



**POWER  
WORKERS'  
UNION**

**July 14, 2021**

Independent Electricity System Operator  
1600-120 Adelaide Street West  
Toronto, ON  
M5H 1T1

Via email to [engagement@ieso.ca](mailto:engagement@ieso.ca)

**Re: June 2021 Hybrid Integration Project**

The Power Workers' Union ("PWU") represents a large portion of the employees working in Ontario's electricity industry. Attached please find a list of PWU employees.

The PWU appreciates the opportunity to provide input on the June 2021 Hybrid Integration Project engagement. The PWU is a strong supporter and advocate for the prudent and rational reform of Ontario's electricity sector and recognizes the importance of low-cost, low-carbon energy to the competitiveness of Ontario's economic sectors.

The PWU believes that IESO processes and initiatives should deliver energy at the lowest reasonable cost while stimulating job creation and growing the province's gross domestic product (GDP). We are respectfully submitting our detailed observations and recommendations.

We hope you will find the PWU's comments useful.

Yours very truly,

Jeff Parnell  
President

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Atlantic Power Corporation - Kapuskasing Power Plant  
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The Electrical Safety Authority  
Toronto Hydro  
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Westario Power

## **Power Worker's Union Submission to the IESO's June 2021 Hybrid Integration Project Engagement**

**July 14, 2021**

The Power Workers' Union (PWU) is pleased to submit comments and recommendations to the Independent Electricity System Operator (IESO) regarding the June 2021 webinar on the Hybrid Integration Project, which is part of the IESO'S Enabling Resources Initiative. The PWU is a strong supporter and advocate for the prudent and rational reform of Ontario's electricity sector and recognizes the importance of planning for low-carbon, low-cost energy solutions to enhance the competitiveness of Ontario's economic sectors.

The IESO's interest in hybrid resources stems from the need to fill Ontario's projected capacity gap that begins to emerge in 2026, following the closure of the Pickering Nuclear Generating Station (PNGS). The IESO has identified hybrid resources – integrated wind and solar plus storage – to provide firm capacity to the IESO Administered Markets (IAM). The IESO notes that this kind of hybrid resource is increasingly being used in markets across North America, particularly in California, Texas, and the Eastern U.S., all jurisdictions where the prevalence of natural gas-fired generation creates more favorable conditions for such hybrid resource configurations. Most of these resources are combinations of PV solar with battery storage. However, integrated, hybrid resources also involve other combinations including natural gas, wind, and pumped hydro.

The PWU appreciates the IESO's efforts to broaden the participation of a range of energy resources that can help meet Ontario's emerging capacity needs. This consultation is focused on how best to shape a vision for these resources to ensure Ontario's electricity needs are met reliably and economically.

The PWU recommends that the IESO should:

1. Validate the ability of hybrid resource configurations to economically supply peak demand;
2. Examine the potential investment interest of hybrid resources project developers to participate in the IAM, following the closure of the PNGS;
3. Determine the optimal use of energy storage; and
4. Consider alternative hybrid resource pairings such as nuclear and storage that can provide lower cost, longer duration capacity.

### **Recommendation #1: Validate the ability of hybrid resource configurations to economically supply peak demand.**

The IESO's current deratings for wind & solar may overstate their potential contribution in meeting peak demand, even when paired with storage. The methodology by which the capacity of these hybrid resources is derated must be reviewed and validated for the conditions present during times of peak demand in Ontario. An analysis of three years of Ontario data shows that, during times of summer peak electricity demand, the availability of the province's solar and wind capacity was just 3% and 7% respectively.<sup>1</sup> Battery storage can only firm up these resources to the extent that they are sufficiently charged to provide the required backup, which is unpredictable due to intermittency of solar and wind

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<sup>1</sup> Strapolec, Electricity Markets in Ontario: An Examination of Mismatched Conditions and Options for Future Competitive Procurements, 2020

resources. This is especially true for wind generation – its output is much more variable than that from solar generation. Simulations indicate that the addition of storage may only increase the availability of solar and wind output during peak to 40% and 9%, respectively.<sup>2</sup> Achieving a greater capacity contribution becomes less economic.

Ultimately, the value of integrated solutions that include wind and solar for meeting peak demands is subject to significant seasonal variation in their availability. The IESO's 2020 reliability outlook shows that the capacity contribution from solar generation approaches 0% value during winter months.<sup>3</sup> Similarly, wind resources contribute little to meeting summer peak needs. Furthermore, peak demand has shifted to later hours in the evening when solar output is decreasing. As a result, using storage to firm up the capacity shortfalls of these resources for only one season increases the cost of capacity. The IESO should validate the cost effectiveness of these hybrid resources to provide capacity during peak times.<sup>4</sup>

**Recommendation #2: Examine the potential investment interest of hybrid resources project developers to participate in the IAM, following the closure of the PNGS.**

The IESO has described the use of hybrid resources in U.S. markets. The prevalence of natural gas-fired generation in those markets creates more favorable conditions for such hybrid resource configurations. Ontario does not share the same market characteristics nor achieve the same efficiencies for the outputs from renewable generation. Analysis has shown that electricity markets support non-emitting resources only when there is sufficient natural gas in the market to set an economic price.<sup>5</sup> This condition is not currently present in Ontario and may not be present in the long term.

Nevertheless, Ontario intends to rely more on natural gas-fired generation to meet electricity demand when PNGS closes in 2026. This means natural gas-fired generation may set the marginal supply price the majority of the time. Under these circumstances, electricity markets may provide price signals to incentivize hybrid resources to compete in Ontario. Nevertheless, these circumstances may be of an insufficient duration to attract investments in the hybrid resources sought by the IESO.

The IESO 2020 Annual Planning Outlook (APO) indicates natural gas-fired generation and the associated emission consequences are expected to persist throughout the 20-year projection period. However, the PWU submits that IESO's forecast supply mix may not materialize given growing public concerns about climate change and related opposition to increased use of natural gas-fired electricity generation following the closure of the PNGS. The IESO is examining gas phase out scenarios, partially in response to requests by multiple Ontario municipalities.<sup>6</sup> Achieving a gas-phaseout by 2030 would leave hybrid resource developers only 5-years within which to recover their capital investments — from 2026, when PNGS retires, to 2030, when gas may not be reliably setting the market price. Without natural gas

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<sup>2</sup> Strapolec, Electricity Markets in Ontario: An Examination of Mismatched Conditions and Options for Future Competitive Procurements, 2020

<sup>3</sup> IESO, Reliability Outlook, 2020

<sup>4</sup> PWU submission to the MENDM on energy planning reform, 2021

<sup>5</sup> Strapolec, Electricity Markets in Ontario: An Examination of Mismatched Conditions and Options for Future Competitive Procurements, 2020

<sup>6</sup> IESO gas phase-out impact assessment

generation being on the margin, the market price will drop to zero or below, as it does in Ontario today for most hours of the year. Under such conditions, it is not clear whether investors would generate sufficient revenue from the market to warrant the investments.

**Recommendation #3: Determine the optimal use of energy storage.**

Storage is inherent to the definition of hybrid resources. The IESO's definition of hybrids co-locates storage near existing supply i.e., renewables, to firm their intermittent output. Alternatively, storage could be located close to loads and be re-charged using Ontario's available low-carbon baseload electricity e.g., nuclear. The IESO should determine for any given storage technology option, such as lithium-ion batteries, the scenarios in which the capacity is most cost-effective and delivers the most benefits to the system.

How the storage is used differentiates the scenarios. In an integrated hybrid system, storage capacity is used to backstop the output of intermittent resources and match variable demand. In a pure storage only scenario, the task is easier as it must only use its capacity to match variable demand. With this scenario, locating storage close to loads can provide several advantages: peaking capacity, reduced transmission and distribution costs; lower congestion; and demand response.<sup>7</sup> The capacity contribution at peak versus the capacity factor of the storage are performance metrics that affect cost. The greater the energy production capacity factor, the better the overall economics and the lower capacity cost for peak services. Analyses have demonstrated that storage is most cost-effective in providing system services when is located close to the load and leverages supply from Ontario's electricity grid.<sup>8</sup>

The IESO should make the cost-effectiveness of the alternate storage scenarios performance metrics a key element in developing the vision. This will ensure the most cost-effective investments are made to enhance system reliability and lower costs for ratepayers.

**Recommendation #4: Consider alternative hybrid resource pairings such as nuclear and storage that can provide lower cost, longer duration capacity.**

The IESO requested suggestions on possible resource combinations from a technology and storage-to-generation ratio perspective. The PWU recommends that the IESO consider nuclear with storage as an option.

Nuclear paired with storage can meet many of Ontario's electricity demands. Ontario's low-carbon baseload supply can be used to recharge EVs and storage capacity when demand is low, and this storage can in turn help meet peak demands. Pairing storage with nuclear facilities also provides additional flexibility, similar to that provided by gas-fired generation to meet intermediate demand.<sup>9</sup> Pairing nuclear and storage would improve their respective operating and cost parameters, making them attractive options for meeting Ontario's needs.

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<sup>7</sup> NREL, Grid-Scale Battery Storage, 2019. Retrieved from <https://www.nrel.gov/docs/fy19osti/74426.pdf>

<sup>8</sup> Strapolec, Distributed Energy Resources in Ontario: A Cost and Implications Assessment, 2018.

<sup>9</sup> Strapolec, Distributed Energy Resources in Ontario: A Cost and Implications Assessment, 2018.

## **Closing**

The PWU is supportive of IESO's efforts to integrate new types of resources in Ontario's electricity market to help meet emerging capacity needs and increase reliability. However, the current approach unnecessarily exposes Ontario consumers to high-cost electricity options.

The PWU has a successful track record of working with others in collaborative partnerships. We look forward to continuing to work with the IESO and other energy stakeholders to advance innovation across Ontario's electricity system. The PWU is committed to the following principles: Create opportunities for sustainable, high-pay, high-skill jobs; ensure reliable, affordable electricity; build economic growth for Ontario's communities; and promote intelligent reform of Ontario's energy policy.

We believe these recommendations are consistent with, and supportive of, the objectives for supplying low-cost and reliable electricity in Ontario. The PWU looks forward to discussing these comments in greater detail at the IESO's convenience.