Power Workers' Union Submission on IESO York Region NWA Demonstration Project EPRI Study
August 17, 2023

The Power Workers' Union (PWU) is pleased to submit comments and make recommendations to the Independent Electricity System Operator (IESO) regarding its July 27th York Region Non-Wires Alternatives (NWA) Demonstration Project webinar that discussed the draft Electricity Research Power Institute (EPRI) Distributed Energy Resources (DER) Scenarios and Modelling Study findings. The PWU remains a strong supporter and advocate for the prudent and rational reform of Ontario's electricity sector and recognizes the importance of planning for low-cost, low-carbon energy solutions to enhance the competitiveness of Ontario's economy.

Context

The two-year York Region NWA project is intended to help inform DER integration into a local distribution system market for meeting local reliability needs and or to defer or avoid transmission and/or distribution infrastructure upgrades, thereby reducing total system costs. The EPRI study focused on how distribution services for capacity deferral, congestion management and local reserves could work in tandem with the bulk system capacity, energy and reserve capacity services in the IESO administered markets (IAMs). This integrating coordination underpins the value of the Distribution System Operator (DSO) market function concept. EPRI noted that accomplishing this outcome requires that DERs are available to reliably deliver the services they commit to, e.g., if committed to provide reserve capacity, the DER must have the capacity to provide the additional generation if called upon.

The EPRI study focussed on dispatchable assets, notably storage, but could also include thermal units such as the CHP and Behind-The-Meter (BTM) gas-fired generation that was procured in the 2020 York Region NWA capacity auction.[1] It should be noted that while not selected in 2020, storage was eventually procured in the 2021 capacity auction for the demonstration project, displacing other 2020 procured resources. The EPRI discussion at the webinar focussed on the value of DERs for meeting system peak needs.

The PWU is generally supportive of any initiative that is intended to procure the lowest cost option for supplying reliable electricity to Ontario. As noted in past PWU submissions, procuring reliability at the lowest cost can only be met if there is an objective, fact-based analysis of the total system costs and benefits of the options available.[2]

Implications of Key Findings

Complexity

- EPRI noted that the coordination and information exchange for the DSO models could be complex, particularly for aggregated DERs.
- Reliable knowledge of non-dispatched normal DER behavior is required. This assumes that the DER is performing some function on its own in addition to the services offered at peak times.
    - Careful coordination required in off peak conditions to avoid overloads in reverse flow.

[1] IESO presentation to the OEB FEIWG, July 2021.
[2] PWU, IESO York Region Non-Wires Alternatives Demonstration Project and Innovation and Sector Evolution White Papers Submission, 2020.

Dispatchable assets

- EPRI only considered reliably dispatchable assets.
    - Weather dependent assets such as wind and solar were not considered and would require a different assessment.

Impact measured at the Transmission-Distribution Interface

- EPRI considered the impacts presented at the T-D interface: Total MW of capacity; loss avoidance; thermal constraints; and voltage disruptions.
    - EPRI's findings suggest marginal incremental value versus locating a large generator in the Dx side of the T-D interface. EPRI commented that the Alectra feeders analyzed were robustly built and hence operational benefits of DER were minimal (other than capacity and energy).
    - During the "market offers management" discussion it was noted that the value of DER is likely feeder dependent – adding further complexity to the management of DSO market activities.

Scale required

- For material benefits to arise, significant scale e.g., aggregation would be required. EPRI noted that residential storage would not provide enough aggregate energy.

The IESO's Questions

1. What do you see as the benefits and challenges associated with DERs "stacking" distribution and wholesale services?
2. In your assessment, how significant is the opportunity to use DER as NWA (i.e., providing distribution services to defer traditional distribution investments)?
    - What do you expect the scale and pace to be?
3. Do the protocols outlined in the study provide sufficient detail and clarity in order to further evaluate the coordination models?
    - What additional details and/or protocols (if any) would be beneficial?
4. Does the study's modelling component provide sufficient assurance of the feasibility of using DER for distribution and wholesale services?
    - What additional modelling (if any) would be beneficial?

Challenges for the IESO

The PWU has identified several challenges to DERs in a DSO and/or IAMs and offers the following observations regarding the above noted questions.

1. Stacked distribution and wholesale services *provide MARGINAL value* to the electricity system.
    - There is no evidence that DERs, in general, offer a positive benefit that would warrant the use of the DSO model.
    - The EPRI analysis established that the value is primarily provided by the capacity:
        - Most system value can be delivered by a large installation within an LDC service area; and
        - The IESO has not yet identified any meaningful opportunities for DERs as NWAs in its Integrated Regional Resource Plans.
    - While conceptually conceivable that new DER capacity within an LDC could enhance capacity benefits, including capacity deferral, such a case has not yet been established. The PWU's

previous submission to the York NWA project recommended a full assessment of the costs and benefits of such options.[3]

- The OEB Framework for Energy Innovation Working Group (FEIWG) established the clear need for a benefit cost analysis (BCA) or business case to be developed when DER is considered as a solution to Dx or system needs.[4]
- The PWU has provided an extensive and detailed overview of the values to be included in such a benefit cost analysis and the role that the BCA should play in the overall planning processes for Ontario's electricity system.[5]

2. The opportunity to use DER as NWA is ***NOT*** sufficiently significant to warrant a DSO model.
   - The IESO commissioned the DER Potential Study, which purports that DER has the potential to supply up to 10 GW of capacity. Analyses show that this amount is clearly overstated.
   - PWU submissions on the results of the DER Potential Study have supported this conclusion on the following grounds[6]:
     - The most value was evident for small scale residential and commercial BTM solutions, which the EPRI analysis suggests would be too hard to aggregate;
     - The role of the OEB and other rate programs should be explored before the IESO pursues any IAM solutions;
     - The assumptions for the accelerated scenario were contrived and are now unfounded given the IESO's procurement plans for grid connects, storage and new gas assets; and,
     - Solar is ill-suited as EPRI has indicated and would require a different approach, including storage as backup.
   - LDCs should be required to transparently assess whether a DER option can cost-effectively meet its needs in accordance with the above noted PWU comments and the findings identified by the OEB's FEIWG.
3. The protocols identified in the EPRI presentation do ***NOT*** provide sufficient detail and clarity to advance the evaluation of the considered coordination models. For example:
   - The process is not defined for informing the DSO/LDC of the normal behaviors of installed DERs;
   - The process to accommodate feeder specific values in bulk system bids was identified as a challenge with no evident practical solution; and,
   - The limited cost-effective opportunity for DERs strongly suggests that investments in a DSO model would not be in the best interest of rate payers.
4. The study's modelling does ***NOT*** provide sufficient assurance of the feasibility of using DER for distribution and wholesale services.
   - The EPRI study showed that for the feeder examples used, DER provided little additional value beyond capacity. There was no identification of a need to dispatch such DERs at times other than for system peaks.
   - Transparent assessments of the anticipated deployments of DER and other demand side management technologies within Ontario should be a prerequisite.

[3] PWU submission to the IESO on the York Region NWA Demonstration Project, August 2021.
[4] OEB FEIWG final report, June 2022.
[5] PWU submission to the OEB on Considerations for Developing a DER BCA Framework, January 2023.
[6] PWU submission to the IESO on the DER Potential Study, October 2022.

        - The PWU has consistently advocated that the most cost-effective way to advance DER integration into Ontario's electricity system is via rate programs not the IAMs or a DSO model.
    - There are three large potential opportunities:
        - *Bidirectional EV charging* in a Vehicle to Building (V2B) scenario without grid connection
            - Combined with ultra-low rate programs V2B could help smooth a significant amount of demand from daytime to nighttime and encourage EV owners to use power from their EVs during the peak evening hours.
            - GM will be providing V2B capabilities in most of its future models.[7]
        - *Dual fuel heat pumps*, will provide natural gas for backup to anticipated peak heating demands. Currently, a pilot project is underway in Peterborough. [8]
        - *The advent of the hydrogen economy* driven by Ontario's Hydrogen Strategy could result in an electrolysis-based, regionally distributed, demand response capability enabled by the new interruptible rate program. In future, this could help displace the need for gas-fired generation while achieving a significant rate reduction for the province.[9]
    - The 2500 MW of storage currently being procured by the IESO and the potential for future procurement will significantly impact Ontario's need for DERs going forward. With robust and transparent integrated planning, as recommended by the PWU to the OEB as noted above, these capacities could be selected to optimize the benefits for LDCs.
    - The net benefits of these three options include:[10]
        - more investment in cost-effective, low-carbon bulk electricity supply;
        - increased capacity utilization of Dx and Tx networks;
        - additional time for the Dx and Tx system upgrades to be scaled up to the anticipated demands in 2050; and,
        - lower electricity rates than today.

The IESO should consider how the multiple rate programs and other government incentives will increase the pace of emissions reduction technology adoption of emission reducing technologies e.g., EVs, heat pumps and use of hydrogen. These innovations may be very prevalent in the marketplace before the IESO's Market Renewal initiatives are sufficiently advanced to cost-effectively accommodate DERs and any new DSO models.

These technologies will have peak smoothing behaviors that will significantly impact Dx and Tx networks and the benefits of additional markets-based DER programs. This potential undermines the merits of a DSO model, much like they have undermined the assumptions and recommendations of the IESO's DER Potential Study.

[7] GM Unveils New Vehicle-To-Home EV Charging, But What About The Bolt?, Clean Technica, Aug 8, 2023. EVs will bring 'unprecedented' power demand, but their flexibility can improve grid reliability, utilities say, Utility Dive, Jul 25, 2023.
[8] https://news.ontario.ca/en/release/1002324/ontario-launches-clean-home-heating-initiative
[9] Ontario's Low-Carbon Hydrogen Strategy - A PATH FORWARD, April 2022.
[10] Strategic Policy Economics, Electrification Pathways for Ontario, 2021.

Closing

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 strengthen and modernize Ontario's electricity system. The PWU is committed to the following principles: Create opportunities for sustainable, high-pay, high-skill jobs; ensure reliable, affordable, environmentally responsible 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 Ontario's objectives to supply low-cost and reliable electricity for all Ontarians. The PWU looks forward to discussing these comments in greater detail with the IESO and participating in the ongoing stakeholder engagements.