

ATTACHMENT 1

Noyes, Thomas G. (DNREC)

From: Firestone, Jeremy Mark <jf@udel.edu>
Sent: Friday, April 01, 2016 2:41 PM
To: Noyes, Thomas G. (DNREC)
Cc: Cherry, Philip J. (DNREC)
Subject: Re: RPS Cost Cap Determination

Categories: Red Category

Dear Mr. Noyes,

I am submitting a preliminary comment of the RPS Cost Cap Determination. In the Determination, in regard to both the RPS and the Solar PV carve out, the Director states that in “exercising my statutory discretion, I have determined to not freeze...” Although the analysis embodied in the Determination would lead the Director not to freeze either program, the Director has no discretion to exercise. The statute is clear that the Director only has authority to exercise discretion if a cost cap is exceeded. Since under the Department’s analysis no cost cap was exceeded, the Director is without authority and there is no discretion to exercise. It is only in those instances when the cost caps are exceeded, that the Director may consider whether or not to institute a freeze and to exercise his discretion. While the outcome is the same here, it is important to recognize that in such circumstances, the Director is wholly without legislative authorization to institute a freeze even should he or she desire to do so.

Respectfully,

Jeremy Firestone

Jeremy Firestone

Professor, College of Earth, Ocean, and Environment

Director, Center for Carbon-free Power Integration

373 ISE Lab

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1.302.831.0228 (landline)

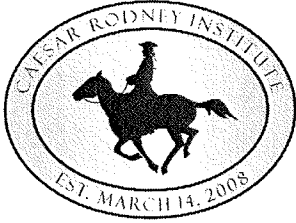
jf@udel.edu

<http://www.ceoe.udel.edu/our-people/profiles/jf>

www.ceoe.udel.edu/windpower

www.carbonfree.udel.edu

ATTACHMENT 2



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Thomas Noyes
Principal Planner for Utility Policy
Department of Natural Resources and Environmental Control
Division of Energy & Climate
100 W. Water Street, Suite 5A
Dover, DE 19904

4/7/2016

Dear Mr. Noyes;

I am submitting comments regarding the Division of Energy & Climate Director's Determination under 26 Del.C. §354(i) & (j) and 7 DE Admin. Code 104 Implementation of Renewable Energy Portfolio Standards Cost Cap Provisions. We take issue with several assumptions used in the calculations that are the basis of the Director's decision.

Include QFCP Compliance Cost

Qualified Fuel Cell Project generation compliance costs are ignored but the QFCP generation is included in the externality benefit calculation. The QFCP compliance cost must also be included. Delmarva Power would have had to buy more Renewable Energy Credits (RECs) without the QFCP project. We note the cost equivalent of the avoided QFCP RECs are in line with other REC and SREC costs. Delmarva used 317,676 standard RECs at a compliance cost of \$15,923,739 for an average cost/REC of \$50.13 each. They used 53,622 SRECs at a compliance cost of \$7,465,951 for an average cost/SREC of \$139.23 each. Delmarva met the 2014 Compliance Year (CY) REC requirement with 416,275 QFCP equivalent RECs at a compliance cost of \$33,848,300 for an average cost/REC of \$81.31 each (estimates reduced by 12,293 additional Recs were carried over to the 2015/16 CY). Adding the QFCP compliance cost to the calculations raises the compliance cost to 9.09%, in line with the compliance cost shown on electric bills.

Use Current PJM Emission Rates and EPA Values of Benefits of Avoided Emissions

The calculation used an updated estimate from July, 2015, for the Social Cost of Carbon but used out of date rates from the EPA for the \$/ton value of reduction of NOX and SO₂. The EPA has updated the emission reduction value at this link; Regulatory Impact Analysis for the Clean Power Plan Final Rule, Table 4-7, page 4-23, <http://www.epa.gov/airquality/cpp/cpp-final-rule-ria.pdf>. The updated value of emission reductions of \$9,300/ton for NOX, and \$30,000/ton for SO₂ should be used. In addition, the calculation used PJM average emission rates from the 2012 IRP and is out of date. The PJM GATS system provides up to date average emission rates for any time period and should be used to match Compliance Year renewable generation rates with emission rates for the same Compliance Year. The information is available at this link; <https://gats.pjm-eis.com/gats2/PublicReports/PJMSystemMix/Filter>. PJM GATS average fuel mix emissions in tons/megawatt-hour for the 2014 CY were 0.5348 for CO₂, 0.00042 for NOX, and 0.001 for SO₂. Using the updated information reduces the externality benefits from \$20,694,209 to \$14,110,062, almost a one third reduction.

Economic Impact Should Only Count Solar Jobs Created by the Delmarva Power SREC Auction

New solar projects are supported by GEF grants and the reward of twenty-year SREC purchase agreements by Delmarva to bidders in an annual auction. The annual auction, usually held in April, leads



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directly to new solar PV projects in the next CY. The 2014 SREC auction contracted for 7000 SRECs, which translates to 5 megawatts (MW) of new capacity as each MW generates about 1400 SRECs (Solar Energy Industries Association, 1400 MWh/MW, “What’s in a Megawatt?,” <http://www.seia.org/policy/solar-technology/photovoltaic-solar-electric/whats-megawatt>). The 5 MW estimate equals the amount of new solar capacity reported for the 2014 CY in the GATS report compiled by the Delaware Public Service Commission that used Delaware labor (PSC List of Certified Eligible Energy Resources, <http://depsec.delaware.gov/delrps.shtml>). If there are additional solar jobs in Delaware they would not be impacted by freezing the RPS requirement as the only practical impact of a freeze would be to end SREC auctions. So, only jobs supported by the SREC auction should be counted. Table 1 below shows the sales revenue generated by the new capacity and the estimated direct labor cost based on information provided by the solar industry.

Table 1: Revenue and Labor Cost of New 2014/15 CY Solar PV Capacity

Tier	New MW Capacity	Avg. Price \$/MW	Total Revenue \$	Direct Labor \$/MW	Total Labor \$
N1	3.16	\$3,500,000	\$11,060,000	\$560,000	\$1,769,600
N2	0.63	\$3,500,000	\$2,205,000	\$560,000	\$352,800
N3	1.23	\$2,100,000	\$2,583,000	\$280,000	\$344,400
Total	5.02		\$15,848,000		\$2,466,800

Source of \$/MW and labor/MW from Solar Energy Industries Association “Solar Market Insight 2015 4Q”

The Division of Energy & Climate calculation also included managerial labor and shows direct labor as only 71% of total labor. Marking up the labor cost estimate in Table 1 suggests total labor costs for new capacity added in the compliance year was about \$3.5 million. This is dramatically lower than the \$17.2 million direct labor cost used by the Division. We note the Divisions’ labor cost estimate exceeds the total selling price for new capacity estimated to be worth about \$15.8 million, a conclusion that defies common sense.

Economic Impacts of Solar Jobs Should be Offset by the Cost of the Supporting SREC Auction

According to the Renewable Energy Task Force and the Division of Energy & Climate SREC auctions are required to continue selling solar PV systems in Delaware. However, the cost of those auctions is spread out over twenty year contracts and doesn’t show up in current Compliance Year costs. The 2014 SREC auction will add \$8.8 million to electric bills. Using a 3% discount rate the Net Present Value of that cost is \$4.8 million which should be subtracted from the \$3.5 million value of solar labor and yields a negative economic impact of \$1.3 million.

The Negative Economic Impact of Jobs Lost Due to Higher Electric Rates Should be Considered

Delmarva reported about \$60 million of Renewable Compliance Charges for the 2014 CY. Those costs, added to electric bills, takes money out of the economy causing a loss of jobs elsewhere in Delaware. The Delaware Economic Development Office (DEDO) calculated an economic impact using the solar jobs data provided by the Division. DEDO defined the direct effect as the income from direct solar PV jobs. An indirect effect occurs as businesses buy from other businesses, which can add jobs and income. An induced effect occurs when the household income of people working directly or indirectly in the PV solar industry spend the money in the general economy, which can add additional jobs and income. The DEDO calculation



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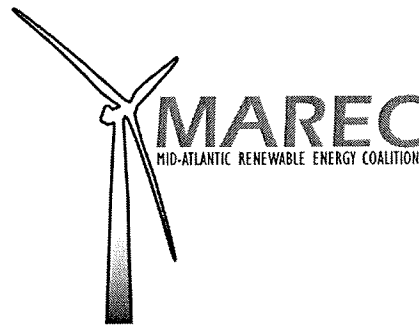
added 57% to the direct labor calculation to account for the indirect and induced impacts on the economy. The indirect and induced negative impact of the \$60 million compliance cost would be about \$34 million which should be deducted from the Divisions' benefit calculation.

Conclusion`

An honest calculation of non-priced benefits the Division is trying to make results in net costs rather than net benefits. The net impact of the above suggestions adds \$20 million, or 3% to total RPS compliance cost for the 2014 CY for a total impact of 12\$ compared to a 3% cost cap. The Director needs to revisit his decision and freeze the Renewable Portfolio Standard requirements at the 2014 CY levels.

David T. Stevenson
Director, Center for Energy Competitiveness
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ATTACHMENT 3



April 22, 2016

Via Electronic Mail

Thomas Noyes, Principal Planner for Utility Policy
Department of Natural Resources and Environmental Control
Division of Energy and Climate
100 W. Water Street, Suite 5A
Dover, DE 19904

Re: Comments of the Mid-Atlantic Renewable Energy Coalition on the Director's Determination under 7 DE Admin. Code 104 Implementation of Renewable Energy Portfolio Standards Cost Cap Provisions and 26 Del. C. §354(i) & (j)

Dear Mr. Noyes:

The Mid-Atlantic Renewable Energy Coalition ("MAREC") submits these comments in support of the determination **not** to freeze the Renewable Portfolio ("RPS") cost cap based upon the interpretation of 26 Del. C. §354(i) and (j). We appreciate this opportunity to comment in this important matter.

MAREC is a nonprofit corporation that was formed to help advance the opportunities for renewable energy development primarily in the region where the Regional Transmission Organization, PJM Interconnection, LLC ("PJM"), operates. MAREC's footprint includes Delaware, Pennsylvania, Maryland, New Jersey, Ohio, Virginia, West Virginia, North Carolina, and the District of Columbia. MAREC's membership consists of wind developers, wind turbine manufacturers, service companies, nonprofit organizations and a transmission company dedicated to the growth of renewable energy technologies to boost economic development in the region, improve our environment, and diversify our electric generation portfolio, thereby enhancing energy security. The primary areas of focus of MAREC are to work with state regulators to develop rules and supportive policies for renewable energy; provide education and expertise on the environmental sustainability of wind energy; and offer technical expertise and advice on integrating variable wind energy resources into the electric grid.

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E-mail: bburcat@marec.us

The decision not to freeze the cost cap was based on the Director's determination that the benefits of the renewable portfolio standard outweighed the costs. This includes both environmental benefits of reduced emissions and economic benefits of jobs in the state. We feel that this actually underestimates benefits in two ways.

First, the renewable energy added through the standard will not displace the average fuel mix, as assumed in the analysis, but will instead displace the marginal mix of fuel. The difference is shown below.¹

Fuel	Average Mix (%)	Marginal Mix (%)
Coal	36.6	51.74
Nuclear	35.5	
Natural Gas	23.4	35.52
Other	4.5	12.74

As the chart shows, there is more coal in the marginal mix than in the average mix, so the amount of emissions reduced will actually be higher than that assumed in the analysis.

Second, the cost suppression benefits were not included in the analysis. While we understand that this is because a method for determining them has not been established yet, not including them assumes the value is zero, which is most certainly not the case. There was also no discussion of the benefits of a hedge for fuel prices, which again, although difficult to determine specifically, is not zero.

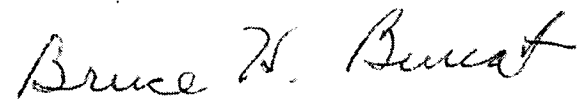
Therefore MAREC supports the decision not to freeze the cost cap for the renewable portfolio standards. The cost benefit analysis performed shows that there is a net benefit to including renewable energy in the Delaware fuel mix, and this analysis didn't even account for all of the benefits of renewable energy. Including them would make the benefits outweigh the costs of compliance even more.

We also want to emphasize that the regulations and, more importantly, statutory authority support the Director's use of discretion to choose not to impose a freeze that would have created a very detrimental effect on the State's strongly held policy to support the development of renewable energy. Not only did the Director appropriately look at how continued renewable energy procurement provides considerable benefits to the citizens of Delaware, but how those benefits substantially outweigh any costs. For future consideration, the trend for pricing of renewables to meet the Delaware RPS should be a downward trend as the cost of renewable energy, especially for wind and solar, has dropped precipitously over the past several years and will be reflected in rates going forward. In the case of wind energy, rates now have in some case been cost competitive with natural gas prices that are at all-time lows. We do not expect that to continue for natural gas, because of its history of extreme price volatility over the years.

¹ Market Monitoring Analytics. State of the Market Report for PJM, 2015. Page 15. Available at: http://monitoringanalytics.com/reports/PJM_State_of_the_Market/2015/2015-som-pjm-volume1.pdf

MAREC appreciates this opportunity to comment on the determination not to freeze the renewable energy portfolio cost cap provisions.

Sincerely,

A handwritten signature in black ink that reads "Bruce H. Burcat". The signature is written in a cursive style with a large, prominent 'B' at the beginning.

Bruce H. Burcat, Executive Director
Mid-Atlantic Renewable Energy Coalition
29 N State St. Ste 300
Dover, DE 19901
Phone: (302) 331-4639
bburcat@marec.us

c. Thomas Noyes

ATTACHMENT 4

Thomas Noyes
Principal Planner for Utility Policy
Department of Natural Resources and Environmental Control (DNREC)
Division of Energy & Climate
100 W. Water Street, Suite 5A
Dover, DE 19904

April 22, 2016

**IN THE MATTER OF THE DIRECTOR OF
THE DEPARTMENT OF NATURAL
RESOURCES AND ENVIRONMENTAL
CONTROL INSTITUTING A COST CAP FREEZE**

Mr. Thomas Noyes,

As solar businesses operating in Delaware, we are part of a growing clean energy jobs sector working to drive innovation, job expansion and private investment in our regional economy. We are writing in support of DNREC's Division of Energy and Climate Director Philip Cherry's Determination, dated March 15, 2016. The Director's Determination under 26 Del. C. § 354(i) & (j) and 7 D.E. Administrative Code 104 Implementation of Renewable Energy Portfolio Standards (RPS) Cost Cap Provision clearly shows the benefits of the RPS far exceed the cost of compliance for the RPS and the solar photovoltaic (PV) carve-out.

DNREC's Determination to not freeze the solar PV RPS carve-out is reasonable and justified. DNREC completed a thorough cost and benefit analysis. The results of the analysis showed that the externality benefits and economic benefits of solar PV totaled to 4.58 percent, significantly higher than the 1.5 percent cost of RPS solar carve-out compliance. DNREC's Determination separated the costs and benefits of the solar carve-out from the larger RPS. The externality and economic benefits of the broader RPS totaled to 7.29 percent, also significantly greater than the 3.93 percent for RPS compliance.

We applaud DNREC for completing such a detailed assessment of the RPS with independent analysis by both the Delaware Economic Development Office and DPL. As stated in DNREC's Determination, there are over 300 solar employees in Delaware with salaries that total to \$21 million. Further, the direct, indirect and induced economic benefits of the solar carve-out exceed \$27 million. Not only would an RPS freeze stall our ability to do work in Delaware, but it would also result in lost jobs and closed businesses. The RPS is a successful state policy that

drives well-paying in-state jobs, grows the solar industry, and advances Delaware's clean energy economy.

In summary, we support the Director's decision not to freeze the RPS. In the event you have any questions regarding this letter or its contents, please contact Dana Sleeper at 571-766-8638 or by email via director@mdvseia.org. Thank you for your continued service to the citizens of Delaware.

Regards,



Dana Sleeper
Executive Director
MDV-SEIA



Julia Jazyanka
Associate
Energy Freedom Coalition for America



Chris Ercoli
Deputy Director
SolarCity



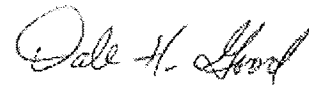
Robert Babcock
Owner
Salt Energy Group



Keith Matthis
President & CEO
NSAI Energy



Matthew Meares
Member
Virginia Solar LLC

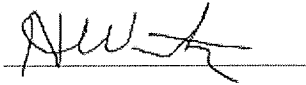


Dale Good
President
Paradise Energy

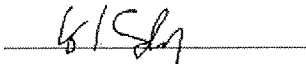


Grant Klein
Program Manager
Community Power Network





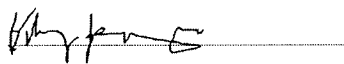
Hans Wittich
President
Solargaines



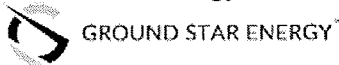
Gregg Shively
President
PRX Energy LLC



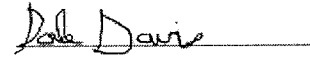
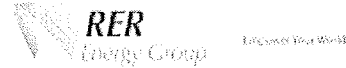
Adam Thompson
Asset Manager
Urban Grid Holdings, LLC



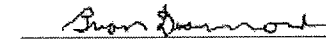
Hilary Pearson
Director of Government Affairs
Sungevity



Dennis Satnick
Sr. Consultant
RER Energy Group



Dale Davis
President
CMI Solar and Electric Inc.



Brian Desmond
Sales & Marketing Manager
Standard Energy Solutions
STANDARD
ENERGY
SOLUTIONS



Nicole Steele
Executive Director
GRID Alternatives



ATTACHMENT 5

Table 4-7. Summary of Regional PM_{2.5} Benefit-per-Ton Estimates Based on Air Quality Modeling from Proposed Clean Power Plan in 2020 (2011\$)*

Pollutant	Discount Rate	Regional		
		East	West	California
SO ₂	3%	\$33,000 to \$75,000	\$6,200 to \$14,000	\$95,000 to \$210,000
	7%	\$30,000 to \$68,000	\$5,600 to \$13,000	\$85,000 to \$190,000
Directly emitted PM _{2.5} (EC+OC)	3%	\$140,000 to \$320,000	\$27,000 to \$60,000	\$370,000 to \$830,000
	7%	\$130,000 to \$290,000	\$24,000 to \$54,000	\$330,000 to \$740,000
Directly emitted PM _{2.5} (crustal)	3%	\$23,000 to \$52,000	\$11,000 to \$25,000	\$73,000 to \$160,000
	7%	\$21,000 to \$47,000	\$9,900 to \$22,000	\$66,000 to \$150,000
NO _x (as PM _{2.5})	3%	\$3,100 to \$7,000	\$0,670 to \$1,500	\$22,000 to \$49,000
	7%	\$2,800 to \$6,300	\$0,610 to \$1,400	\$19,000 to \$44,000
NO _x (as Ozone)	N/A	\$6,500 to \$28,000	\$2,000 to \$8,900	\$14,000 to \$59,000

* The range of estimates reflects the range of epidemiology studies for avoided premature mortality for PM_{2.5} and ozone. All estimates are rounded to two significant figures. The monetized co-benefits do not include reduced health effects from direct exposure to NO₂, SO₂, ecosystem effects, or visibility impairment. All fine particles are assumed to have equivalent health effects, but the benefit-per-ton estimates vary depending on the location and magnitude of their impact on PM_{2.5} concentrations, which drive population exposure. The monetized co-benefits incorporate the conversion from precursor emissions to ambient fine particles and ozone. Benefit-per-ton estimates for ozone are based on ozone season NO_x emissions. Ozone co-benefits occur in analysis year, so they are the same for all discount rates. Confidence intervals are unavailable for this analysis because of the benefit-per-ton methodology. In general, the 95th percentile confidence interval for monetized PM_{2.5} benefits ranges from approximately -90 percent to +180 percent of the central estimates based on Krewski *et al.* (2009) and Lepeule *et al.* (2012).

Table 4-8. Summary of Regional PM_{2.5} Benefit-per-Ton Estimates Based on Air Quality Modeling from Proposed Clean Power Plan in 2025 (2011\$)*

Pollutant	Discount Rate	Regional		
		East	West	California
SO ₂	3%	\$37,000 to \$83,000	\$7,100 to \$16,000	\$110,000 to \$240,000
	7%	\$33,000 to \$75,000	\$6,400 to \$14,000	\$97,000 to \$220,000
Directly emitted PM _{2.5} (EC+OC)	3%	\$160,000 to \$360,000	\$30,000 to \$68,000	\$410,000 to \$930,000
	7%	\$140,000 to \$320,000	\$27,000 to \$61,000	\$370,000 to \$830,000
Directly emitted PM _{2.5} (crustal)	3%	\$25,000 to \$58,000	\$12,000 to \$28,000	\$82,000 to \$180,000
	7%	\$23,000 to \$52,000	\$11,000 to \$25,000	\$74,000 to \$170,000
NO _x (as PM _{2.5})	3%	\$3,300 to \$7,500	\$0,750 to \$1,700	\$24,000 to \$54,000
	7%	\$3,000 to \$6,800	\$0,670 to \$1,500	\$22,000 to \$49,000
NO _x (as Ozone)	N/A	\$7,100 to \$30,000	\$2,300 to \$10,000	\$15,000 to \$66,000

* The range of estimates reflects the range of epidemiology studies for avoided premature mortality for PM_{2.5} and ozone. All estimates are rounded to two significant figures. The monetized co-benefits do not include reduced health effects from direct exposure to NO₂, SO₂, ecosystem effects, or visibility impairment. All fine particles are assumed to have equivalent health effects, but the benefit-per-ton estimates vary depending on the location and magnitude of their impact on PM_{2.5} concentrations, which drive population exposure. The monetized co-benefits incorporate the conversion from precursor emissions to ambient fine particles and ozone. Benefit-per-ton estimates for ozone are based on ozone season NO_x emissions. Ozone co-benefits occur in analysis year, so they are the same for all discount rates. Confidence intervals are unavailable for this analysis because of the benefit-per-ton methodology. In general, the 95th percentile confidence interval for monetized PM_{2.5} benefits ranges from approximately -90 percent to +180 percent of the central estimates based on Krewski *et al.* (2009) and Lepeule *et al.* (2012).