

**Written Statement of Peter Gregg
President and Chief Executive Officer
Independent Electricity System Operator
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Good afternoon Chairman McIntyre, and Commissioners Chatterjee, LaFleur and Powelson. Thank you for the opportunity to speak today about some of the ways the IESO is contributing to the reliability of the North American bulk power system and the North American Electric Reliability Corporation and regional entities.

As the system operator for Ontario, the Independent Electricity System Operator (“IESO”) is responsible for reliability coordination, balancing supply and demand, transmission operations, planning along with administering and settling the wholesale market. The IESO also plans for and competitively acquires resources, as well as guides conservation efforts in Ontario. The reliability of Ontario’s power system benefits from being interconnected with our neighbours both in Canada and the U.S, such as Manitoba, Quebec, New York, Michigan and Minnesota. The IESO works with system operators in these other jurisdictions to ensure energy adequacy and reliability across the northeastern part of the continent.

I am pleased to be here today to speak about how the IESO is not only adapting to but embracing the unprecedented transformation of the electricity sector in Ontario, especially around emerging technologies, the growth of distributed energy resources (DERs), the increasing role of storage providers and – partially as a result of these changes – our efforts to redesign the wholesale electricity market.

In the past decade, Ontario has seen its supply mix drastically change – coal-fired generation has been phased out; wind and solar generation have joined the provincial supply mix; and new types of demand response and storage resources are helping meet the province's electricity needs.

When it comes to distributed energy resources, Ontario has more than 3,300 MW of generation capacity within its local distribution systems – almost 10 per cent of Ontario’s installed capacity. More than half of this generation capacity is from solar facilities (62 per cent). Wind resources comprise 18 per cent of that total. Hydro and natural gas (both combined heat and power and combined cycle and simple cycle), each contributes 8 per cent, and bio energy accounts for 3 per cent of capacity.

DERs represent new opportunities and challenges for the electricity sector. DERs can offer greater customer choice – through the IESO’s regional planning process, some communities have expressed a preference for DERs to address regional demand growth or to replace aging assets. DERs may also

present opportunities to optimize overall system (both transmission and distribution) investments and provide a range of grid services.

However, increasing DERs creates a more decentralized electricity system and changes the traditional dynamic between local distribution systems and broader transmission system. This creates a need to understand the impact on the transmission-distribution interface, which the IESO, local distribution companies, and other stakeholders are exploring through the Grid-LDC Interoperability Standing Committee. Collaboration is required to ensure the IESO can effectively forecast DER activity, benefit from the provision of reliability services, and explore opportunities to incorporate them into electricity markets.

Understanding that the role of storage will only increase and knowing the important role it can play in the reliability of the grid, in 2014 the IESO issued two Request For Proposals for a cumulative capacity of 50 MW of storage.

The first RFP (distribution connected resources) looked for technologies that could offer ancillary services to the grid: reactive support, voltage control and regulation service. The second RFP sought storage technologies with a range of performance characteristics that can benefit from arbitrage – storing energy when prices are lower and re-injecting it at times of the day when prices are higher.

In response to these RFPs, as of May 2018, seven storage facilities have completed commissioning and become operational at several distribution connected locations across Ontario. Five of the facilities are providing reactive support and voltage control services, and two are offering regulation service.

Separately, the IESO is also seeking to increase regulation to help manage second-to-second balancing needs and improve our minute-to-minute operational flexibility. Two energy storage facilities that rely on battery technologies were the most economic new resources and together will provide 55 megawatts of regulation service – again connected to the distribution system.

So it's clear, storage is becoming a full player in the marketplace, adding to the arsenal of tools to meet our reliability requirements.

Moving to the technical considerations for DER, the growing role of DERs was the catalyst behind stakeholder development of the IEEE standard IEEE-1547-2003. It established the technical standards for interconnecting DERs, focusing on the technical specifications for, and testing of, the interconnection and interoperability between the electricity system and DERs. The IESO is in the process of further assessing the application of IEEE 1547-2018 in Ontario and exploring the need for more specific distribution requirements to maintain bulk electric system reliability in light of larger penetration of DERs. Ontario's transmission connection requirements have resulted in transmission resources that are designed and tested to ride through a "Blue Cut" event.

As the operators and, more important, the trustees of the reliability of the North American power system, we can never rest on our laurels. The challenges are only going to increase with innovative thinkers creating new technologies or adapting existing ones and applying them to our power system in ways we had never envisioned.

This will require us to continue to work together to ensure that the electricity grid is robust, resilient, and adaptive to the changing landscape.

As the sector evolves, so too must markets. As previously mentioned, when the current Ontario electricity market opened in 2002, the electricity landscape looked very different.

While our supply mix has evolved significantly over the last 15 years, Ontario is in a stable supply situation that is expected to continue into the mid-2020s. Even with stable supply and demand, our sector is becoming more complex than ever before.

That's why, with the benefit of a decade of experience with wholesale markets and the lessons learned in other jurisdictions, the IESO is introducing structural changes to the province's electricity markets.

In a collaborative process involving our stakeholders from across the sector, our efforts to renew the market will address inefficiencies and improve the way capacity and energy is priced, scheduled and acquired. The objective is to create a more efficient, stable marketplace with competitive and transparent mechanisms that have the flexibility to adapt to sector change and meet system and stakeholder needs at the lowest costs.

The specific initiatives of the project include the enhancement/development of a single schedule market, a day-ahead market, an enhanced real-time unit commitment mechanism and an incremental capacity auction. Once complete, the renewed marketplace will allow for even greater participation in the market by a wide range of resources, including distributed energy and storage.

We are creating a marketplace where we can manage an increasingly complicated sector more effectively and efficiently. The work we have begun with stakeholders will improve our existing markets focused on the principles that reduces waste; lowers costs; creates more opportunities and certainty for system participants; and, most important, ensures that the province is prepared to meet future electricity needs reliably.

Cybersecurity also plays a key role in the IESO's maintenance and safe operation of the power grid and ensuring a reliable supply of electricity for Ontarians. We continue to strengthen the organization's security posture and ensure compliance while supporting innovation and capacity building in the field of cyber threat management. And, most important for an audience that represents organizations from all parts of the sector across the continent, the IESO is expanding and collaborating on cyber defense by

building and strengthening partnerships and bringing together the world's leading cybersecurity policy experts to stay up to date on best practices and trends in the emerging cyber-threat landscape.

The reliability of our individual power systems benefits from and depends on us being interconnected at the transmission level all the way to forums like the one today. I would like to thank the commissioners for their ongoing support and for providing us with opportunities such as this to dialogue and work together to enhance the reliability of the interconnected bulk electric system.