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VIA ELECTRONIC MAIL

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Re: Comments of Constellation Energy Corporation

**Investigation of Resource Adequacy Alternatives
BPU Docket No. EO20030203**

In its 2022 Progress Report on New Jersey’s Resource Adequacy Alternatives (“Staff Report”), Board Staff addresses a key challenge in achieving the State’s ambitious clean energy goals: how to decarbonize the grid without jeopardizing reliability.¹ The Staff Report recommends new forward markets for environmental attributes that would operate either in conjunction with, or separate from, the PJM capacity market.

Constellation Energy Corporation (“Constellation”) strongly supports the Board’s proactive efforts to ensure a reliable supply of carbon-free energy. New Jersey’s policies, particularly its support for nuclear generators via the zero-emissions credit program and other carbon-free resources via the compliance obligations reflected in the Renewable Portfolio Standards, already have reduced the emissions profile of resources located within New Jersey and across PJM. And now, with the repeal of the overly broad and expansive Minimum Offer Price Rule, New Jersey has the opportunity to consider afresh which measures will have the greatest impact on the resource mix from which its load is served and how to most effectively support carbon-free resources instead of fossil.

¹ *In re the BPU Investigation of Resource Adequacy Alternatives*, NJBPU Docket No. EO20030203, 2022 Progress Report on New Jersey’s Resource Adequacy Alternatives (Sept. 2022).

To be sure, the market design proposals outlined in the Staff Report have potential to further expand carbon-free energy. However, they are complex and could take years to implement. They also would be dependent upon actions taken by other decisionmakers—PJM and FERC, with respect to an integrated clean capacity market, and other states, with respect to a regional forward clean energy market.

To meet the State’s fast-approaching 2025 and 2030 goals, and to position the grid to meet the State’s 100% clean-energy goal by 2050, the Board should consider independent action that New Jersey can take today to promote reliable clean energy: namely, implementing an hourly environmental attribute program, under which load-serving entities would be required to procure a certain percentage of their load *each hour* from carbon-free generation (including both nuclear and renewable). This will ensure that New Jersey incentivizes clean energy resources that can fully displace carbon-emitting generation in a timely and effective manner, and deliver reliable clean power to New Jersey customers across all hours of the day and in all seasons of the year.

I. New Jersey must take action to achieve greater levels of decarbonization without jeopardizing reliability.

New Jersey has been a global leader both in spurring the deployment of new carbon-free generation and retaining existing carbon-free generation, including nuclear plants. But as intermittent renewable generation increases, New Jersey is approaching a new and more difficult phase in decarbonization: in order to displace fossil resources, New Jersey needs carbon-free resources that can be available *whenever* homes and businesses are consuming electricity. Building nameplate capacity is not enough. As the Staff Report highlights, to “achieve the State’s long-term clean energy and climate objectives,” “New Jersey must ensure that it can meet increasing portions of its resource adequacy needs without relying on carbon-emitting resources...”² However, the State’s existing renewable portfolio standard is not designed to overcome this challenge.

To start, the operating characteristics of certain clean-energy technologies present new reliability challenges. Intermittent technologies, such as solar and wind, can ramp quickly up and down, but do not operate during all hours. Their operation thus does not align with the daily load demand curve. For example, solar resources (without co-located storage) fall almost entirely out of the stack during peak evening hours. As a result, experience has shown that as renewable deployment increases, grid operators must curtail clean energy generation during some hours, and

² *Id.* at 41.

then rely heavily on fossil generation during others.³ California, for example, has been able to achieve nearly 100% clean-power use during some lower-demand intervals.⁴ But California is frequently experiencing reserve shortages at peak times, when it must dispatch and import high levels of polluting generation to maintain reliability.⁵

The combination of renewable resources' operating parameters and their physical location also contributes to congestion. In its energy transition study, PJM concluded that under different clean-energy scenarios, congestion could increase by up to 60%, forcing renewable curtailments of up to 16%.⁶ Given these figures, PJM concluded that there is a "need for a diverse set of solutions ... to pursue a reliable and cost-efficient energy transition."⁷

The existing renewable portfolio standard is well-suited for encouraging growth in renewable generation from a small base, but it was never intended to facilitate deep decarbonization. Under the RPS program, load can meet *annual* procurement obligations by purchasing attribute credits from renewable generators operating off peak. As a result, the Staff Report notes that existing "REC markets cannot ensure that New Jersey's resource adequacy needs are met with clean resources, especially in times of grid congestion, lack of availability of

³ California Independent System Operator Corp., *Managing Oversupply* (updated Oct. 10, 2022), <http://www.caiso.com/informed/Pages/ManagingOversupply.aspx> (showing that during May 2022, the CAISO curtailed close to 600,000 MWh of wind and solar); California Independent System Operator Corp., *Supply and Renewables* (visited Oct. 24, 2022), <https://www.caiso.com/todaysoutlook/Pages/supply.html#section-supply-trend> (showing reliance on fossil generators and imports during evening and overnight intervals) ("CAISO Supply Trend").

⁴ Mark Chediak, *California Briefly Inches Closer to 100% Clean Energy Goal*, Bloomberg (May 2, 2022), <https://www.bloomberg.com/news/articles/2022-05-03/california-briefly-inches-closer-to-100-clean-energy-goal>. During those intervals, the CAISO continued to dispatch large amounts of fossil generation for export). See CAISO Supply Trend, Data for April 30, 2022 (showing resource mix and generation during 100% clean-supply interval).

⁵ See, e.g., *Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Reliable Electric Service in California in the Event of an Extreme Weather Event in 2021*, Rulemaking No. 20-11-003, Legal and Policy Brief of the California Independent System Operator Corporation at 5-8 (Cal. Pub. Utils. Comm'n Feb. 21, 2021), <http://www.caiso.com/Documents/feb5-2021-Legal-and-Policy-Brief-ReliableElectricService-ExtremeWeatherEvent-R20-11-003.pdf> (describing reliability concerns during early evening peak periods when solar is no longer available).

⁶ PJM Interconnection, L.L.C., *Energy Transition in PJM: Emerging Characteristics of a Decarbonizing Grid* at 20-21 (May 17, 2022), <https://www.pjm.com/-/media/library/reports-notice/special-reports/2022/20220517-energy-transition-in-pjm-emerging-characteristics-of-a-decarbonizing-grid-white-paper-final.ashx>.

⁷ *Id.* at 21.

intermittent resources, or locational constraints when the grid is likely being supplied by predominantly fossil fuel technologies.”⁸

Indeed, REC markets with annual procurement obligations will bring diminishing returns as the procurement requirement rises above 50%. Figure 1 below shows that a REC program with a 100% annual procurement requirement will only match 72% of New Jersey’s hourly load. Figure 2 shows that annual renewable procurement requirements in excess of 30% yield quickly diminishing returns. For example, only 80% of an increase in the annual renewable procurement targets from 40 to 50% will be matched to hourly load. And only 30% of an increase in the annual renewable procurement target from 90 to 100% will be matched to hourly load. The remainder of the incremental renewable generation will be unable to reach load.

Figure 1

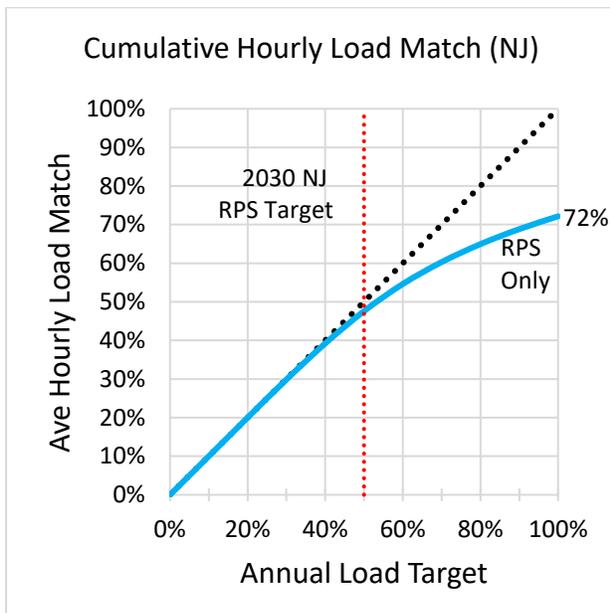
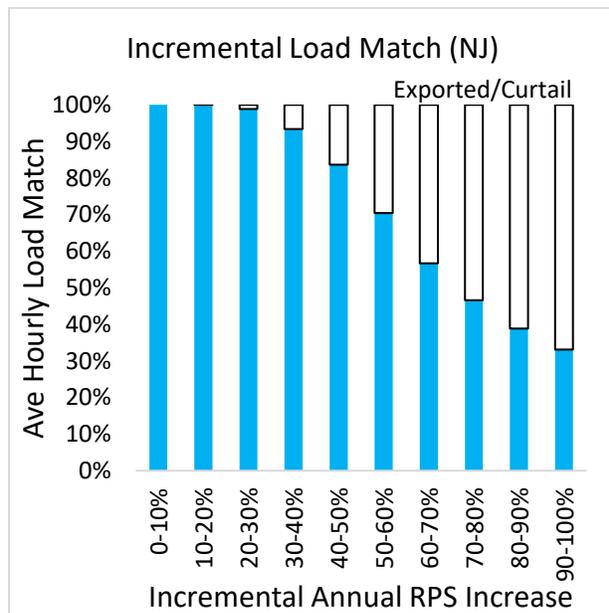


Figure 2



This phenomenon is not unique to New Jersey. Princeton University’s ZERO Lab estimates that RTO-wide, 100% annual matching would result in clean generators matching only 62% of hourly load in PJM.⁹ For its part, Google has maintained a global 100% renewable energy

⁸ Staff Report at 41.

⁹ Qingyu Xu et al., *System-Level Impacts of 24/7 Carbon-Free Electricity Procurement*, Princeton Univ. ZERO Lab at 14 (Nov. 16, 2021), <https://acee.princeton.edu/24-7/>.

portfolio based on annual matching since 2017, but found that in 2019, only 61% of its load was matched with clean sources on an hourly basis.¹⁰

In sum, increasing the *annual* procurement target for carbon-free generation will not ensure that New Jersey customers actually use that much clean energy on an hourly basis. Instead, customers will still need to meet a portion of their hourly load from emitting generation. To address the problem, New Jersey needs to adjust its attribute programs to ensure that there is sufficient deliverable carbon-free generation in every hour.

II. New Jersey should adopt an environmental attribute program requiring hourly matching,

To ensure that reliable, carbon-free energy can supply load throughout the day, New Jersey should enhance its environmental attribute programs to include hourly matching. Specifically, load-serving entities (LSEs) would be required to procure environmental attributes from clean, carbon-free generation matching a specified percentage of their load during each hour. Thus, for example, during a high demand hour, an LSE would need to procure attributes reflecting a larger number of megawatt-hours than it would need to procure for a low demand hour. This will incentivize the deployment of the next generation of reliable carbon-free energy technologies by rewarding carbon-free suppliers that can match load.¹¹

As discussed above, a significant drawback of the existing annual-matching standard is that it targets only output, regardless of when that output occurs. That made sense when clean energy programs were nascent, because the first 10-20% of renewable generation will match load regardless of when during the day it operates. But, as renewable deployment increases, that ceases to be true. Hourly matching is thus necessary for attribute programs to target not merely output, but the much more important goal of deliverability. It promotes the right mix of clean technologies located in the right places to serve customers whenever power is needed, building on New Jersey's efforts to promote offshore wind, energy efficiency, storage, and demand response, and to retain

¹⁰ Google, *24/7 by 2030: Realizing a Carbon-free Future* at 6 (Sept. 2020), <https://www.gstatic.com/gumdrop/sustainability/247-carbon-free-energy.pdf>.

¹¹ See, e.g., Mark Dyson et al., *Clean Power by the Hour*, Rocky Mountain Inst. at 9 (July 2021), <https://rmi.org/insight/clean-power-by-the-hour/> (“Hourly procurement strategies explicitly recognize the declining incremental value of wind and solar as their market share grows, and open the door for emerging technologies that, while perhaps more costly, can complement variable renewables in meeting hourly grid needs.”); Melissa Lott & Bruce Phillips, *Advancing Corporate Procurement of Zero-Carbon Electricity in the United States: Moving From RE100 to ZC100*, Columbia Univ. Ctr. on Glob. Energy Pol’y at 23 (Dec. 2021), <https://www.energypolicy.columbia.edu/research/report/advancing-corporate-procurement-zero-carbon-electricity-united-states-moving-re100-zc100> (“[A]dditional resources are needed to maintain balance in the power grid while fully decarbonizing the system.”).

existing nuclear generation. Hourly matching would promote a carbon-free reliability backbone to enable the State to retire fossil-fuel generators.

Importantly, hourly matching can be implemented on a much faster timetable than the proposals in the Staff Report. New Jersey could implement hourly matching without engaging the lengthy PJM stakeholder review and it would not require FERC approval. New Jersey also could tailor hourly matching to achieve a balance between promoting decarbonization and technological realities. Thus, for example, the State could maintain its existing annual matching goals and phase in hourly matching over a period that enables storage and other emerging technologies to become less expensive and more widely available.

Finally, although New Jersey can pursue hourly matching itself, it can also work with a broader group of stakeholders—including other states and large power purchasers—to encourage a broader transition to hourly matching. The same implementation and substantive benefits of hourly matching in New Jersey would apply to these other groups as well. Promoting a wider adoption of hourly matching would increase efficiency by fostering competition among more suppliers, lowering prices for consumers.

For these reasons, hourly matching provides the best near-term opportunity for advancing State clean-energy goals while ensuring reliability.

III. The Staff Report’s forward market proposals have potential, but their success in meeting New Jersey’s carbon-free energy goals will be highly dependent on how they develop and are implemented.

Although Constellation favors hourly matching, the Staff Report’s recommendations for forward markets for environmental attributes have potential and, depending on the details of implementation, will encourage reliable carbon-free energy. However, Constellation is concerned that, as a practical matter, the proposals will be challenging to implement, as they are technically complex and will require broad intergovernmental cooperation.

Regarding the Integrated Clean Capacity Market (“ICCM”) proposal, the Staff Report is candid about the implementation challenges the proposal would face. It would “require[] active cooperation from PJM and its stakeholders to become a reality, and ... the PJM process can take a number of years.”¹² Specifically, “[a]ny proposal must be approved by PJM member[s], the PJM Board of Directors, and then approved by FERC.”¹³ Whether a future FERC will be receptive to

¹² Staff Report at 21.

¹³ *Id.* at 21-22.

such a proposal is impossible to predict.¹⁴ And even if FERC initially approved the proposal, new FERC commissioners could attempt to frustrate it later.

With respect to the Forward Clean Energy Market (“FCEM”) proposal, one advantage it has over the ICCM structure is that it could be implemented by states without PJM or FERC approval.¹⁵ However, the FCEM still would require interstate cooperation over potentially thorny issues, such as product definition—including which resource attributes should qualify—and the shape of the demand curve.

The Clean Capacity Credit (“CCC”) concept presents a promising alternative to the ICCM and FCEM concepts that can accomplish similar goals with fewer implementation challenges. Under this proposal, load-serving entities would need to procure environmental attributes reflecting the capability to generate carbon-free energy, in addition to the environmental attributes they currently must procure reflecting the actual generation of carbon-free energy. Among other things, such a program would encourage developers to site clean resources in areas that can serve New Jersey load. Although the framework is encouraging, many details remain to be seen, and will require careful evaluation. In addition, the Board must take care to ensure that the program cannot be considered a FERC-jurisdictional “capacity” product, lest it become mired in the same complexity and endless litigation that has characterized PJM’s Reliability Pricing Model for years.

Importantly, none of the Board’s proposals offer the same degree of reliability improvements and ease of implementation as hourly matching would. The CCC comes closest, but even with a mechanism to index credit value to emissions-reduction impact, the CCC would still tolerate a high degree of unmatched load. Therefore, the Board should consider hourly matching in conjunction with any other proposal it decides to pursue.

¹⁴ The Staff Report does not recommend implementing the ICCM by way of the FRR alternative. *Id.* at 24-25. However, to the extent that the procurement of capacity is co-optimized with the procurement of capacity credits in the PJM market mechanism, as the proposal appears to envision, FERC approval may nevertheless be required.

¹⁵ *Id.* at 21-22.

IV. Conclusion

Constellation supports the objectives of the Staff Report, but urges the Board to consider concepts and mechanisms that can be deployed on a shorter timetable and largely within New Jersey's control. In particular, revising New Jersey's environmental attribute programs to require LSEs to procure attributes from carbon-free generators to match hourly load would ensure the development of a grid that is both decarbonized and reliable.

Respectfully submitted,

A handwritten signature in black ink that reads "Jesse Rodriguez". The signature is fluid and cursive, with the first name "Jesse" and last name "Rodriguez" clearly legible.

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