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Illinois Environmental Protection Agency
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NRG Energy, Inc. Response to Resource Adequacy Post-Workshop Stakeholder Questions

NRG Energy, Inc. ("NRG") appreciates this opportunity to provide feedback on key topics and data that are pertinent to the inter-Agency Resource Adequacy Study ("RA Study") process. NRG thanks the agencies for seeking such feedback and utilizing the material received to create a more robust RA Study. The outcome of this study and its application will have a meaningful impact on the future of Illinois energy policy, the reliability of the state and region's electric system, and the affordability of energy for consumers in Illinois.

A Fortune 500 company operating in the United States and Canada, NRG delivers innovative solutions that help people, organizations, and businesses achieve their goals while also advocating for competitive energy markets and customer choice. NRG serves approximately 8 million energy and energy services customers across the country. This includes the provision of energy supply to end-use customers in Illinois and other restructured markets within the PJM footprint. In addition to serving the electric supply needs of customers, NRG also owns and operates a large power generation fleet, including three generating stations in Illinois, and provides demand response services in Illinois and throughout the country.

In addition to the unique answers below, NRG also supports the concurrent comments filed by the PJM Power Providers ("P3"). The P3 comments identify a number of considerations and important data sources for the agencies to consider. In particular, NRG emphasizes P3's recognition of Illinois' commitment to maintaining a competitive wholesale and retail market, as provided in the Electric Service Customer Choice and Rate Relief Law of 1997, P.A. 90-561, eff. 12-16-97. (Sec. 16-101 – 16.102). As noted by P3, the law frames how Illinois should go about ensuring reliability for its consumers, using market forces to offer the best outcomes for the state's electricity-buying population.

TOPIC 1: Resource Adequacy Study goals and scenario analysis considerations.

Question 1: The Agencies recognize this study process is purposefully targeted in its nature, with Section 9.15(o) providing clear goals and expectations of the resource adequacy study and resulting report. What additional goals, objectives, or evaluation metrics should be considered, either as part of this study process or future resource adequacy study efforts?

NRG ANSWER: The Illinois Climate and Equitable Jobs Act (CEJA) mandates the retirement of approximately 12 GWs of fossil-fired dispatchable generation by 2030. A study that encompasses performance only through 2030 may not correctly identify the consequences of closures that may

happen only that year, at the latest, under the current law. The RA Study therefore should do a "look ahead" of an additional two years—through 2032 at least—to fully understand the implications of the law's required retirements. This is especially important because, as a practical matter, future studies conducted under the law will either come too late to reverse any retirements or could impose substantial costs to turn-around a facility that has planned for a likely retirement (e.g., not making certain investments in major maintenance or capital repairs for long-term operational readiness versus that of a run-down toward retirement).

Despite 80 GWs of proposed generation in Illinois currently proceeding through the PJM and MISO interconnection queues, only a small fraction of that quantity is dispatchable replacement capacity and projected to be available by 2030, likely falling short of the anticipated reliability needs. In light of the projected reliability need between 2026 and 2030 the following evaluation metrics should be considered:

- Forecasting energy and capacity market impacts on the Illinois portions of PJM and MISO.
- Evaluating the sufficiency and timing of generation replacement options via interconnection queues.
- Modeling Illinois' transmission system constraints and renewable integration limits.
- Assessing resiliency during extreme weather scenarios (e.g., winter storms, extreme heat, etc.).
- Assessing the likely load growth scenarios with more than one transparent and replicable methodologies, including both a fundamentals analysis as well as one based on the inbound interconnection requests by large loads to Illinois electric utilities.

Question 2: Which variables are the highest priority to explore? Further, are there important policies or drivers missing in addition to those outlined in the preceding stakeholder workshop that could help shape scenario development?

NRG ANSWER: Since the passage of CEJA, load growth has emerged as the single most dynamic variable in this exercise. NRG recommends both a fundamentals analysis of organic and large-load growth, as well as a build-up forecast based on submissions made through the load interconnection processes that Illinois electric utilities currently undertake. Various RTOs have recently assigned *ex post* adjustments to utility forecast submissions, and NRG recommends that the RA Study authors consult with ERCOT, PJM, and other RTOs on the best practices that have incorporated probabilistic estimations of large load growth. On this point the RA Study should document its assumptions thoroughly in any reporting.

Question 3: Which of the following drivers are most critical to explore in the resource adequacy modeling scenarios and why?

a. *Extreme weather*
b. *Demand growth*
c. *Thermal retirements*
d. *Transmission build and future needs*
e. *Generation resource diversity*
f. *Out-of-state reliance on generation resources*
g. *Some other driver not described above*

NRG ANSWER: As described in relation to Question 2, demand growth is the emergent variable that will impose the most significant threats in an RA Study. Additionally, the following elements should also be considered:

1. Thermal Retirements. Despite 80 GWs of proposed generation in Illinois currently proceeding through the PJM and MISO interconnection queues, only a small fraction of that quantity is dispatchable capacity and projected to be available by 2030, likely falling short of the anticipated reliability needs. The agencies should review the anticipated retirements embedded in CEJA, other economic- or policy-driven retirements, as well as the existing and anticipated interconnection queue as part of their modeling.
2. Extreme Weather. Under the expected CEJA generation closures, and absent replacement of or adjustments to dispatchable generation, Illinois is likely to face elevated outage risks under extreme weather outcomes similar to those experienced in Winter Storm Elliott. In support of their underlying resource adequacy markets, both of the RTOs in Illinois have explored the impacts of weather on resource performance. PJM has done significant work modeling all technologies' (and unit specific) probability of generating energy during conditions of extreme system stress. Similarly, MISO has implemented steps to consider technology performance on a seasonal basis. Specific study of cold and hot weather events should be considered in the agencies' RA Study.

Question 5: How should cost implications or other findings beyond potential reliability shortfalls be presented or considered to support constructive policy decisions?

NRG ANSWER: The RA Study should produce a net present value for generation supply, including the costs of any transmission assumed to be necessary to produce reliable and resource-adequate system conditions, for all scenarios the RA Study models, including its base case.

Additionally, the RA Study should include a ratepayer impact analysis that evaluates a bill impact for an average customer from each customer class of relevant electric utilities. For any out-of-market approaches that the study proposes, other than a relaxation to emissions limitations, the study should assess separately the ratepayer impact of requiring the investments associated with this cost, including an analysis that is netted against any benefits that are derived from that investment.

Question 6: What blind spots or gaps in the RA Study process do you worry might be overlooked or otherwise not addressed?

a. *Are the identified blind spots or gaps unique to customer segments, modeling scenarios, market conditions or other targeted parameter?*
b. *How could the identified blind spots or gaps be addressed? (e.g. through additional scenarios, targeted data inputs, utilizing specific modeling, etc.)*

NRG ANSWER: In the absence of relief of certain CEJA generation closure targets and/or replacement in-kind by dispatchable resources, Illinois may become a net importer of power, increasingly reliant on out-of-state resources—both fossil and intermittent. We encourage the agencies to consider the following:

1. What is the economic impact to Illinois related to the retirement of dispatchable generation?
2. What is the economic impact to Illinois in replacing retired generation with dispatchable generation, incentivizing dispatchable generation via virtual power plants?
3. What is the economic impact to Illinois in replacing retired generation with dispatchable generation, incentivizing dispatchable generation via battery storage?
4. What is the environmental impact of Illinois becoming more reliant on out of-state generation resources?
5. What is the impact on available imports as surrounding states increase the number of data centers locates in their states?

Question 7: Have any peer jurisdictions developed scenario(s) through the completion of their own resource adequacy assessments or studies that should also be considered by the Agencies through this Resource Adequacy Study?

a. *Provide details concerning the scenario(s), which jurisdiction developed the scenario, and provide a link to the supporting detail(s).*
b. *Is the assessment part of a broader resource adequacy assessment, or a more detailed integrated resource planning effort?*
c. *Are there any market conditions or policy considerations that are unique to the jurisdiction and/or the scenarios referenced?*

NRG ANSWER: Yes. Both PJM and MISO, as well as NERC and U.S. DOE, have developed a series of resource adequacy studies or reviews that can be informative to the agencies' work here. For example, PJM developed its "Energy Transition in PJM: Resource Retirements, Replacements & Risks" report in 2023 which anticipated some of the gaps stakeholders are experiencing now.[1] In MISO, a white paper on their long-term load forecast may be instructive to the agencies' undertaking.[2] NERC publishes a series of reliability assessment reports, with focus on both the near term (e.g., 2025 Summer Assessment) and the long term (e.g., 2024 Long Term Reliability Assessment).[3] Finally, the U.S. Department of Energy recently has published a nationwide assessment of resource adequacy using a loss of load hours perspective, and based on resources' historical performance, in view of the possibility of resource retirements—in essence, the question the Illinois RA Study is asking at a more granular level.[4]

In sum, these various reporting products, along with the resource adequacy market outcomes from PJM and MISO should be used as inputs and scenario. NRG recommends using the Effective Load Carrying Contribution values used in RTO analyses for the RA Study to ensure consistency between measures of RTO market performance and design changes that may need to be made in that policy landscape with the matters that are within the jurisdiction of the State of Illinois in this matter.

TOPIC 2: Analytical approach to analysis and data assumptions.

[1] https://www.pjm.com/-/media/DotCom/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx
[2] https://cdn.misoenergy.org/MISO%20Long-Term%20Load%20Forecast%20Whitepaper_December%202024667166.pdf
[3] https://www.nerc.com/pa/RAPA/ra/Pages/default.aspx
[4] https://www.energy.gov/articles/department-energy-releases-report-evaluating-us-grid-reliability-and-security

Question 8: Are there recommendations for specific data sources that could be utilized in this study?

a. *Are there preferences for certain input assumptions that should be made?*
b. *What prior or concurrent studies could be referenced that might add value or ensure alignment with similar or adjacent work (e.g., queue assumptions, RTO projections)?*

NRG ANSWER: Yes. The agencies should utilize material available from PJM and MISO regarding load forecasts[5], the status of generation interconnection projects[6], the status of transmission system development[7], and the status of generation retirements[8]. This material will support expectations around future load, what resources and delivery systems may be in line-of-sight, what may be further in the future, and what may (or may not be) realistic to reach commercial operation. NRG also urges the agencies to consider the outcomes of the region's resource adequacy markets as they provide additional detail regarding the current state of the system. NRG also refers back to our response to Question 7 in relation to the utilization of consistent ELCC values across studies.

Question 9: Are there specific transmission constraints, expansions, or projects that should be considered and reflected in a model scenario? Further, are these transmission considerations intended to target and/or solve specific challenges? Please explain, provide supporting documentation justifying inclusion, and provide pertinent reference materials including reports or studies.

NRG ANSWER: Yes. NRG anticipates that renewable penetration above certain levels may result in significant curtailment of intermittent resources in the absence of additional dispatchable resources, including energy storage projects, in Illinois and elsewhere. The agencies should consider the impacts of unconstrained intermittent resource penetration and their potential impacts on the transmission system, including potential bus voltage violations, line overloads, and other impacts. We strongly urge that consideration should be given to adjusting the CEJA mandated closure and adjustments to the caps on dispatchable generation and how those variables would impact the transmission constraints and transmission upgrades. The authors of the RA Study should consider directly asking PJM and MISO to collaborate to write this section or chapter of the RA Study. Specific transmission constraints that may be identified include:

- Voltage Stability
- Thermal Overloads
- Congestion Near Load Centers
- Limited Hosting Capacity for Renewables
- Costs of curtailment and transmission upgrades associated with these issues.

[5] PJM: PJM - Load Forecast Development Process MISO: MISO Long-Term Load Forecast Whitepaper
[6] PJM: PJM - Service Requests MISO: Generator Interconnection Queue
[7] PJM: PJM – Project Status MISO: MTEP
[8] PJM: PJM - Generation Deactivations MISO: Generator Interconnection and Retirement

Question 10: Are there specific assumptions that should be considered concerning generation resources, including buildout (queue, pace, technology availability) or retirements, both in-state and regionally in the RTO markets?

a. *Which proposed assumptions should be considered as part of the base case and which are best considered as part of a prospective scenario? Provide any available references to RA studies, IRPs, or comparable assessments and reports to support your recommendations.*
b. *Which assumptions are contingent upon specific policy and/or legislative conditions being met or otherwise enacted? Please plain in detail.*

NRG ANSWER: Yes. Please see NRG's response to Question 8 above for sources of baseline assumptions. NRG further supports the use of scenario analysis (e.g., high or low load growth, high or low intermittent resource penetration, high or low battery storage penetration, etc.) to provide further context to the work ahead.

Thank you for the opportunity to submit views on the scoping of the RA Study. We would be happy to speak to you about our input.

Respectfully submitted,

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