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On Behalf of the Canadian Electricity Association
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Good afternoon Acting Chairman LaFleur and Commissioner Honorable. Thank you for the opportunity to speak today on policy issues related to the reliability of the North American Bulk Power System.

My name is Sylvain Clermont and I currently serve as Director, Reliability Standards and Regulatory Compliance for Hydro-Québec TransÉnergie ("HQT"). HQT is the transmission division of Hydro-Québec, a vertically-integrated Crown corporation responsible for the generation, transmission and distribution of electricity in the Canadian province of Québec. HQT operates the most extensive transmission system in any North American jurisdiction, including 17 interconnections with the neighboring provinces of Ontario and New Brunswick, and with the Northeastern United States. Its 735 kV AC Network was recognized as a technical milestone in electrical engineering in 2005 by the Electrical Engineer Society.

I am appearing today on behalf of the Canadian Electricity Association ("CEA"), the national forum and voice of Canada's electricity industry. Every day, CEA members generate, transmit, distribute and market electric energy to industrial, commercial and residential customers across Canada and into the United States.

CEA's diverse membership includes integrated electric utilities, independent power producers (several of which also own assets in the United States), transmission and distribution companies, power marketers, manufacturers and suppliers of materials, technology, and services that keep the industry running smoothly.

Canadians and Americans share custody of a highly-integrated electric grid, linked by over 35 cross-border transmission lines. This interconnected grid has provided indispensable social, environmental and economic benefits to both the United States and Canada for over 100 years. It has also drawn our two countries together in common purpose. For example, Canadian stakeholders work together with our

American counterparts every day to ensure the success of the internationally-focused North American Electric Reliability Corporation ("NERC"), assuring the reliability and security of the bulk power system in North America.

Thus, as we discuss the reliability of the Bulk Power System, we must remember that the North American nature of the grid means that no one stakeholder, government department, or nation can pursue grid reliability or security solutions in isolation. Instead, our shared electric system requires solutions based on a foundation of continued and deepened North American partnership and collaboration.

It is in this spirit that I offer my thoughts on the following three specific topics of this panel: electromagnetic pulse ("EMP"); emerging hazards that could have severe and lasting impacts on the Bulk Power System; and grid resilience.

First, the electricity industry takes an 'all-hazards' approach to the resiliency and reliability of the electric grid, and EMP is one of the many risks to the grid that industry is examining. While the probability of an EMP incident remains low, the impact of a major EMP event could be high. Understanding this low probability/high risk dynamic, Public Safety Canada has released guidelines focused on EMP and geomagnetic disturbance ("GMD") operational readiness.

At this point in time, the impacts of an EMP attack are not yet fully understood. Unlike GMD events, where effects can be studied, expertise can be gained, and solutions can be developed through operating experience and observation during relatively minor solar storms, the impacts of a large-scale EMP attack cannot be practically assessed. To deepen our collective understanding, the Canadian electricity sector supports continued EMP related research and investigation, both in terms of system hardening options and service restoration protocols.

The good work already being done to study EMP by industry and industry groups, such as the multi-year study currently underway by the Electric Power Research Institute ("EPRI"), should be recognized by the Commission. While the EPRI study is focused on U.S. systems, Canadian companies are members of EPRI and will learn from and build upon the findings of this project. Governments and regulators should leverage ongoing efforts, and seek opportunity to work and share information with industry.

As more is learned about the EMP threat and its possible impacts, research and information must gradually be translated into operational protocol and investment

allowing regulators and industry to make informed decisions. Consideration to cost effectiveness and cost/risk analysis must be part of the decision. The right balance must be struck between possibly substantial investment and risk reduction.

Second, in regards to emerging hazards that could have severe and lasting impacts on the Bulk Power System, and issues industry could face when bringing back the Bulk Power System from an extended blackout, there are a few issues to highlight.

At top of mind is cybersecurity. Although this issue is already being addressed, it is an evolving threat. It is also one Canadian companies take very seriously. CEA members fully understand that cyber crime has regrettably become a growth industry, and therefore requires a dedicated, ongoing and evolving strategy to combat the threat. This commitment fundamentally recognizes that an indispensable line of defense is in the sharing of information and in company-to-company collaboration.

As cyber-threats evolve and grow, it is imperative that they continue to constitute a very high priority for our industry and for governments. Recent positive Canadian cybersecurity initiatives include the Canadian Cyber Threat Exchange (CCTX) which, launched in early 2016 by some of the largest firms in Canada, is a new hub for automated sharing of cyber threat information between the private sector and government, and across all infrastructure sectors.

Also of note is the recent Communications Security Establishment/CEA information sharing agreement, which will give Canadian participants cyber threat information from the signals intelligence community, and the review completed by the Government of Canada regarding its approach to cyber security, which will result in the release in the coming month of a new Canadian cyber security strategy.

Another key issue is the impact of more frequent and more severe weather related disruptions to the network. While it is nearly impossible to forecast these extreme weather events, studying and understanding changing weather patterns is worth investing in. Further, regulators and industry have learned from past experiences, and must continue to do so.

In my company, for example, we have applied and are continuing to adapt the lessons learned from the 1998 ice storm that struck down a sizeable part of our transmission and distribution grid. Following the storm, the plan to make the grid more secure and more resistant in case of widespread severe weather events had

specific and measurable objectives. It included a detailed review of the various transmission corridors and critical substation, and of supply chain management and inventory of critical spare parts.

Some examples of actions and changes to our network include:

- Raising some design criteria for new lines
- Adding stronger structures in key points
- More looping in the transmission grid to ensure critical substation are connected to more than one line.
- Use of remedial action schemes

This example contains broadly applicable lessons to improve resiliency: hardening where it makes sense, access to critical spare parts, and access to mutual assistance. Industry has been taking and continues to take similar actions to improve resiliency. Regulators should support these efforts.

In this regard, the electricity industry understands the critical importance of both physical and cyber mutual assistance programs, and of equipment sharing programs. We support continued efforts to expand on these initiatives, including working with other sectors to develop best practices and operational procedures. In the case of an extended blackout, it is imperative that governments and regulators help facilitate the efficient movement of mutual assistance personnel and equipment across the Canada-U.S. border, and ensure timely and responsible information sharing, and coordinated emergency and restoration plans.

Third and lastly, the value of cross-border partnership and collaboration as it relates to grid resilience should be strengthened and encouraged. We know that cyber threats, and often physical threats such as extreme weather, do not recognize borders. As legislators and regulators seek to address grid reliability, resiliency and security challenges, sustained vigilance is required to ensure that a continental lens is applied to grid management, and that industry is considered a full partner, so that solutions are as effective as they can be.

As such, CEA wishes to reaffirm its commitment to the continued success of vital forums like NERC and the Electricity Subsector Coordinating Council ("ESCC"). Canadian stakeholders remain engaged in numerous ESCC work streams which have direct cross-border relevance. These include efforts to expand mutual assistance programs and transformer transportation contingency planning, and efforts to position the Electricity Information Sharing and Analysis Center ("E-

ISAC") as an indispensable hub of electricity sector information sharing within North America. Programs such as these can play an essential role, in that in the case of a prolonged blackout, all stakeholders can take coordinated, appropriate and effective action to restore power to the shared grid.

The Commission should also be aware of the value of grid resiliency and security forums, such as NERC's GridSecCon, which was hosted in Quebec in Canada last year, and exercises such as the GridEx series. Industry and government in both Canada and the U.S. are currently preparing for GridEx IV in November 2017. CEA's fall Board Meeting of its member CEOs is being structured around this exercise.

The Joint U.S. Canada Electric Grid Security and Resilience Strategy which aims to enhance a shared approach to risk management for the electric grid in the face of adversarial, technological and natural threats also offers opportunities to pursue North American solutions. CEA believes there is particular room for Canadian and American officials to build on this Strategy in areas of cyber security and the development of integrated, cross-border incident response plans for security threats.

Finally, CEA would argue that the international electric reliability model has proven to be successful because the solutions developed consider the interconnectedness of the North American grid from the outset. Reliably planning and operating the bulk-power system is a highly complex and technical enterprise, which demands the collaboration and support of numerous entities in both countries working across borders. The NERC model brings together the right experts from the right organizations, and produces outputs that are widely supported and effective.

NERC has continuously demonstrated its unique capability to facilitate this collaboration and to administer a robust, inclusive standards development process, under the rigorous oversight of applicable government authorities across North America. Evidence attesting to this success is evident from the sustained levels of high Bulk Power System reliability performance.

As FERC seeks to find ways to continue to ensure the reliability of the Bulk Power System, CEA would also offer that while standards are important tools in ensuring reliability, they are not the sole means to mitigate risk. Non-standards-based products, such as best-practice guidelines, also have an important place in the tool-box, and forums such as the North American Transmission Forum play an essential

role in disseminating lessons learned and allowing industry to have frank and open information exchanges.

In summary, CEA wishes to thank the Commissioners for their ongoing support for the value that U.S.-Canada electric integration brings to electric reliability, affordability and sustainability. CEA urges the Commission to seek to continue strengthening its engagement with Canadian counterparts and to bear in mind that many of its directives have impacts in Canada due to the interconnected, international nature of the grid.