Comments of the American Wind Energy Association in Response to *2017 Inventory of Renewable Energy Generators Eligible for the Maryland Renewable Energy Portfolio Standard* (2017 Inventory Report)

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Ms. Gray,

Thank you for the opportunity to respond with comments to the 2017 Inventory of Renewable Energy Generators Eligible for the Maryland Renewable Energy Portfolio Standard (2017 Inventory Report).

The American Wind Energy Association (AWEA) is the national trade association for the U.S. wind industry – the country's fastest growing energy industry. With thousands of wind industry members and wind policy advocates, AWEA promotes wind energy as a clean source of electricity for American consumers. As the premier organization representing the interests of America's wind energy industry, AWEA counts around 1,000 organizations in its membership program. Our members are wind power project developers and parts manufacturers; utilities and researchers – organizations at the forefront of the wind energy industry.

Overview

As drafted, AWEA has significant concerns about the premises and conclusions of the 2017 Inventory Report. The report, in current form, could be read as suggesting that insufficient renewable resources exist in the PJM area to support existing Renewable Portfolio Standard (RPS) policies in PJM states, and that, as a result, further legislative action increasing Maryland's commitment to renewable energy is therefore imprudent. Whether that is the intent of the draft report or not, AWEA believes that just as states are complying with RPS policies now, sufficient technical and practical wind resource is available in the PJM and surrounding regions to support expansion of RPS policies in the region.

Currently, PJM REC prices are very low – the opposite of what one would expect if the market were presently undersupplied as the 2017 Inventory Report suggests. Moreover, there appear to be significant

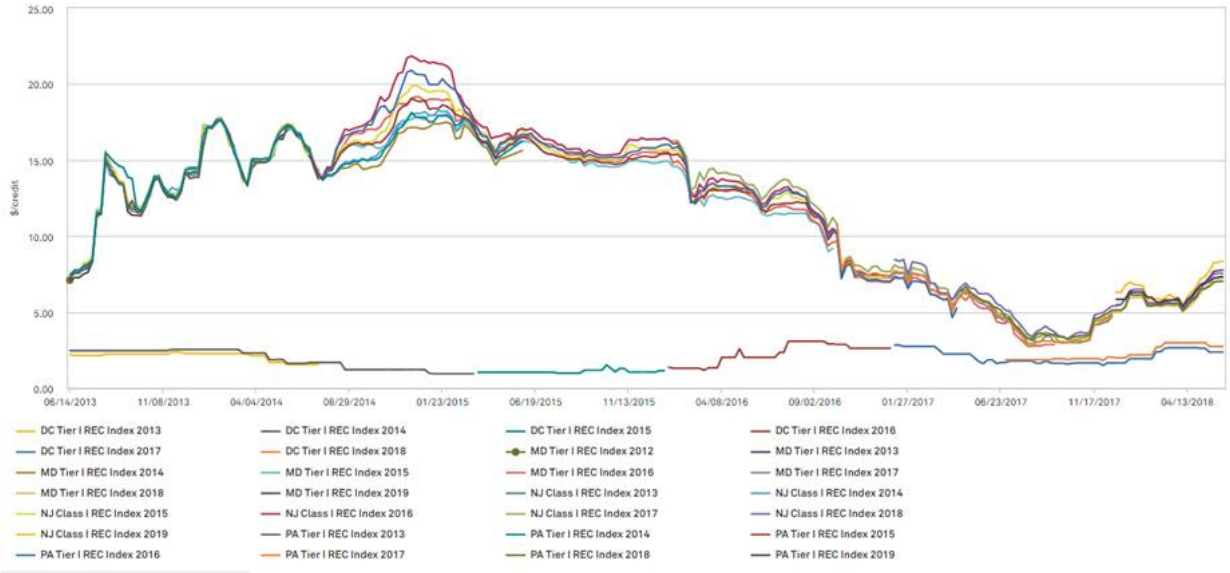
methodological errors in the Exeter analysis. After correcting for these errors, the market appears to be *oversupplied*, not undersupplied, and the structural market dynamics support the REC prices that we observe in the present market.

Exeter and PPRP should strongly consider reassessing the 2017 PJM inventory of renewable resources to correct these methodological concerns. Upon that further analysis, AWEA is confident that the 2017 Inventory Report will conclude that sufficient generation will be available to support further RPS expansion in Maryland and other PJM states.

Baseline Inventory Discrepancy

The 2017 Inventory Report suggests that the PJM REC market is *currently* undersupplied with RECs. However, recent REC prices are historically low in PJM states. If the REC market were truly undersupplied, we would expect to see REC prices at very high levels. Moreover, we would expect to see electricity suppliers with compliance obligations under state RPS policies making Alternative Compliance Payments rather than incur the high prices of RECs. The fact that REC prices are currently so low indicates that there is, if anything, an oversupply of RECs in the PJM compliance markets and that higher levels of REC demand are needed to accommodate this surplus.

One clear example of this discrepancy can be found in the report itself. In Figure IV-1, Exeter displays a chart showing that Tier 1 PJM non-carve-out requirements have far exceeded supply in the past few years, which is not supported by current Tier 1 REC prices within PJM, which are well below ACP levels. PJM REC prices decreased from a peak of roughly $20/MWh in 2015 to around $3/MWh in 2017 due to an oversupply of RECs and are currently trading at around $7.50/MWh. If RPS demand truly exceeded generation, REC prices would be higher and trading close to ACP levels.



Much of the confusion likely stems from the limited dataset the 2017 Inventory Report used in establishing the baseline inventory. If the question at hand is whether market conditions support policy changes to

expand REC demand, then the relevant dataset is all generators within PJM that *could be* eligible for retirement in Maryland's RPS. Instead, the report only uses Maryland-certified resources in its analysis of PJM-wide RPS generation and requirements, which is not representative of the full universe of renewable generators within PJM and grossly underestimates current and future supply. Exeter should include all generators that are eligible for any RPS within PJM if it is going to make conclusions about PJM's ability to meet RPS requirements.

In fact, PJM's Renewable Generators Registered in GATS database shows 47,973 MW of PJM-registered renewable generators at the end of 2017, with 44,366 MW located within PJM. This includes 5,528 MW of solar and 8,298 MW of wind in PJM. Focusing on wind, Exeter's analysis assumes there are 6,884 MW of wind available in 2017 (Table II-2) and estimates that grows to only 8,189 MW by 2030 (Table VI-2), even though GATS data shows there are already 8,298 MW of wind registered in PJM. Exeter also estimates that by 2030 there will be a total of only 11,599 MW of non-carve-out Tier 1 projects in PJM, while PJM GATS data show roughly 16,500 MW of currently registered renewable facilities that typically qualify for Tier 1.

Further confusing the issue is the ambiguity with which the dataset is characterized. On page IV-2, Exeter states that "The 2017 Inventory Database contains 8,806 MW of nameplate, non-carve-out Tier 1 capacity from 282 individual plants, excluding solar resources.[32,33]" Footnote 32 incorrectly states "These data reflect all existing capacity as opposed to capacity that has Maryland Renewable Certification," which directly contradicts sentence the sentence in the middle of the page stating "The analysis was restrictive in terms of generation estimates, including only those resources that are Maryland-Certified under Maryland's non-carve-out Tier 1 requirements."

Another critical market dynamic that does not seem to appear in the 2017 Inventory Report is the fungibility of solar RECs across different PJM markets and the ability of increasingly cost-competitive utility scale solar to participate in Tier 1 RPS markets. On page IV-2, Exeter states that they exclude solar resources from the non-carve-out Tier 1 analysis because "it is anticipated that the vast majority of Maryland solar installations will be used to meet the Maryland solar carve-out, or other solar requirements in PJM, and thus will be unavailable for meeting the remaining Tier 1 requirement." This argument is not supported by other data presented in the study. Specifically, Table VII-3 shows that Exeter's projected solar generation far exceeds the solar carve-out generation requirements across all of PJM in 2030 (by 68,087 GWh), resulting in excess solar generation that would be able to meet non-carve-out Tier 1 requirements. Several states in PJM allow the use of imported solar RECs to fulfill Tier 1 requirements. For the purposes of this analysis, as long as some states in PJM allow this, solar generation beyond what is needed for SREC compliance should be considered as available to meet Tier 1 requirements. Rather than excluding solar resources from the non-carve-out Tier 1 supply, the report should net out the solar needed to meet solar carve-outs across PJM and include the rest as Tier 1 eligible resources.

Finally, while a full analysis could not be completed in time for these comments, the report should consider further refining the inventory to consider the treatment of "banked" RECs. In many PJM RPS states, RECs can be carried forward for one or more years to be used for future compliance. This greatly facilitates compliance and adds flexibility to the REC supply. That flexibility may not be fully captured in a static analysis without further consideration.

Market Dynamics

In healthy markets, supply and demand interact in such a way that they tend towards balance over time. If all other factors remain equal, the higher the demand for RECs, the higher the price of RECs, and the

greater the potential revenue that accrues to a producer of RECs. Over time, this should foster more deployment of wind energy and other sources of eligible RECs in and outside the PJM region.

One of the constraints of any type of analysis of REC sufficiency over time is the inherent challenge of forecasting markets. In the absence of a crystal ball, analysts must perform a static or retrospective analysis and project forward scenarios or trends. The 2017 Inventory Report may create an impression that because current REC supply is insufficient to meet future demands, that this threatens the ultimate viability of these policies. In order to correct this potential impression, Exeter and PPRP should consider qualifying such projections as speculative and describing how the market could incent significant new generation that is not currently economical.

This is particularly so with respect to the projected growth rate of wind energy in PJM. Table VI-2. Estimated Capacity of Non-carve-out Tier 1 Projects in PJM by Technology (2018-2030) (MW) suggests that PJM wind capacity can only be expected to grow by 1.03% annually through 2024 and only .97% annually from 2024 through 2030. In real terms, this is the equivalent of only 78 megawatts of new wind in PJM per year. AWEA feels strongly that these growth projections are far too low and that, supplemented with MISO RECs, PJM renewable generation will be sufficient to meet RPS demands in the PJM region. In combination with other modeling challenges discussed above, the report should consider how markets might respond to projected supply limitations.

Voluntary RPS States

While in both Virginia and Indiana, mandatory RPS legislation has been proposed, these states do not currently require electricity suppliers to retire RECs on a compliance basis. When considering the net demand for RECs in PJM states, only mandatory, compliance based RPS policies should be considered. Indiana and Virginia RPS policies are not compliance-based but rather voluntary. Therefore, they should be removed from consideration for the purposes of understanding REC sufficiency. This would narrow the gap between projected non-carve out Tier I RPS requirements and projected PJM renewable generation by 20,691 GWh (or 28%) in 2030 (using 2017 Inventory Report figures on page III-6 and VII-1).

Capacity Factor

In its analysis, Exeter assumes future wind projects will achieve an average capacity factor of 26%. This assumption is based on historical production rates for turbines located within the PJM footprint. AWEA feels this is not the optimal methodology for projecting future capacity. The concern is that many projects in PJM employ older wind technology and are not at all representative of the performance profile of wind turbines that will be deployed going forward. Wind technology has improved dramatically over that past decade, permitting cost reduction and performance improvement.

Wind projects built in PJM between 2012 and 2017 operated at an average capacity factor of 35% in 2016. This is more indicative of the performance of future wind projects. AWEA feels that over the compliance timelines of PJM RPS requirements, this net capacity factor is likely to increase further but that using the trailing 5-year trend is a conservative and acceptable methodology.

“No Wind” Scenario

In 2017, the Maryland General Assembly passed House Bill 1414, which was the enabling legislation for the Maryland RPS Study of which the 2017 Inventory Report is a component. That bill included language that called on PPRP, as part of the study, to assess “whether the standard is able to meet current and

potential future targets without the inclusion of certain technologies". (7–714 (C)(3). Accordingly, the 2017 Inventory Report explores how the exclusion of technologies like wind energy and others from eligibility for Maryland's RPS would impact compliance and the viability of the RPS.

AWEA feels it is appropriate, and within the scope of the statutory mandate, to explore this issue. However, without this critical context, a reader of the 2017 Inventory Report could get the misconception that discussion of removal of wind energy specifically from eligibility for Maryland's RPS was a subject of interest to the legislature. To our knowledge, there has never been legislation introduced in the Maryland General Assembly that sought to make wind power ineligible for the Maryland RPS, nor has there been any suggestion of such in media discussions in the state or region.

In order to preempt any misunderstanding of the origin or rationale behind a "no-wind" scenario, AWEA feels that future drafts of the 2017 Inventory Report should explain that wind is being considered in this way simply because it is the greatest source of Tier 1 RECs, and that it is by no means suggesting any consideration of any such disqualification.

Treatment of Out-of-PJM RECs

The geographic eligibility of RECs for compliance with Maryland's RPS has changed over time, as have the policies of other PJM states. Currently, every RPS policy in PJM, with the exception of Washington, DC, allows some importation of RECs from other balancing areas and RTOs. These typically involve a requirement that the power generating such RECs be delivered into PJM. Increasingly, PJM RPS policies are taking advantage of these imports, retiring RECs from states considerably distant from the PJM territory. The question of how to value this distant renewable generation involves significant political dimensions and extensive discussion of the future of transmission, especially increased transmission capacity along the MISO/PJM seam.

All other things being equal, clean energy generated far from PJM can still achieve many of the policy goals of PJM RPSs so long as it is delivered into PJM territory. By offsetting fossil fuel generation in PJM, this importation reduces pollution in the Maryland airshed, and fulfills the carbon reduction goals of the state policy.

However, for the RPS policy to be most effective in driving the deployment of new renewables, ideally the policy should strive for greatest additionality. Importation of lower priced RECs from more wind-rich areas could lead to lower prices for consumers but could also result in instances of distant projects receiving revenues from PJM RPS policies, and creating less price signal to incent new wind build in PJM. Ultimately, markets should resolve these concerns over time, but they are important factors to consider in assessing how much states would benefit from supporting additional transmission buildout. For the purposes of this 2017 Inventory Report, further clarification would be helpful that imported properly certified RECs from MISO or other RTOs, by delivery of power into PJM, should be considered fully eligible for RPS compliance and equivalent in providing supply to the PJM renewable inventory.

Offshore Wind

While offshore wind as a technology in the US is currently supported by technology-specific RPS carve-outs and state procurements, this is likely to change as prices for offshore wind energy decline. Already, we are seeing offshore wind prices far lower than was expected when establishing Maryland's OREC program. In considering future sufficiency of RECs in PJM, the Inventory Report should allow for the possibility that further offshore wind price reductions will lead to the use of offshore wind energy credits in PJM RPS Tier 1 compliance markets.

Conclusion

AWEA very much appreciates the opportunity to participate in this study process and inform the development of the 2017 Inventory Report and other work products the study may entail. We feel strongly that any fair and thorough review of Maryland's RPS will show that it has performed well as a market, has brought tremendous benefits to the state of Maryland and to our environment, and promises to continue providing these benefits even as it scales up along with other RPS policies in the PJM region. We are confident that market dynamics will support expansion of clean energy to meet the needs of PJM RPS policies.

And we are proud that as the backbone of Tier 1, wind is playing a leading role in driving these strong results. We look forward to continuing to engage with PPRP, Exeter and other stakeholders in the continued study of Maryland's RPS.

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