ONTARIO SOCIETY OF PROFESSIONAL ENGINEERS

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Call for Information Response: Assessing Regulatory, Policy and Market Impacts On Canada's Electricity Grid Modernization

The Ontario Society of Professional Engineers (OSPE) is the advocacy body and voice of the engineering profession. Ontario currently has over 85,000 professional engineers, 250,000 engineering graduates, 6,600 engineering post-graduate students and 37,000 engineering undergraduate students. The engineering profession's commitment to safeguarding the public interest has always been extremely important, and in these times, there is no exception.

We are pleased to respond to Natural Resources Canada (NRCan)'s Request for Information (RFI) regarding regulatory, policy and market barriers and opportunities. OSPE's network of engineers includes experts in all disciplines of engineering. This response is a collaboration from members of our Climate Crisis Task Force and Energy Task Force.

Barriers And Opportunities That Are of Regulatory or Policy Nature

There are multiple areas of opportunity that exist in Federal and Provincial jurisdictions. Below is a compilation of recommendations from subject matter experts and members of OSPE's Climate Crisis Task Force and Energy Task Force.

Policy Opportunities

- Building heating in urban areas will be less costly if the policies encourage the development of integrated clean district energy systems, including clean combined heat and power, as is now being developed in many European cities that use district energy systems. This is especially important with the increasing number of large data centres (which produce waste heat) and recent developments in passively safe modular nuclear reactors (which can supply both electricity and heat, and can be located closer to urban centres.) Clean reliable heat is much cheaper to produce than clean reliable electricity on a unit energy basis.

- Retail pricing policies discourage the use of surplus clean energy during off-peak periods, because the retail volumetric price set by provincial regulators is several times higher than the actual marginal cost of producing additional clean energy. Without domestic demand, surplus clean energy is curtailed or sold to adjoining US markets at very low marginal costs of production, without recovering any fixed costs. Fixed costs need to be recovered through a different mechanism than volumetric energy rates.

- Continuing to fund decarbonization and electrification equipment for homes (including energy efficiency/ conservation measures, insulation, heat pumps, Distributed Energy Resources (DER), storage) will support DER adoption and help mitigate the impacts of electrification for homes.

National energy policies should encourage the adoption of clean technology innovation, support commercialization, and promote mass deployment of scalable and cost-competitive solutions. To sustain Canada's reliance on global trade, it is crucial to uphold competitive energy prices. Furthermore, to maintain its status as a frontrunner in the field of clean energy, it is imperative to refrain from selecting costly alternatives.

Regulatory Opportunities

- As residential and commercial customers become prosumers, providing services to the grid, regulatory frameworks should increase incentives for them to benefit from decentralization actions. At the same time, utilities will need to be supported in their regulatory model for helping engage customers on these projects.

- Currently, electric vehicles (EVs) are not being utilized for grid services due to the risk of voiding the battery warranty. To overcome this hurdle and further the advancement of EV technology, either the owner or the manufacturer must receive compensation. Installing behind-the-meter systems may not be a financially viable option for the average homeowner in Ontario. Moreover, the benefits of net metering are limited when compared to the associated capital costs.

Market Opportunities

- To accelerate electrification and grid modernization, appropriate cost sharing is crucial to prevent electricity prices from increasing to a point where costs hamper progress. The transition to clean energy should not be solely borne by the ratepayer. Federal funding, in addition to provincial funding, can help accelerate investment and facilitate the transition.

- The electrification of light vehicles in urban areas is cost-competitive; however, heavy-duty vehicles, off-road vehicles and construction equipment are not viable solutions at present. Synthetic, emission-free liquid fuels are a more practical option in these cases. If synthetic liquid fuels become available for this sector, they can also complement air-sourced heat pumps for building heating in rural areas on very cold days. We already have an extensive distribution system for liquid fuels, so we should leverage that asset rather than retire it. According to recent research conducted at MIT, it is possible to produce net-zero synthetic liquid fuels on a large scale in refineries using biomass waste, nuclear reactor-generated heat, and hydrogen obtained through steam methane reforming. The process includes carbon capture and storage, all at a competitive cost of 80 US dollars per barrel, equivalent to crude oil prices.

- Clean energy is capital-intensive, with high fixed cost and low volumetric cost, which is the opposite of high-emission energy. The province's energy policies have evolved from when we relied on high-emission energy sources with lower capital costs and much higher volumetric costs. Ontario's current energy policies mandate retail energy pricing that recovers costs based on volume of energy used. This discourages clean energy development and encourages continued high-emission energy use.

- Energy efficiency and conservation technologies can offer cost-competitive solutions to reduce emissions in all sectors and should always be considered. A kWh or BTU saved is a unit of energy that does not have to be produced and transmitted.

Tools, Services and Resources To Integrate

To ease financial burdens and encourage public agreement, Canada has a range of tools at its disposal, which include the following:

- Developing a simplified coordinated process for joint federal and provincial environmental assessments and regulatory approvals for projects such as new nuclear generation and inter-provincial transmission lines. Early approval of potential sites should be considered to reduce implementation times and investment uncertainty.
- Considering sites ahead of time and engaging with communities earlier will prevent delays when projects are needed. Streamlined approvals will be more attractive when Canada is competing with other jurisdictions.

- Increasing education for the public on electrification, DER, storage and other technologies, as well as life-cycle cost, maintenance would be beneficial. This could include videos and testimonials for others who own technologies. Educating the public on the total utility cost after electrification is critical, as while electrical bills will increase, natural gas and other bills will be eliminated.

- Increasing education for decision-makers in communities to help support necessary projects based on facts about actual impacts and benefits.

- Establishing a funding program for grid modernization projects, such as advances in the control room (new tools to integrate new loads and variable resources like wind).

- Continuing funding support to keep Canada an attractive place for clean energy investments, as we continue to compete with the Inflation Reduction Act (IRA) in the US.

- Supporting pilot programming for innovative smart grid ideas, such as demand response using electric heaters in Hawaii. (More information can be found here.)

- Implementing a “hybrid” solution, much like those in HVAC systems, can be implemented in Canada using small solar PV installations to reduce peak heating loads. PV heating of water leads to energy storage in hot water “battery”, which can also be used in the summer to reduce peak cooling loads.

- In commercial and residential spaces, using a combination of existing heating systems, such as natural gas, propane, and heating oil, can be augmented with heat pumps to reduce Green House Gas emissions by up to 70 per cent while reducing peak electrical demand. This takes advantage of the existing heating infrastructure and offers dual-fuel resiliency along with peak heating load reduction.

- Efforts should be made to properly insulate both existing building infrastructure and new constructions as a well-designed building envelope can significantly reduce energy demand. This can be achieved by providing necessary assistance for insulation measures.

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OSPE’s network of professionals comprises data-driven, practical engineers who thrive in their respective sectors. We welcome the opportunity to meet with you and your office for further discussion regarding this and future matters. Should you need more information, please contact advocacy@ospe.on.ca.