Illinois' Resource Adequacy Study
Invenergy Comments to Post-Workshop Stakeholder Questions

Invenergy appreciates the opportunity to provide comments to Illinois' Resource Adequacy Study. As a company founded and headquartered in Illinois, and the nation's largest privately held developer, owner and operator of clean energy solutions, Invenergy is committed to supporting the state's goals and accelerating cleaner, more reliable, affordable energy. Invenergy and its affiliated companies have successfully developed more than 34,000 megawatts of projects that are in operation, construction or contracted, including natural gas, solar and wind power generation, transmission infrastructure, and advanced energy storage projects.

<u>TOPIC 1</u>: Resource Adequacy Study goals and scenario analysis considerations.

<u>Question 1</u>: 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?

Section 9.15(o) requires the Agencies to examine the State's current progress toward its renewable energy resource development goals, the status of emissions reductions, and the current and projected status of resource adequacy for the period beginning 5 years ahead. In assessing these efforts, it is critical that the Agencies evaluate the existing processes used to encourage renewable energy resource development goals and address the disparity between renewable development independent of the IPA utility-scale procurements and the shortfall in the procurement goals. Illinois has a robust renewable portfolio standard and REC procurement, and yet the number of projects energized through these procurements is limited in comparison to the number of projects energized throughout Illinois. Understanding developers' hesitation to participate in these procurements may lead to additional changes that enable enhanced participation and deployment of projects.

The Agencies should also consider whether barriers to participating in other state-run procurements, including Block Energy and Capacity Procurements, are a limiting factor in further renewable deployment. Today, the structure of these procurements is largely prohibitive for clean energy resources. The current Block Energy and Capacity Procurements only procure for Delivery Years 3 to 5 years out from the current year. The short length of these contracts does not make them financially viable for renewable projects, and the state has instead supported PJM Interconnection, L.L.C. ("PJM") and Midcontinent Independent System Operator, Inc. ("MISO") 'mix' which are predominantly out of state fossil generation. One possible solution to this problem would be to create additional procurements from long-term bundled contracts for energy, capacity, and RECs from various new clean resources including resources delivered via HVDC transmission lines. The inability to enter long-term capacity contracts for capacity resources that could serve as a hedge against capacity auction price volatility should also be assessed as a contributing factor to resource adequacy concerns. Until Illinois adopts new tools to encourage the development of new high-capacity resources, the state will be unprotected from capacity shortfalls in PJM and MISO. Furthermore, when analyzing the current Block Energy and Capacity procurements, the

Agencies should weigh the impact of supporting out-of-state fossil fuel production against our progress towards meeting the state's emissions reductions.

While the study must consider resource adequacy through 2031, at a minimum, a standard planning horizon typically looks 20 years into the future to understand future cash flows for new resources needed to maintain resource adequacy. If Illinois seeks to manage reliability shortfalls in the face of thermal retirement and load growth, the State needs to develop a long-term vision as the investments and planning needed for these resources require nearly a decade, or beyond, of lead time. Invenergy supports efforts at the legislature to create a more holistic planning process that captures a greater portion of IL load and considers longer-term needs

Accordingly, the Agencies should assess whether developing a robust resource planning process with a long-term horizon to better evaluate the evolving nature of the energy landscape. The process should provide an opportunity for stakeholder input and data, including, but not limited to, the incumbent utilities, independent power producers, developers, relevant Illinois state agencies, energy industry trade associations, consumer and industrial customers. The input and information from all these relevant stakeholders will ensure that the Agencies have a clear understanding of all the factors necessary to address resource adequacy with sufficient time to plan, develop, and invest as needed.

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

a. Extreme weather

Extreme weather events are continuing to stress our electric grid and threaten national security, economic investment, and public safety. In evaluating how to plan for and address the impact of extreme weather, the Agencies should emphasize solutions and resources that can reduce variability. In a report by Converge Strategies assessing national security, it was noted that "achieving energy resilience will require physical infrastructure capable of accessing geographically dispersed electric generation resources and delivering them across the country." [1] Further, as ACORE highlighted in its discussion of the importance of a resilient transmission grid, "strategic investments in a high-voltage transmission system would add new capacity and flexibility, enabling the system to better withstand increasingly frequent extreme weather events and physical threats." [2]

b. Demand growth

c. Thermal retirements

When considering the impact of thermal retirement on resource adequacy, the issue of reliance on out-of-state generation for these resources is likely to be directly implicated. Illinois is expected to face 28 gigawatts ("GW") of coal and natural gas generation retirements by 2035, with 11 GW of retirements by 2030. Although Illinois statute includes a provision that these generators may be called upon for reliability reasons and run in exceedance of emissions limits and deadlines, the study should consider whether generators will continue to operate in the face of significant inefficiencies and market distortion. In addition to zero-emission deadlines, the resource adequacy analysis should consider whether interim emissions

[1] Converge Strategies and Invenergy Transmission, "HVDC Transmission: A National Security and Energy Resilience Imperative" (2022).
[2] American Council for Renewable Energy. https://acore.org/resources/energy-assurance-depends-on-a-resilient-transmission-grid/

limits applicable only to natural gas facilities are impeding the most efficient operation of generators across Illinois—from both a cost-effective and emissions perspective.

The current decarbonization requirements also pose the risk of greenhouse gas emissions leakage. Without similar decarbonization requirements in the neighboring states of Missouri, Wisconsin, or Indiana, Illinois will likely become more dependent upon out-of-state natural gas at the expense of Illinois consumers. As noted by the Illinois Commerce Commission in the Renewable Energy Access Plan ("REAP"):

> "The specific avenues of GHG emissions leakage include the potential for: (a) increases in GHG emissions from the fossil plants that are not subject to emissions caps, which may offset reductions in energy output from emissions-capped and retired plants; (b) increases in GHG emissions from fossil resources outside of Illinois to offset decreases in Illinois fossil production."[3]

d. Transmission build and future needs

Illinois does not have any meaningful process to support interregional transmission development that can deliver the high-capacity clean energy resources Illinois needs to achieve a reliable and affordable electric grid given decarbonization requirements and projected load growth. In Order No. 1920, the Federal Energy Regulatory Commission ("the Commission" or "FERC") recognized the resource adequacy value provided by investments in transmission. The Commission called "a robust, well-planned transmission system . . . foundational to ensuring an affordable, reliable supply of electricity."[4] FERC explained that "larger, more integrated transmission systems result in a diversity of supply and demand conditions and a certain degree of redundancy that allows the system to better withstand failures during extreme events."[5]

Transmission also allows "system operators . . . [to] reduce their resource adequacy requirements (i.e., planning reserve margins), resulting in a benefit of reduced capital cost of generation needed to meet resource adequacy requirements."[6] The Commission explained "that requiring the measurement and use of this benefit is necessary because it reflects an important category of reliability benefits…."[7] Invenergy agrees and believes the ability of interregional HVDC transmission projects to reduce loss of load probability and planning reserve margin requirements is even greater than for regional lines within a single transmission planner's long range transmission plan. HVDC technology, almost by definition, is designed to connect distant regions many miles apart with lower line losses than typical AC lines.[8] Interconnecting distant regions can result in greater diversity of generation and demand, as well as greater resource adequacy benefits.

Studies have demonstrated that interregional transmission can reduce planning reserve margins, saving consumers billions of dollars. Americans for a Clean Energy Grid has reported that the benefits generated by MISO's Multi-Value Projects Portfolio and SPP's Priority Projects exceeded costs by 2.2 to 3.5 times,

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[3] Illinois Commerce Commission. Renewable Energy Access Plan. 2024. https://icc.illinois.gov/api/web-management/documents/downloads/public/2024-05-30%20REAP.pdf

[4] Bldg. for the Future Through Elec. Reg'l Transmission Plan. & Cost Allocation, Order No. 1920, 187 FERC ¶ 61,068, at P 90, order on reh'g & clarification, Order No. 1920-A, 189 FERC ¶ 61,126 (2024), order on reh'g & clarification, Order No. 1920-B, 191 FERC ¶ 61,026 (2025).

[5] *Id.*

[6] *Id.* P. 671.

[7] *Id.*

[8] As of September 2023, 8 HVDC transmission projects totaling approximately 2,664 miles were ready to begin construction in the United States, yielding an average project length of 333 miles. Zachary Zimmerman, Michael Goggin, and Rob Gramlich, Ready-to-Go Transmission Projects 2023 (September 2023), https://cleanenergygrid.org/wp-content/uploads/2023/09/ACEG_Transmission-Projects-Ready-To-Go_September-2023.pdf.

which "means that every dollar spent on transmission will enable access to generation that is $3 to $4 cheaper than would otherwise be available."[9] In a recent study, Resources for the Future concluded that "the potential for generation cost savings from integrating existing supply across regions is quite large and has been increasing: $5.8-7.1 billion under 2022 conditions and $3.4-5.0 billion under 2023 conditions, substantially higher than in previous years."[10]

The above evaluation and calculation of resource adequacy benefits can be extended to Illinois' planning process. While Illinois has a limited opportunity to influence the RTO planning process that is controlled primarily by the RTO members, RTO leadership and the RTO Boards, embracing merchant transmission gives the state an opportunity to control its own transmission expansion goals.

e. Generation resource diversity

For Illinois, the benefits of increasing the geographic diversity of resources serving load cannot be understated. An increase in resource diversity means a decrease in the vulnerability of the grid to common failures and a more resilient system. By delivering wind and solar generation with complementary generation profiles versus local renewable resources alone, high voltage direct current transmission avoids coincident generation that can cause operational and reliability challenges for utilities, supports greater renewable energy penetration and provides for a more stable supply of power during more hours of the day.

As Grid Strategies reported, "events that interrupt generation tend to be more localized, allowing for regions to call upon these interregional transmission lines to import electricity from regions experiencing different weather patterns to cancel out local fluctuations in electricity supply and demand[...] avoid renewable curtailments as well as manage internal congestion and transmission flows. In a sense, interregional transmission ties are the '*lifelines'* that keep the grid up and running when these types of interruptions occur."[11] Additionally, renewable energy resources from states like Kansas, with strong wind and solar resources, carry a greater capacity value than similar resources located in Illinois. For example, compared with local MISO wind, Kansas wind resources delivered via HVDC transmission lines will achieve a higher capacity accreditation using MISO's forthcoming Direct Loss of Load ("DLOL") methodology that FERC approved in 2024 for implementation in MISO's 2028-2029 planning year. Under this DLOL methodology, Kansas wind would receive 38% capacity accreditation versus 16% for local MISO resources. This enhanced capacity performance is even greater when delivered to PJM. Using PJM's Effective Load Carrying Capability ("ELCC") methodology, Kansas wind resources are expected to deliver a 48% ELCC value compared to 28% for local PJM resources.

Further still, with capacity markets shifting to a system of marginal capacity accreditation, the more of any one type of resource the less valuable it becomes – emphasizing the need for geographic and resource diversity to meet local resource requirements.[12] Put simply, only building additional in-state renewable generation and in-state transmission assets will challenge the state's ability to provide clean, reliable, affordable power.

In the REAP, the Illinois Commerce Commission ("ICC") specifically stated a need to bring in geographically diverse resources to reach clean energy goals, stating, "Illinois' current geographic requirements for renewable supply eligibility mean that Illinois consumers do not have access to other low-

[9] Order No. 1920 at P 91 n.196.
[10] Dason Ham, Owen Kay, and Catherine Hausman, Power Flows, Part 2: Transmission Lowers US Generation Costs, But Generator Incentives Are Not Aligned 2 (April 2025), https://media.rff.org/documents/WP_25-10_kFRJaAE.pdf.
[11] Grid Strategies, "Fleetwide Failures: How Interregional Transmission Tends to Keep the Lights on When There Is a Loss of Generation", at 1 (Nov. 2021). Available at: https://www.ferc.gov/media/panel-4-rob-gramlich-grid-strategies-2
[12] PJM 2026-2027 ELCC Ratings, *available at*: https://www.pjm.com/-/media/DotCom/planning/res-adeq/elcc/2026-27-bra-elcc-class-ratings.pdf

cost renewable supply in other states for compliance with the RPS and for competitive IPA solicitations. In the long term, the most cost-effective and balanced 100% clean electricity resource mix will likely need to account for the ability to import clean electricity from other decarbonizing states and export clean energy when Illinois is in surplus."[13]

f. Out-of-state reliance on generation resources

See Q3.c

Question 4: Are there known or expected developments in federal or state policy that should be integrated into scenario development? Please explain in detail and provide references where possible.

The federal legislation that was signed into law this month produced a significant reduction in tax credits available for renewable energy projects and will likely slow the pace of deployment over time. At the same time, the current federal administration's efforts to encourage coal, gas, and nuclear resources and reduce national emissions regulations will provide for additional thermal development in neighboring states. These factors should be included in scenario planning assumptions as to the deployment of renewable generation and reliance on out-of-state thermal generation.

Legislation being considered in Illinois also explores several options to address resource adequacy. Aligned with proposals contained in the legislation, the study should consider impacts from scenarios of the following:

- The impact of added storage capacity, at 3 GW by 2030 and 6 GW by 2035, with an emphasis on the benefits of adding surplus storage capacity to existing or retiring generation.
- The value of integrated resource planning and enabling additional procurements of energy, capacity, environmental attributes, or resource adequacy attributes, or some combination thereof intended to serve all retail customers.
- Meeting the state's renewable portfolio standards through the expansion of the RPS budget and facilitating the deployment of renewable generation through permitting and siting improvements.

TOPIC 2: Analytical approach to analysis and data assumptions.

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

Production-cost and power flow models are the best analytical tools available from the RTOs to determine whether the grid can serve all loads securely.

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)?

The Department of Energy's National Transmission Needs Study is the most comprehensive consideration of transmission needs across the country and its analysis and findings can support this Study in assessing improved reliability and resilience benefits from additional transmission investments and geographically

[13] Final Order, Illinois Commerce Commission Investigation into a Renewable Energy Access Plan, Appendix at 44 (Dt. 22-0749; May 30, 2024). Available at: https://www.icc.illinois.gov/docket/P2022-0749/documents/351191

diverse resources.[14]

The North American Electric Reliability Corporation's Interregional Transfer Capability Study projects 35 GWs of interregional transmission investment are needed over the next decade.[15] The Study highlights important considerations of this study as to the value of high voltage direct current transmission projects to provide additional transfer capacity, especially for PJM and MISO, and support overall grid resilience.

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.

The state should consider transmission projects in development that will provide meaningful resource adequacy benefits and support the state's decarbonization goals. The Grain Belt Express transmission line project, an approximately 800-mile, overhead, multi-terminal 600 kV HVDC transmission line and associated facilities, including converter stations and alternating current connector lines ("GBX"). GBX will provide the capacity to deliver up to 5,000 MW, primarily from renewable energy generation facilities in Western Kansas, to load-serving entities in the Midwest and adjacent regions via an interconnection with MISO, PJM, and Associated Electric Cooperative, Inc. ("AECI"). With regard to GBX Belt specifically, the ICC has noted that the "… Project will provide substantial reliability and resiliency benefits by interconnecting three regions," and "…Illinois residents will benefit from this interconnection and delivery of electricity from this Project."[16] Interregional HVDC transmission is essential to improved reliability and resiliency as the state manages a transition to 100% clean energy future under the stressors of climate change.

In a multi-year study of the value of interregional transmission, the Department of Energy's National Transmission Planning Study found "the use of high-voltage direct current (HVDC) transmission technologies [...] results in the greatest benefits to consumers across the transmission options studied," and further that the lowest-cost solutions include increasing transmission between regions.[17] When considering recent capacity shortfalls observed in Winter Storm Uri and Winter Storm Elliot, the Department found that grid operators were "unable to import additional available generation capacity during the cold weather event, which negatively impacted resource adequacy and introduced high price spikes," whereas the ability to move power between regions via interregional HVDC transmission lines "would improve system reliability during extreme weather events."[18]

Projects like GBX will enable Illinois to diversify its energy supply – both technologically and geographically – to take advantage of the complementary generation profile of high-capacity factor remote renewable energy resources. By delivering wind and solar generation with complementary generation profiles versus local renewable resources alone, HVDC transmission avoids coincident generation that can cause operational and reliability challenges for utilities. Such high coincident generation can lead to a

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[14] National Transmission Needs Study. Department of Energy. https://www.energy.gov/gdo/national-transmission-needs-study
[15] NERC. Interregional Transfer Capacity Study. https://www.nerc.com/pa/RAPA/Documents/ITCS_Final_Report.pdf
[16] Final Order, Grain Belt Express LLC, CPCN Application, at 36 (Dt. 22-0499, Mar. 2023).
[17] Executive Summary, at pg. 14, available at: https://www.energy.gov/sites/default/files/2024-10/NationalTransmissionPlanningStudy-ExecutiveSummary.pdf
[18] U.S. Department of Energy Grid Deployment Office Initiation of Phase 2 of National Interest Electric Transmission Corridor (NIETC) Designation Process: Preliminary List of Potential NIETCs Issued Pursuant to Section 216(a) of the Federal Power Act, at 21 (May, 2024). Available at: https://www.energy.gov/sites/default/files/2024-05/PreliminaryListPotentialNIETCsPublicRelease.pdf

simultaneous loss of output from local solar resources, representing a single unit contingency. Conversely, remote wind and solar generators delivered by HVDC transmission facilities are unlikely to be affected by weather events that might impact local generation assets.

Furthermore, GBX also improves MISO's Loss of Load Expectation independent of any connected generation resources due to its interregional connectivity and thereby reduces the need to even build new capacity resources to serve incremental load. GBX has MISO's Network Resource Interconnection Service (NRIS), which is deliverable to the entire MISO footprint, and as such, GBX capacity does not put additional pressure on Ameren's Network Integration Transmission Service to deliver to Illinois load via costly firm Point to Point Transmission Service.

Finally, as the ICC also noted in its Order granting GBX its Certificate of Public Convenience and Necesity, there are additional project benefits outside of the provision of technologically and geographically diverse renewable resources that the generating resources cannot provide alone, because "the project will mitigate high energy prices during extreme weather events, avoid loss of load, reduce local resource adequacy procurement obligations, hedge against future capacity procurement needs, provide valuable system restoration capabilities like 'black start' and provide active and reactive power control and fast power run back capabilities."[19]

<u>Question 12</u>: Are there any additional considerations – data inputs, policy, drivers, or assumptions – that Stakeholders believe the Agencies should consider, not already explain in response to the preceding questions? Please explain in detail.

There are numerous factors that may contribute to ongoing risks for the deployment of renewable energy resources that should not be underestimated in the scenario planning of this study. These include federal actions that create significant uncertainty for wind, solar and storage resources, including, but not limited to, tariff costs, tax credit uncertainties, supply chain constraints, and federal reviews and permitting. Additionally, interconnection queue delays continue to be a significant barrier to bringing projects online at a reasonable timeframe.

[19] Final Order, Grain Belt Express LLC, CPCN Application, at 36 (Dt. 22-0499, Mar. 2023).