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Priority: Normal
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TO: E Joseph Hillings at ENR-LOBBY-PO
TO: Mark (London) Schroeder at EI_LONDON_PO
TO: Steven J Kean at EGS3_PO
TO: Margaret Carson
Subject: Carbon Abatement Cost/Benefit for Enron

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Mike Terraso and I have spoken to Terry Thorn about the need for the corporation to do some deeper thinking about the effect of carbon abatement policies on Enron. Whereas up to now we have just thought in terms of substituting gas and renewables for coal and earning revenues from CO2 air-permit trading, we need to consider the negatives of higher electric rates and other fuel costs on Enron's operations and commodity trading activities. We might also think of the effect of higher energy costs on employees, capital markets, and stock prices.

John, you mentioned that every \$10 per ton of CO2 value translates into one penny per kWh. That means that a \$30 value kills the gains from electric restructuring. I am seeing values in the hundreds of dollars per ton; can you provide a range for us with and without developing country participation? We can then see the loss to Enron with our energy bills and estimate the trading loss for electricity from a drop in demand assuming Enron has a 10% share of the U.S. market and some share of the European market.

What prompts all this is the escalating debate by opponents who are now advancing arguments that the science is far from certain and, in fact, may go the other way. I saw an interview with noted climate-change proponent Stephen Schneider on a major network program last week who said there is an even chance that climate change would positively "green" the earth (more precipitation, longer growing seasons) but that it was his job to alarm the public on the worst case side.

The fact that the science is not settled but being hyped by both sides, and the fact that the Republican Congress and labor-sympathetic Democrats will probably not ratify a carbon accord, tells me that we should do our homework on the downside for Enron as well. The results may be interesting.

Finally, Terry and I have a tentative date of April 30 to meet in Washington D.C. with environmental specialists from some of the D.C. market-oriented think tanks on environmental issues (Cato, CSE, CEI, maybe AEI, Heritage). We would get a big meeting room somewhere and meet for most of the day to educate each other on our issues and get a political sense of what is doable versus gridlock. It would be good to have someone from our London office with us.

*Journal
Debate
97-98*

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states and I serve on a tri-national panel (Mex-US-Canada) working on this program. These regional programs will be critical in understanding the mechanics of accounting for cross-boundary emission reduction activities. We need these insights and experiences before trying to construct a global trading system.

As of June 1996, 12 countries have included JI in their convention-mandated National Climate Action Plans and support is growing. China, India and many other countries are interested in JI.

Enron's Position

Enron has taken a constructive, leadership role in the climate debate. By accepting that the science is good enough to indicate a problem, that it makes sense to begin mitigating emissions as soon as possible, and mitigation should be accomplished through emission credit trading and JI programs, we have received accolades from the environmental community, regulators, and praise from the developing countries. We have however made it clear that the developing countries must participate as soon as possible in a mitigation program.

Unfortunately, this high profile, while beneficial outside the US, has made us a convenient target for the "dirty-carbon" crowd and right-of-center groups in the US. When you consider our position in its entirety, it's hard to understand why we're being attacked. They hear target and timetables, but they don't hear gradual and phase, support for market-based solutions, and insistence on developing country participation. Even EPRI agrees that our proposals would produce programs that cost 70% less than alternatives.

Nonetheless, we have internally agreed to review our policy. The previous discussion and the following position recommendations should provide a framework for debate:

Position Standards

1. The scientific evidence to date indicates that human activity is having an impact on climate. The exact extent is unknown.
2. Actions should be taken now and proceed steadily to avoid more hurried and costly solution at a later date.
3. A policy framework to establish a short-term target is important to provide a clear signal to the industrial community to accelerate efforts to develop and use low cost climate protection technologies. In this respect, Enron supports early, gradually phased in targets and timetables. Developing countries should be included. We have discussed with NRDC their proposal for a phased approach: ¹

¹ - A 450 ppm target

4. The development of energy conservation and renewable energy technologies should allow US industry to compete more effectively for the growing world market for energy development and energy conservation services. US AID projects a world market of between \$8 billion to \$17 billion annually for energy efficiency technologies and service alone.
5. Because of the labor-intensive nature of energy conservation and renewable energy, total employment in energy production and Service industries should increase in the US becoming major employers by 2010.
6. A range of technologies are currently available to cost-effectively reduce GHG emissions.
7. Significant "no-regrets" opportunities are available in most countries mitigating the initial cost of and justifying early compliance. Numerous studies have indicated that over 10% energy efficiency gains above present levels are feasible at little or no net cost in many parts of the world through technical conservation measures and improved management practices over the next 2 to 3 decades. Many cost-effective, energy efficient technologies are not widely adopted now due to lack of information and other market barriers. Proper price signals will speed the development of these technologies.
8. Despite the initial resistance to joint implementation, it and an emissions credit trading program remain the most cost-effective way to reduce emissions. We support JI and emissions trading.
9. There should be a shift away from taxes on employment and income taxes toward taxes on pollution and other negative externalities.

Since we don't know enough about the ultimate requirements of the climate change mitigation programs, it's hard to judge the impact on the US economy and Enron's commercial activities. Nonetheless, it's save to assume:

Phase I 1992-2020

- Annex I caps, trading, 20% below 1990 -2005

Phase II 2010-2060

- Regime expansion and convergence to equal per capita allowance applications

Phase III 2050-2100

- Atmospheric stabilization

The overall price of energy will increase.*

The competitiveness of renewables will improve.

There will be some form of carbon trading.

There will be more demand for natural gas.

It will create a driver for energy efficiency.

Currently, we use about 17 Quads of coal in the US in the electricity sector. From a stoutly business perspective, the potential market for gas is 10 TCF of new gas load, a lot of potential! In addition, carbon credit trading and the creation of related financial and other risk management products provide huge business opportunities for Enron.

To summarize:

1. It is unlikely that the US will approve a climate treaty anytime soon - the votes aren't there and there is a convoluted process to undertake. This does not mean that the rest of the world won't go ahead without the US and there won't be regional emission credit trading programs.
2. It's hard to judge the impact on our operations since we don't know the final targets and timetables that will be before the convention later this year. We have yet to see the US proposal which is due out in May. The greatest concern of our operations people is the caps being set on greenhouse gases, not just CO2 emissions. If EGP's system leaks methane at the industry average, we would lose about 16 Bcf of methane per year, a significant amount. Unlike the utility industry, we don't have the ability to measure emissions continually and accurately - an expensive undertaking. I also understand that EOG has considerable CO2 emissions overseas.
3. The upside for natural gas markets is considerable even if we only get 15-20% of the 10 tcf coal market at risk.
4. The upside for renewables and energy efficiency programs is straightforward, both in the US and internationally. We would obviously be a major player in any emissions trading program. Rob Bradley notes that we need to study the impact of higher electricity prices on the relevant economics of manufacturing renewable equipment as well as the emissions from the manufacturing process (total fuel cycle analysis).
5. Right now we are on the side of the angels with what I consider eminently reasonable position. I won't see the upside of siding with the Chamber or Nam on this issue.
6. The Department of Commerce will soon complete a sectorial analysis to judge the impacts of CO2 controls. This is as much of a political analysis as an economic analysis. You quickly identify what coalition will be fighting you. The administration has also taken the position that electric restructuring cannot end to

* What will be the impact on Enron's electric bill? How will increased electricity prices lower the demand for electricity and our trading volumes?

increases in NOX and SOX. They cannot cut a deal that will allow coal to increase its market share. Ironically, you will be fighting over this issue with the same people as on the climate debate. Many argue that we should engage the Congress on both issues since CO2 controls impact NOX and SOX. I have argued this is a great idea. Keep them both separate and don't add either to the electric bill.

7. We need, and are working on, a quantitative analysis on the pluses and minuses for Enron.