equitable relief, including abatement of the nuisances complained of herein;
3. Reasonable attorneys' fees as permitted by law;
4. Punitive damages;
5. Disgorgement of profits;
6. Costs of suit; and
7. For such and other relief as the court may deem proper.

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REQUEST FOR JURY TRIAL

Plaintiff hereby demands a jury trial on all causes of action for which a jury is available under the law.

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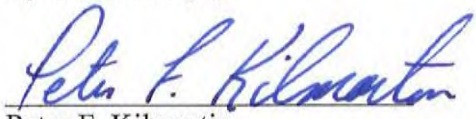
Dated: July 2, 2018

STATE OF RHODE ISLAND

By Its Attorneys,



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