Artificial Intelligence

Electricity Canada's submission to the Standing Committee on Science and Research (SRSR)

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Questions concerning this submission can be directed to:
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Dear members of the Standing Committee of Science and Research:

On behalf of Electricity Canada and its members, I would like to thank the Standing Committee on Science and Research for the opportunity to submit comments to the committee study on Artificial Intelligence.

Electricity Canada is the national voice of Canada's evolving and innovative electricity business. Our members generate, transmit, distribute and market electric energy to industrial, commercial and residential customers in every province and territory across Canada and into the U.S. every day. Members include integrated electric utilities, independent power producers, transmission and distribution companies, power marketers, and system operators. Our 40+ members have been at the forefront of the most significant clean energy initiatives over the past 25 years, delivering affordable, reliable and low-emission power to Canadians from coast to coast to coast.

Data centres, the facilities that power artificial intelligence, are powered in turn by electricity. Data centres are major electricity consumers, equal to or potentially exceeding the electricity demand from large industrial facilities like aluminum smelters. Serving more of these high-demand facilities will require more electricity generation capacity, as well as more dedicated infrastructure like transmission lines and substations.

Canada's electricity system is already undergoing unprecedented changes. After decades of nearly flat electricity demand growth, electricity consumption in Canada is accelerating rapidly. By 2050, the grid is expected to double or triple in size, from 600 TWh/year to over 1200 TWh/year due to increased demand from all sectors of the economy. The data centres that enable AI will further increase the demand on the power grid.

Supporting Canada's AI ambition will require a rapid buildout of critical electricity infrastructure. To build enough infrastructure to power AI as well as other parts of our economy, the electricity sector will need support from the federal government to streamline permitting processes, reduce regulatory barriers, coordinate with provinces, territories and key stakeholders and rights holders, and ensure programs and funding tools are tailored for rapid deployment at scale.

The foundation of Canada's AI development is Canada's clean, affordable and reliable electricity grid. We appreciate this opportunity to provide our feedback and advice on leveraging our clean electricity advantage to support Canada's prosperity.

Electricity is the Fundamental Constraint for AI

AI, and all data centre operations, are completely dependent on access to power. In industry parlance, the the computational ability that can be deployed by a data centre is known as "compute". **Electricity is the fundamental constraint on compute.** Data centre operators increasingly measure the capacity of a facility by its electricity supply, because power availability determines the upper bound of computational capacity that a data centre can offer.

Power consumption for AI tools can consume an order of magnitude more electricity than traditional data centre operations. A query on a tool such as ChatGPT can use ten times more electricity than a traditional web search. This translates to increased demand at AI data centres: Electricity demand at newer data centres can range from fifty to several hundred megawatts (MW). The largest planned facilities will reqire over one gigawatt (GW). A single large facility in Tennessee and Mississippi employs 460 MW of onsite natural gas-fired electricity generation, in addition to a grid connection, and that is less than half of its planned electricity demand.

This increased demand is already apparent in Canada: The Canada Energy Regulator (CER) expects that data centre power demand will reach an annual growth rate of nine per cent, 1.16 gigawatts (GW) by the end of the decade.

If Canada is to be a leader in AI, we must be able to build generation, transmission and distribution infrastructure sufficient to serve several gigawatts of electricity to data centres across the country in a short period of time.

AI and electricity infrastructure must be considered together

We note that there are currently no representatives from the electricity sector on the federal AI Taskforce. We also note that there was no option to identify as a representative from the electricity sector in the Department's online portal submission form for this consultation.

The absence of electricity sector expertise risks misalignment between growing Canada's AI capacity and electricity supply. This has the potential to lead to higher costs, ballooning electricity prices, constrained development of AI infrastructure and missed opportunities for Canadian leadership in energy and AI.

Including electricity sector expertise on the Taskforce will help to ensure that the single most important input to data centre operation – reliable electricity supply – is fully considered and supported.

Policy must enable the electricity infrastructure to support AI development

More electricity generation, transmission and distribution infrastructure will be needed to support AI investments in Canada.

Generation and transmission assets must go through five or ten years of successive permitting, approval, and consultation processes before construction can begin. This is not in line with the speed and ambition necessary to support Canada's overall economic growth, let alone its desire for AI leadership. The outcomes of permitting and approval processes – mainly, supporting environmental and social outcomes and mitigating risk – must be done at a far faster rate.

This is well-understood at the international level. Canada's permitting regime is one of the slowest in the OECD and Canada has earned a reputation at home and abroad as a jurisdiction that is "too difficult" to invest in. It will take a sustained commitment to making faster decisions to change that perception and deliver on national ambitions around energy development, AI and overall economic growth.

Canada must leverage its reliable and low-cost energy resources to meet the unprecedented energy needs of AI and the modern economy. This requires taking an "all of the above" approach to electricity generation, including hydroelectricity, natural gas-fired generation, intermittent renewables and nuclear power.

With extensive nuclear expertise and a leading uranium mining sector, nuclear power is a competitive advantage for Canada as well as a federally regulated industry. Working with provinces to support new nuclear development will help to supply more clean, reliable power across the country.

AI leadership is dependent on access to reliable and affordable power. Canada must align its permitting and approvals processes with its AI ambitions.

Finally, electricity infrastructure also includes the software and analytics tools that help manage the demands of rapidly evolving electricity grids. Regulated utilites are constrained from developing and deploying certain AI solutions because of the regulatory frameworks under which they are permitted to operate. Providing funding for the co-creation, testing and implementation of AI tools will help regulated utilities use AI tools to improve their ability to deliver affordable, reliable power to Canadians.

Recommendations:
1. Include Electricity Sector Representation on the AI Task Force: Electricity supply is fundamental to Canada's success in developing domestic AI capabilities. The electricity sector's advice and perspectives would be valuable to the work of the AI task force.

2. <u>Faster Permitting and Approvals</u>: AI and data centres run on electricity. Canada must eliminate barriers to building critical electricity generation and transmission infrastructure by:
    a. Addressing the unworkable Clean Electricity Regulations (CERs) which threaten the reliability of the electricity grid in several Canadian provinces and hinders investment in the sector.
    b. Implementing two-year project approvals with permits for all critical infrastructure projects, and continuing efforts to coordinate its permitting and approvals with provinces to eliminate duplication.
    c. Deploying federal funding to support provincial efforts in nuclear development, helping meet net-zero targets and address growing electricity demand.

3. <u>Invest in the expansion of Canada's electricity infrastructure by</u>:
    a. Implementing the outstanding Clean Electricity Investment Tax Credit, including eligibility of major intra-provincial transmission lines, and optimizing the existing suite of Clean Economy Investment Tax Credits. To meet growing demand and interconnect new loads critical for building Canada's economy, new major transmission lines built within a province should be considered nation-building projects.
    b. Addressing critical funding gaps for distribution and grid modernization infrastructure. This is typically the last-mile infrastructure that connects AI data centres to the electricity grid.
    c. Provide funding for regulated utilities to co-develop, test and implement AI tools that improve efficiencies and allow for better provision of affordable, reliable and clean electricity.

We appreciate the opportunity to provide comments on this study, and we thank you for your time and consideration.

Kind Regards,

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Electricity Canada