

**RESPONSE TO PETITION FOR RULE-MAKING RELATED TO FREEZING THE RENEWABLE ELECTRICITY PORTFOLIO STANDARD**

Gary Myers of Rehoboth Beach recently submitted a Petition for Rule-Making under Del. C. #10114, which relates to freezing and unfreezing the schedule (Schedule I) for increasing the annual percentages of electricity sold in Delaware that come from eligible renewable energy sources, as shown below.

SCHEDULE I <sup>1</sup>		
Compliance Year  (beginning June 1 <sup>st</sup> )	Minimum Cumulative Percentage from Eligible Energy Resources	Minimum Cumulative Percentage from Solar Photovoltaics*
2010	5.0%	0.018%
2011	7.0%	0.20%
2012	8.5%	0.40%
2013	10.0%	0.60%
2014	11.5%	0.80%
2015	13.0%	1.00%
2016	14.5%	1.25%
2017	16.0%	1.50%
2018	17.5%	1.75%
2019	19.0%	2.00%
2020	20.0%	2.25%
2021	21.0%	2.50%
2022	22.0%	2.75%
2023	23.0%	3.00%
2024	24.0%	3.25%
2025	25.0%	3.50%
* Minimum Percentage from Eligible Energy Resources Includes the Minimum Percentage from Solar Photovoltaics.		

Some key paragraphs from the Public Service Commission (PSC)<sup>2</sup> are (emphasis added):

“(i) The State Energy Coordinator in consultation with the Commission, **may freeze the minimum cumulative solar photovoltaics requirement for regulated utilities if the Delaware Energy Office determines that the total cost of complying with this requirement during a compliance year exceeds 1% of the**

total retail cost of electricity for retail electricity suppliers during the same compliance year. In the event of a freeze, the minimum cumulative percentage from solar photovoltaics shall remain at the percentage for the year in which the freeze is instituted. The freeze shall be lifted upon a finding by the Coordinator, in consultation with the Commission, that the total cost of compliance can reasonably be expected to be under the 1% threshold. The total cost of compliance shall include the costs associated with any ratepayer funded state solar rebate program, SREC purchases, and solar alternative compliance payments.”

“(j) The State Energy Coordinator in consultation with the Commission, **may** freeze the minimum cumulative eligible energy resources requirement for regulated utilities if the Delaware Energy Office determines that the total cost of complying with this requirement during a compliance year exceeds 3% of the total retail cost of electricity for retail electricity suppliers during the same compliance year. In the event of a freeze, the minimum cumulative percentage from eligible energy resources shall remain at the percentage for the year in which the freeze is instituted. The freeze shall be lifted upon a finding by the Coordinator, in consultation with the Commission, that the total cost of compliance can reasonably be expected to be under the 3% threshold. The total cost of compliance shall include the costs associated with any ratepayer funded state renewable energy rebate program, REC purchases, and alternative compliance payments.”

It is important to note that both paragraphs say that the State Energy Coordinator (in consultation with the Commission (PSC)) **may** freeze the requirement; it does not use the word ‘must’ or ‘should.’ DNREC, in which the Climate and Energy Division is now located, and the PSC have responsibilities to protect natural resources, the environment and public health and welfare, in addition to restraining energy bills. It is clear that in considering whether or not to allow the percentages of renewable energy sources to increase according to Schedule I, externalities must also be considered.

Paul Epstein (Harvard Medical School) and 10 co-authors published an important paper in 2011 titled, **Full cost accounting for the life cycle of coal.**<sup>3</sup> The Abstract says,

“Each stage in the life cycle of coal—extraction, transport, processing, and combustion—generates a waste stream and carries multiple hazards for health and the environment. These costs are external to the coal industry and are thus often considered “externalities.” We estimate that the life cycle effects of coal and the waste stream generated are costing the U.S. public a third to over one-half of a trillion dollars annually. Many of these so-called externalities are, moreover, cumulative. Accounting for the damages conservatively doubles to triples the price of electricity from coal per kWh generated, ...”

While much of the externality cost of coal is from increased morbidity and mortality, a substantial but uncertain fraction is attributable to climate change. On the

high end, Epstein et al. estimate the average climate change cost to society at about 10¢/kWhr or \$100/MWh. Since an ordinary powdered coal plant produces about a ton of CO<sub>2</sub> per MWh, that means a cost to society of about \$100/ton of CO<sub>2</sub> emitted. Natural gas, while cleaner burning than coal, still produces about 0.5 ton of CO<sub>2</sub> per MWh of electricity generated.

A 2011 study of carbon capture and storage (CSS) by scientists from Stanford and Princeton concluded that capturing CO<sub>2</sub> at power plants would cost \$50 to \$100/ton, while capturing it from the atmosphere, where it is much more dilute (about 0.04% by volume) would cost about \$1000/ton<sup>4</sup> (or \$1.00/kWh for coal and \$0.50 for natural gas). I get my power in Wilmington from Delmarva Power and Light at a cost of about 15¢/kWhr; 3% of that would be about 0.5¢/kWhr – far less than the costs of the externalities caused by the continued burning of fossil fuels.

Many have concluded that the global mean temperature should not be allowed to increase more than 2°C above what it was at the beginning of the Industrial Revolution in about 1750. James Hanson (Columbia University and NASA) and nine other scientists concluded that staying below 2° means that the atmospheric carbon dioxide concentration [CO<sub>2</sub>] should be lowered and kept below 350 parts per million (ppm).<sup>5</sup> In the Abstract they write,

“Decreasing CO<sub>2</sub> was the main cause of a cooling trend that began 50 million years ago, the planet being nearly ice-free until CO<sub>2</sub> fell to 450 ± 100 ppm; barring prompt policy changes, that critical level will be passed, in the opposite direction, within decades. If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO<sub>2</sub> will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that.”

Since that paper was written, [CO<sub>2</sub>] has increased to over 395 ppm, and is increasing by more than 2 ppm a year. At this rate we'll surely get to 450 ppm within a few decades. Getting back to 350 will require not only eliminating almost all CO<sub>2</sub> emissions from fossil fuels on a worldwide basis, but pulling CO<sub>2</sub> out of the atmosphere at huge cost. In 2007 Kempton and Dhanju posted a paper in which they found that the loss of ice from both Greenland and the West Antarctic Ice Sheet would raise global sea level by about 15 meters (about 50 feet); the additional loss of all East Antarctic ice would raise sea level by a total of 80 m.<sup>6</sup> Their figure below shows what Delaware and parts of neighboring states would look like under those conditions. At 80 m very little of Delaware is left. That will take centuries, but is the direction we are currently headed.



Figure showing what land is still above water with SLR of 15 m (light green) and 80 m (dark green).

The cost of climate change for Delaware is going to be huge – especially because of sea level rise (SLR). I serve on the Delaware Sea Level Rise Advisory Committee,

which is about to issue a detailed Vulnerability Assessment Report.<sup>7</sup> Delaware is especially vulnerable both because of its long shoreline and its exceptionally low average elevation (60 feet) – the lowest of any state in the country.<sup>8</sup> The committee found that a sea level rise (SLR) of 1.5 m (5 feet) – quite possible by the end of the century – will threaten 99% of our wetlands, 73% of the area of the Port of Wilmington, and about 17,000 Delaware homes with inundation at high tide. This is no doubt an underestimate of the residences at risk because it doesn't take into account the storm surges and large waves that are likely to accompany coastal storms. If we estimate the average cost of moving families at \$200,000 apiece, the cost just of moving 17,000 families would be \$3.4 billion. Losses of resources, property and infrastructure will occur in all three counties and will impose a heavy financial burden on all of us – whether or not we live near the coast.

DNREC and the PSC can best serve the state by deciding not to freeze the RPS and by leaving Schedule I to go forward without interference. I would like to see our goals in dealing with climate change strengthened rather than weakened. Delaware – like the other states in the RGGI region have done – should adopt a comprehensive energy/climate change plan that includes targets and a timetable for greenhouse gas emissions from all sources in the state - not just electricity generation. It should promote reducing energy waste - through both conservation and improved energy efficiency - and the transition from all fossil fuels to renewable energy sources, as soon as possible. Delaware should become an energy/climate leader – if we want to protect its people's health and welfare and preserve it for future generations.

Chad Tolman

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PS For those who think that a clean and sustainable energy future is beyond our reach, they should learn about Malmö, Sweden, a coastal city of 280,000 that decided to reduce its CO2 emissions from all sources 25% by 2012 and 100% by 2030.<sup>9</sup> If they can do it, why can't we?

## REFERENCES

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<sup>1</sup> **TITLE 26, Chapter 21. Public Service Commission, Subchapter III-A. Renewable Energy Portfolio Standards. At:**  
<http://delcode.delaware.gov/title26/c001/sc03a/index.shtml>

<sup>2</sup> **Ref. 1, Section §354.**

<sup>3</sup> **Paul R. Epstein et al., Full cost accounting for the life cycle of coal, New York Academy of Sciences, Vol. 1219, Ecological Economics Reviews, pp. 73-98, Feb.**

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2011. At: <http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2010.05890.x/abstract>

<sup>4</sup> **Scrub carbon dioxide directly from the atmosphere? Too expensive, says a Stanford researcher. Better to start with the smokestacks of coal-burning power plants.** Stanford University News, Dec. 9, 2011. At: <http://news.stanford.edu/news/2011/december/extracting-carbon-air-120911.html>

<sup>5</sup> James Hansen et al., **Target Atmospheric CO2: Where Should Humanity Aim?** The Open Atmospheric Journal, 2008, 2, 217-238. At: [http://pubs.giss.nasa.gov/docs/2008/2008\\_Hansen\\_etal.pdf](http://pubs.giss.nasa.gov/docs/2008/2008_Hansen_etal.pdf)

<sup>6</sup> Willett Kempton and Amardeep Dhanju, **Sea Level Rise and its Effect on Delaware**, Figure 8. UD College of Marine and Earth Studies, Feb. 2007. At: [http://co2.cms.udel.edu/SeaLevel\\_DE.htm](http://co2.cms.udel.edu/SeaLevel_DE.htm)

<sup>7</sup> The **Vulnerability Assessment** should be posted on the web by September 2012 at: <http://www.dnrec.delaware.gov/coastal/Pages/DESLRAdvisoryCommittee.aspx>

<sup>8</sup> **List of U.S. states by elevation.** At: [http://simple.wikipedia.org/wiki/List\\_of\\_U.S.\\_states\\_by\\_elevation](http://simple.wikipedia.org/wiki/List_of_U.S._states_by_elevation)

<sup>9</sup> C.M. Faust, **City of Sustainability and Renewable Energy - Amazing Malmö, Sweden Puts Us All To Shame**, February 2011. At: <http://spfaust.wordpress.com/2011/02/25/city-of-sustainability-and-renewable-energy/>