RPS Working Group Meeting
9 a.m., August 29, 2018
Renditions Golf Course, Davidsonville, MD
Meeting Minutes

I. RENEWABLES INVENTORY (RI) UPDATE

Exeter's presentation is available on PPRP's website. Q&A discussion is summarized below.

Projections for Solar

- John Fiastro (MEA): Why does the RI project more solar generation in PJM than RPS laws require?
- Kevin Porter (Exeter): The cost of solar continues to decline, even with tariffs.
- David Murray (MDV-SEIA): We expect that solar requirements will continue to rise.
- Tom Dennison (SMECO): You show 5,000 MW of solar in Maryland in 2030. How was this value determined?
- Kevin Porter: We used a 15% annual growth rate for solar capacity. We based that on a historical growth rate of 30%.

Land Use / County Zoning

- Tom Dennison: Is 5,000 MW of solar in Maryland consistent with what MEA and MDA feel is feasible, based on county zoning and other restrictions?
- John Fiastro: If all 5,000 MW goes onto the land, that's equivalent to roughly 10% of Cecil County.
- Matt Teffeau (MDA): There are 1.2 million acres of agricultural land in Maryland. We want to preserve soils 1, 2, 3.
- Mike Volpe (USSEC): 5,000 MW is consistent with a 14% solar carve out. Remember that historically, 60% of solar in Maryland has been BTM. If 50% of the 5,000 MW goes BTM, then the land needed for 2,500 MW equates to about 1% of agricultural land in MD.
- Janet Christensen-Lewis (KCPA): That 1% comes disproportionately from rural counties.
- Megan Billingsley (Valleys Planning Council and Billingsley Energy & Environmental Research LLC): Many counties have said no more solar. Remaining counties are going to bear the burden.

- Janet Christensen-Lewis: Increasing rooftop solar will likely lead to more restricted circuits.

Market Dynamics

- Mike Volpe: In the years that you showed a shortfall, REC prices should rise to the Alternative Compliance Penalty (ACP), which would then lead to more renewable energy capacity additions. How is this captured in the RI?
- Kevin Porter: We address this in the report but not the conclusions section. We can add it there.
- Alex Pavlak (FEI): At what point does solar have diminished economic returns?
- Kevin Porter: I don't know the answer for PJM.

Capacity Factor - Wind

- Andrew Gohn (AWEA): 35% capacity factor is what we've seen recently in PJM for new wind projects built since 2012; it should be the norm, not an alternative scenario.
- Alex Pavlak: I suggest that you look for and aggregate physical data of actually operating wind farms, with at least one year of operation.
- Kevin Porter: We always look at both what's in the ground and what's coming.

Capacity Factor - Solar

- David Murray: The assumption in the RI of a 16% capacity factor for solar is very low and is more indicative of rooftop PV than utility-scale solar projects.
- Mike Volpe: Also, the capacity factor for utility-scale solar facilities is rising as the industry shifts from fixed arrays to single-axis tracking. In 2016, 80% of utility scale solar installations were single-axis tracking. In PJM, single-axis tracking allows for 23%-26% capacity factors.

Capacity Factors over Time

- Michael Aimone (Roosevelt): Does capacity factor deteriorate over time? Please include a discussion of this.
- Andrew Gohn: If wind projects receive scheduled maintenance, capacity factors should not decrease over time.
- David Murray: For solar, capacity factor declines 0.5% per year.

Black Liquor (BL)

- Bill Fields (OPC): How is black liquor treated in the report? What happens if black liquor is no longer eligible for the Maryland RPS?
- Kevin Porter: The RI has a discussion on this very point. For renewable energy technologies such as wind that is eligible in all states in PJM with RPS policies, RECs from other states would make up any REC deficit that might occur in Maryland in the unlikely event that wind is no longer eligible for the Maryland RPS. If black liquor is made non-eligible for the Maryland RPS, the RI states that because black liquor is not eligible for many state RPS policies in PJM, REC supplies would have to increase or would have to be imported into PJM.
- Bruce Burcat (Mid-Atlantic Renewable Energy Council): In Pennsylvania, in-state black-liquor is Tier 1, out-of-state black liquor is Tier 2.
- Mike Volpe: Black liquor RECs in Maryland accounted for only 3% of total RECs in PJM. Mike suggested that because Tier 1 RECs are largely fungible within PJM, the elimination of black liquor as an eligible resource for the Maryland RPS would simply mean that RECs would come from elsewhere within PJM. He noted that a Maryland REC is selling at a 50-cent/MWh discount relative to a tri-state REC.
- John Fiastro: John didn't entirely agree with Mike Volpe's analysis because the number of black liquor RECs used for meeting the Maryland RPS is sizable.

Offshore Wind

- Josh Cohen (Business Network for Offshore Wind): What kind of information on offshore wind would be helpful to you?
- Kevin Porter: Projected capacity factors, for one. The RI used an assumed 40% capacity factor for wind. Any other data for offshore wind the Business Network for Offshore Wind could provide would be appreciated.
- Andrew Gohn: The offshore wind provision in New Jersey is a requirement, not a goal.
- Kevin Porter: We need to account for New Jersey's 3,500-MW, offshore wind requirement (which is part of the state's 50% RPS). We'd like to know about any other such requirements.

Federal PTC

- Andrew Gohn: The expiration of the federal production tax credit has the potential to drive up wind investment in PJM, as state-level policies/price supports kick in.

II. SWOT ANALYSIS

A. Black Liquor (BL)

Supply Mix

- Jerry Schwartz (AFPA): Consider rewording "Increases the MD RPS." Eliminating black liquor doesn't increase the RPS.

Price Impacts

- Jerry Schwartz: Potential short-term REC price increases from the elimination of black liquor are of concern and bear further analysis.
- Bill Fields: Would it be useful to provide some hard numbers from PJM (e.g., the number of black liquor RECs produced, their market price) to help with cost questions?
- Mike Volpe: In 2016, 1,600 GWh of black liquor RECs were used in PJM, representing 3% of PJM's Tier 1 supply pool.

Emissions Impacts

- Jerry Schwartz: We can supply some information to show that black liquor is carbon-neutral and has been considered so by all RPS laws. Biomass waste by-products, such as black liquor, are good candidates for combustion.
- Tim Judson (NIRS): CO_2 that's released by combustion should be absorbed by growth within a reasonable timeframe. This is something that should be evaluated.
- Jerry Schwartz: The trees removed the carbon before the combustion.

In-State vs. Out-of-State

- Bruce Burcat: The final bullet in the draft SWOT, about a shift to out-of-state resources, is over-stated. Many black liquor RECs already come from out of state.

Jobs/Local Economy

- David Murray: To what degree will removing the REC-eligibility impact the output of Luke Mill?
- Kevin Porter: The mill has stated that it would likely close.
- Jerry Schwartz: That mill is facing economic challenges. The parent company has shut some other mills.
- John Fiastro: Each mill competes with other mills within its parent company.
- Tim Judson: I would be very careful about relying on economic impact studies, especially by the industry. They rely on models with economic multipliers that are biased to the industry of interest; these models don't consider the industries that would replace black liquor.

Geographic Restrictions

- Kathy Magruder (MCEC): Has Maryland considered limiting black liquor to Maryland-based sources? I don't object to supporting local jobs via the RPS. But I think we should keep the money in-state. Then we wouldn't be subsidizing out-of-state competition for Luke Mill.
- Kevin Porter: Geographic restrictions may violate the Interstate Commerce Clause of the U.S. Constitution. The Clean Energy States Alliance authored a good paper on this topic.
- Chris Ercoli (Brookfield): In Pennsylvania, in-state black liquor is Tier 1, out-of-state is Tier 2. Big price difference between Tier 1 and Tier 2 RECs in Pennsylvania.
- Mike Volpe: For PV, Maryland got around the interstate commerce clause issue by requiring interconnection to a low-voltage line that connects to Maryland.

Eligibility

- Nicole Sitaraman (Sunrun): Black liquor has been phased out of the Washington, D.C. RPS, as of legislation enacted in 2016.

B. Zero Emissions Credits (ZECs)

Market Competitiveness

- Alex Pavlak: Markets change. The current lack of competitiveness of nuclear energy is a temporary issue. ZECs are a temporary patch.
- Kevin Porter: But the question is whether these plants will survive current market conditions, and whether we want them to.

Calvert Cliffs' Profitability / Ratepayer Protections

- Bill Fields: Is it really necessary to provide ZECs? If not, this may be a weakness. PJM's Market Monitor says Calvert Cliffs is one of PJM's most profitable nuclear plants.
- Bruce Burcat: There hasn't been any showing of Calvert Cliffs being in economic danger.

Avoided Costs

- Nicole Sitaraman: Avoided costs should focus on renewables.

ZEC Costs

- Tim Judson: ZECs are new, impacts are hard to judge. In first year of the New York ZEC, the cost has been $480 million. This dwarfs the cost of RPS compliance.

Indirect Costs

- Bill Fields: ZECs aren't the only costs. FERC has stated that state arrangements for subsidizing certain power technologies create unjust/unreasonable capacity prices. PJM is trying to figure out how to mitigate this issue. Depending on what PJM does, ratepayer impacts could be major or minor.
- Matthew LaRocque (PJM): PJM will be filing a plan with FERC, with a ruling likely in March 2019. Any state-subsidized resource would be subject to PJM's Minimum Price Offer Rule (MOPR). Alternatively, states could elect to carve out nuclear power and the associated load from PJM's capacity market, known as the Reliability Pricing Model. They would then no longer be part of the capacity market and would no longer receive capacity market payments.
- Bill Fields: I think it is good to describe this situation and stress the variability of the cost impacts.
- Matthew LaRocque: We don't think FERC's statement affects existing RECs. Future RECs could be subject to an MOPR.
- Janet Christensen-Lewis: Germany has had issues replacing its nuclear capacity. What amount of acreage would it take to replace Calvert Cliffs?

Transmission

- Alex Pavlak: The scope of this effort is missing system implications. Installing transmission to get wind to market could be two or three times more costly than the generation itself.

Long-term Planning

- Alex Pavlak: Maryland should consider how to incentivize new nuclear construction. Today's nuclear power reactors are "Gen 2". "Gen 3" and "Gen 4" reactors are much better.
- Tim Judson: Operating costs of nuclear fleets are rising with their age. States should be proactive in planning for the closure of these reactors. There's a lot of confusion about the purpose of RPS.

Relevance of ZECs to the RPS

- Mike Volpe: A ZEC is not a market mechanism because there is only one provider. I don't see nuclear as relevant to the RPS discussion.
- Nicole Sitaraman: I have reservations about including ZECs in the RPS. Is this the proper forum? There needs to be a greater review of the "pain point" for nuclear companies.

Waste Disposal

- Alex Pavlak: Waste disposal is not a long-term issue.
- Richard Mallory (MEA): There is a long-term federal plan for waste disposal.
- Nicole Sitaraman: Waste disposal is a serious environmental justice problem.

Safety

- Alex Pavlak: Statistically, nuclear power plants are safe.
- Richard Mallory: Nuclear has a great safety record.

Environmental Impacts

- Tim Judson: Calvert Cliffs is not purely "clean" energy; e.g., water impacts.

Ability of Nuclear to Provide System Flexibility

- Harry Windsor (FEI): How much dispatchable generation is needed to compensate for the variability of renewable energy?
- Mike Volpe: PJM does not need more generation than is currently operational. Nuclear is not a flexible resource, like natural gas or batteries.
- Andrew Gohn: Xcel had a procurement for clean generation. They received 320 bids. Average wind price was 1.7 cents/kWh. Average wind+storage price was 2.1 cents/kWh. Renewables are becoming more dispatchable.
- Tim Judson: Nuclear is the least compatible with renewable energy. In California, there is a plan to phase out the state's last nuclear power plant. Pacific Gas & Electric (PG&E) plan found that closing Diablo would be most efficient option.

Grid Modernization

- Alex Pavlak: There's an enormous difference between renewable and clean electric power. If you're trying to get rid of fossil fuels, you have to look at the whole system. California has a huge contract with NREL to look at modernizing the state's grid.

Next Steps

Work Group:

- Send PPRP comments on the revised Renewables Inventory (RI) report by Sept. 7

PPRP/Exeter:

- Post PPT presentation and draft SWOTs on PPRP's website
- Post email sign-up list for updates on PPRP's website
- Provide Interim Report to the General Assembly by December 1, 2018