

Message

From: McCarron, Suzanne M [/O=EXXONMOBIL/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/C [REDACTED]]
Sent: 7/12/2017 6:52:20 PM
To: Lachenmyer, Lynne M ([REDACTED]@exxonmobil.com)
Subject: RE: PRIV: FW: What carbon fee level is effective to eliminate liquid fossil fuels?

Thanks Lynne

-----Original Message-----

From: Lachenmyer, Lynne M
Sent: Monday, July 10, 2017 3:48 PM
To: McCarron, Suzanne M <[REDACTED]@exxonmobil.com>
Subject: RE: PRIV: FW: What carbon fee level is effective to eliminate liquid fossil fuels?

Suzanne,

Yes, very aware that Doug Grandt has been very active in his communications of late. We are monitoring his location (now living in Vermont) and his social media. Feel free to forward any emails that may appear to be escalating in tone / words. We are assessing for potential escalation patterns. Happy to discuss further.

Lynne Lachenmyer
Vice President
Safety, Security, Health & Environment

Exxon Mobil Corporation
[REDACTED]

-----Original Message-----

From: McCarron, Suzanne M
Sent: Friday, July 07, 2017 12:58 PM
To: Lachenmyer, Lynne M <[REDACTED]@exxonmobil.com>
Subject: PRIV: FW: What carbon fee level is effective to eliminate liquid fossil fuels?

L - You are probably well aware of this but the frequency of these is increasing and Susan Avery is now receiving as well

-----Original Message-----

From: Douglas Grandt [REDACTED]
Sent: Thursday, July 06, 2017 2:04 PM
To: McCarron, Suzanne M <[REDACTED]@exxonmobil.com>; Colton, William M <[REDACTED]@exxonmobil.com>
Cc: Woods, Darren W <[REDACTED]@exxonmobil.com>; Woodbury, Jeffrey J <[REDACTED]@exxonmobil.com>; Susan K. Avery, PhD <[REDACTED]@whoi.edu>; Schulz, Max <[REDACTED]@exxonmobil.com>
Subject: What carbon fee level is effective to eliminate liquid fossil fuels?

Suzanne and Bill,

Today, I would like to delve into ExxonMobil's document "Energy and Carbon -- Managing the Risks <<http://cdn.exxonmobil.com/~media/global/files/energy-and-environment/report---energy-and-carbon---managing-the-risks.pdf>> " which is referenced in your Corporate Citizenship Report, Engaging on climate change policy <<http://corporate.exxonmobil.com/en/community/corporate-citizenship-report/managing-climate-change-risks/engaging-on-climate-policy>> ("the report" hereinafter).

The report seems to contradict what Ken Cohen stated in his December 2, 2015, blog post "ExxonMobil and the carbon tax <<https://energyfactor.exxonmobil.com/corporate-citizenship-sustainability/exxonmobil-and-the-carbon-tax/>> ":

Business planning and a price on carbon

One key point we make in many of these briefings is that ExxonMobil has included a proxy price on carbon in our business planning since 2007.

This enables us to analyze the impact of a price on carbon on various investment opportunities. This proxy cost, which in some regions may approach \$80 per ton, seeks to reflect all types of actions and policies that governments may take. ([Bit.ly/XOM2Dec15](http://bit.ly/XOM2Dec15) <<http://bit.ly/XOM2Dec15>>)

In 2015, it is unclear whether Ken Cohen and ExxonMobil meant \$80/ton of CO₂ or \$80/ton of carbon. As you may understand, \$80/ton of CO₂ actually equates to \$293/ton of carbon using the ratio of molecular weights <<http://Bit.ly/TP25Mar08>> 12 for carbon and 44 for CO₂. Conversely, \$80/ton of carbon equates to \$21.82/ton of CO₂ (Ref Bit.ly/TP25Mar08 <<http://Bit.ly/TP25Mar08>>).

"Energy and Carbon -- Managing the Risks <<http://cdn.exxonmobil.com/~media/global/files/energy-and-environment/report---energy-and-carbon---managing-the-risks.pdf>> " is not dated, so we have no way to know whether it pre-dates or followed Ken Cohen's December 2, 2015 blog post. This is an important detail if one wants to understand ExxonMobil's true intentions for assessing an effective carbon tax that eliminates liquid fossil fuels in the next couple decades. From the chart above (page 9 of the report) and the text that follows (page 8-9 of the report), it seems that ExxonMobil understands that the price per ton of CO₂ or carbon must be extremely high and increase at an exponential rate in order to drive down demand for liquid fossil fuels.

The report seems to use the term "CO₂ price" in context with per ton, and "CO₂ cost" in context with the result when price is applied to tonnage of emissions, but clarification of this would be appreciated. The report also appears not to assume revenue neutrality, as there is no discussion of the burden of "carbon costs" per family being mitigated by a rebate or dividend. Seems to me this report predates Rex Tillerson's public endorsements and insistence on "revenue neutrality."

would you please clarify in simple layman's terms how the discussion and chart on pages 8-9 play out in terms of a carbon-fee that effectively drives down demand for liquid hydrocarbon fuels and over what time period? For example, is the green curve a carbon price that rises from about \$60/ton CO₂ in 2020 yearly to \$1,000/ton CO₂ in 2090, and does that imply that liquid fossil fuels will not be completely eliminated until late in the 21st century? It would be helpful if you were to update the report to include an estimated CO₂ emissions reduction curve as an overlay to the chart on page 9.

Is this analysis the basis for ExxonMobil's statements that you use a proxy fee for carbon of \$40/ton or \$80/ton CO₂ because you believe that is the level that it could might approach if U.S. Congressional policy makers decide to

For your convenience, following is the section on pages 8-9, which is the basis for my questions.

Sincerely yours,

Doug Grandt

4. Carbon Budget and Carbon Asset Risk Implications

One focus area of stakeholder organizations relates to what they consider the potential for a so-called carbon budget. Some are advocating for this mandated carbon budget in order to achieve global carbon-based emission reductions in the range of 80 percent through the year 2040, with the intent of stabilizing world temperature increases not to exceed 2 degrees Celsius by 2100 (i.e., the "low carbon scenario"). A concern expressed by some of our stakeholders is whether such a "low carbon scenario" could impact ExxonMobil's reserves and operations - i.e., whether this would result in unburnable proved reserves of oil and natural gas.

The "low carbon scenario" would require CO₂ prices significantly above current price levels. In 2007, the U.S. Climate Change Science Program published a study that examined, among other things, the global CO₂ cost needed to drive investments and transform the global energy system, in order to achieve various atmospheric CO₂ stabilization pathways. The three pathways shown in the chart below are from the MIT IGSM model used in the study, and are representative of scenarios with assumed climate policies that stabilize GHGs in the atmosphere at various levels, from 650 ppm CO₂ down to 450 ppm CO₂, a level approximating the level asserted to have a reasonable chance at meeting the "low carbon scenario." Meeting the 450 ppm pathway requires large, immediate reductions in emissions with overall net emissions becoming negative in the second half of the century. Non-fossil energy sources, like nuclear and renewables, along with carbon capture and sequestration, are deployed in order to transform the energy

system. Costs for CO2 required to drive this transformation are modeled. In general, CO2 costs rise with more stringent stabilization targets and with time. Stabilization at 450 ppm would require CO2 prices significantly above current price levels, rising to over \$200 per ton by 2050. By comparison, current EU Emissions Trading System prices are approximately \$8 to \$10 per ton of CO2.

In the right section of the chart below, different levels of added CO2 are converted to estimated added annual energy costs for an average American family earning the median income. For example, by 2030 for the 450ppm CO2 stabilization pathway, the average American household would face an added CO2 cost of almost \$2,350 per year for energy, amounting to about 5 percent of total before-tax median income. These costs would need to escalate steeply over time, and be more than double the 2030 level by mid-century. Further, in order to stabilize atmospheric GHG concentrations, these CO2 costs would have to be applied across both developed and developing countries.

<http://cdn.exxonmobil.com/~media/global/files/energy-and-environment/report---energy-and-carbon--managing-the-risks.pdf>

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