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Written submission from NuScale Power

Mémoire de NuScale Power

In the Matter of the

À l'égard de

Darlington New Nuclear Project

Projet de nouvelle centrale nucléaire de Darlington

Application to renew the nuclear power reactor site preparation licence for the Darlington New Nuclear Project

Demande de renouvellement du permis de préparation de l'emplacement d'une centrale nucléaire pour le projet de nouvelle centrale nucléaire de Darlington

Commission Public Hearing

Audience publique de la Commission

June 10, 2021

10 juin 2021

Canada

May 3, 2020

Canadian Nuclear Safety Commission
280 Slater Street
P.O. Box 1046, Station B
Ottawa, Ontario
K1P 5S9

SUBJECT: OPG Application for Site Preparation Licence Renewal (2021-H-04)

Dear Senior Tribunal Officer, Secretariat:

NuScale Power appreciates the opportunity to provide written feedback on the application before the Canadian Nuclear Safety Commissions (CNSC) from Ontario Power Generation (OPG) to renew its nuclear power reactor site preparation licence for the Darlington New Nuclear Project (DNNP). The current licence authorizes OPG to prepare the Darlington site for the potential future construction and operation of a new nuclear generating station, and NuScale Power understands that a separate application and licensing process, with public participation, will be necessary should OPG decide to move forward with the construction and operation of new nuclear reactors.

For background, NuScale Power is a company that has been refining small modular reactor (SMR) nuclear technology for more than a decade and is solely dedicated to bringing this innovative energy resource to market. We are also proud to be working with OPG through their participation on NuScale Power's Advisory Board, and by way of their advice and counsel regarding Canada's nuclear regulatory regime through our mutual Memorandum of Understanding (MOU) established in 2018.

In the Province of Ontario, nuclear power is the backbone of the electricity system, representing one-third of installed capacity and satisfying approximately 60 per cent of the energy needed to power Canada's largest economy. Ontario's three nuclear power stations – Bruce, Pickering and Darlington – generate this power, safely and reliably, at costs that provide a moderating effect on residential and business electricity rates in the province. The output from these stations and from nuclear energy in general is a highly valuable combination of reliable, cost-effective, and non-emitting source of energy, broadly acknowledged alongside baseload hydroelectric resources as a cornerstone element of modern electricity systems that generate long-term economic advantages and enable future environmental sustainability objectives such as net-zero greenhouse gas (GHG) emission goals.

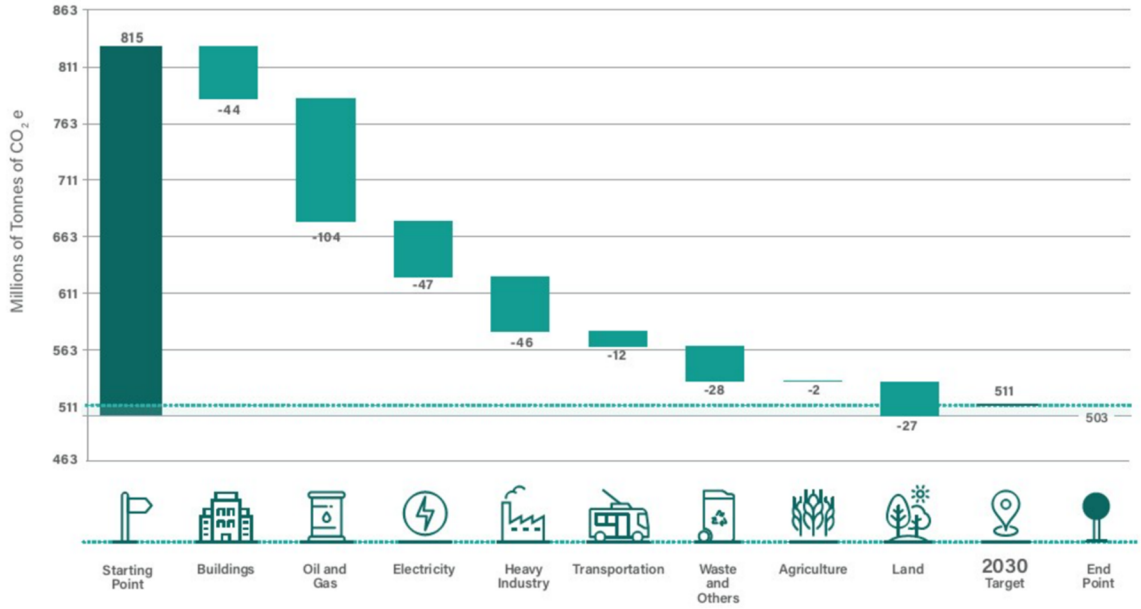
In December 2016, the *Pan-Canadian Framework on Clean Growth and Climate Change (PCF)* became Canada's first-ever national climate plan through development with provinces and territories, and in consultation with Indigenous peoples as comprehensive document outlining how Canada would achieve its *Paris Agreement* target. In December 2020, the Government of Canada introduced enhancements to the PCF by releasing *Canada's Strengthened Climate Plan: A Healthy Environment and a Healthy Economy*, building upon the climate efforts underway as part of the PCF and increasing funding commitments by

$15 billion to various initiatives in order to actually exceed Canada's 2030 *Paris Agreement* targets.

The *Canadian Net-Zero Emissions Accountability Act (Bill C-12)*, introduced concurrently, requires Canada to achieve net-zero emissions by 2050, and to put in place a rigorous process of interim targets, plans and reporting, likewise requiring the Government of Canada to set targets for each five-year milestone from 2030 to 2050. Finally, the Government of Canada released a new, even more ambitious emissions target at President Biden's *Climate Leaders Summit* on April 22nd, 2021 pledging a revised objective of a 40–45% reduction compared to 2005 levels by 2030.

According to *Canada's Strengthened Climate Plan*, more than one-third of the emission reductions required to exceed the 2030 target must come from transportation, non-oil & gas heavy industry, and the building environment. This will require a substantial amount of electrification and alternative fuel production enabled by electricity across these sectors.

Progress to Canada's 2030 Emissions Target



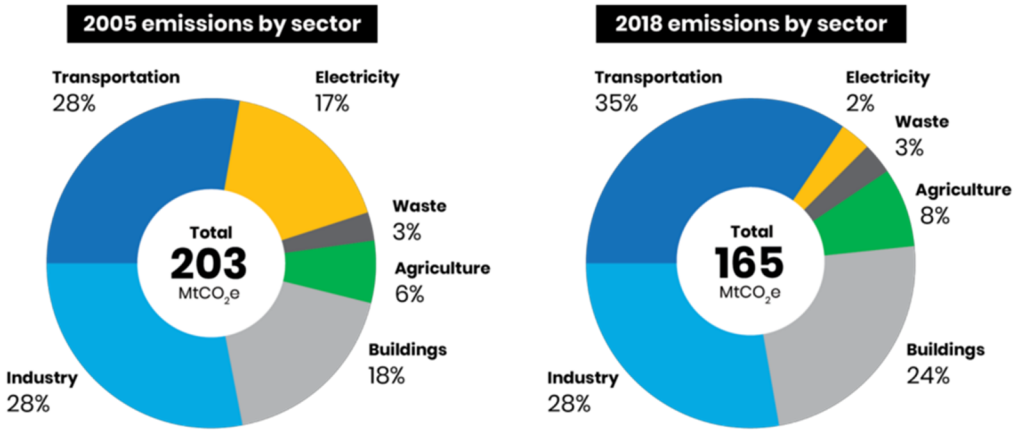
Source: Canada's Strengthened Climate Plan: A Healthy Environment and a Healthy Economy

The Province of Ontario's complete retirement of all coal-fired electricity generation in 2014 represents North America's single largest successfully executed climate initiative to date. While a portfolio of generation and demand-side resources ultimately contributed to a practical transition to a coal-free supply mix, it was increased nuclear output which included the re-energization of approximately 3,000 MW of capacity at the Bruce Power site, supplemented by enhanced performance from OPG's Pickering and Darlington stations which accounted for nearly 90 per cent of the emissions-free replacement energy for coal. The low-emissions system that has been developed in Ontario as a result is in many ways a model for the rest of Canada and the world.

The proportion of Ontario's total emissions attributable to transportation, non-oil and gas heavy industry, and buildings is greater than 85 percent, compared to 33 percent for Canada as a whole. This means that the vast majority of the emission reduction potential of

Canada's second-highest emitting province (after Alberta), must come from these sectors where electrification and lower carbon fuel-switching are achievable. Ontario's largely decarbonized electricity system, in which more than 85 per cent of energy generated comes from nuclear and hydroelectric resources, is a strategic advantage for Ontario and Canada in meeting these targets. However, Ontario's existing non-emitting resources alone will not be sufficient to support future requirements in this regard.

Ontario GHG Emissions by Sector (2005-2018)



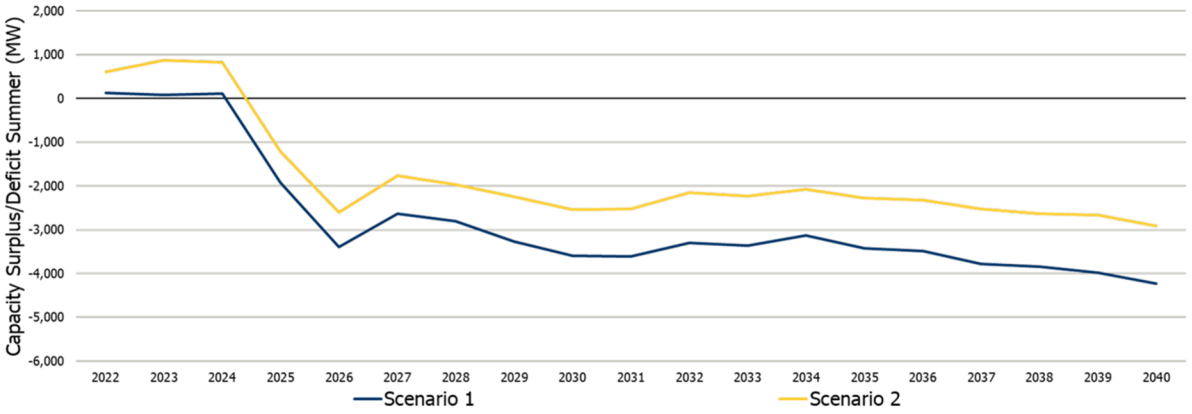
Source: Environmental Commissioner of Ontario

In Ontario, electricity resource adequacy projections and visibility into supply mix dynamics, are currently forecast in the *Annual Planning Outlook (APO)* produced by the province's Independent Electricity System Operator (IESO). The most recent APO, released in December 2020, contained two demand forecast and capacity surplus/deficit scenarios based on pandemic-related impacts associated with different outlooks for post-pandemic economic recovery:

- **Scenario 1** - Shallow economic recession in 2020 and early 2021, with a small-scale reimplementation of temporary restrictions and business closures in early 2021, followed by an economic recovery accelerating later in 2021 and beyond.

- **Scenario 2** - Deeper economic recession from 2020 to the end of 2021. Prolonged and significant impacts will be followed by a slow, multi-year economic recovery starting in 2022.

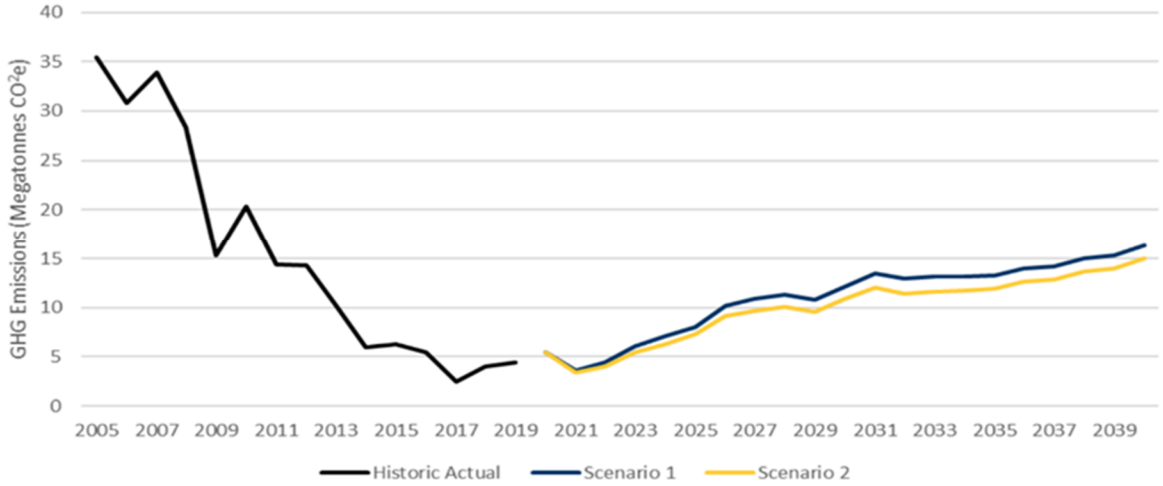
Summer Capacity Surplus/Deficit, with Continued Availability of Existing Resources



Source: IESO Annual Planning Outlook

In either scenario outlined in the APO, Ontario has near-term and sustained incremental capacity needs within a possible range of a minimum of 2,000 MW to more than 3,500 MW by 2030. This forecast assumes that all other supply resources currently under contract, in particular those with are GHG-emitting, are available over the forecast period. This inevitable capacity deficit begins to form in earnest between 2024-2026 largely related to the planned retirement of nuclear reactors at OPG's Pickering site. The reality for Ontario, is that notwithstanding the efforts of Ontarians to reduce electricity sector emissions by eliminating coal, is that in the absence of the maximum flexibility enabled to pursue new, non-emitting supply choices such as the DNNP, GHG emissions from electricity generation will surpass pre-2014 levels by 2030.

Electricity Sector Greenhouse Gas Emissions, Historical and Forecast



Source: IESO Annual Planning Outlook

With respect to the preservation of maximum planning flexibility for Ontario, certainly one strategic advantage for the province is the existing nuclear power reactor site preparation licence for the DNNP for which a 10-year renewal is being sought. The standing licence which OPG already possesses, supported by an exceptionally supportive host community and region, reinforces one of the primary tools Ontario currently has in this regard at a time when perhaps that reinforcement has not been more critical.

Overlapping with the evolution of Canada's GHG emission objectives and the approaching necessity for incremental electricity generating capacity in Ontario is the evolution of the Canadian policy environment surrounding SMRs. In November 2018, Natural Resources Canada (NRCan) published *A Call to Action: A Canadian Roadmap for Small Modular Reactors* following approximately one year of consultation with provinces, territories and industry stakeholders. Subsequent to the publishing of the *SMR Roadmap*, NRCan began the development of *Canada's SMR Action Plan* which would begin to advance the safe and responsible development and deployment of SMRs through a pan-Canadian approach.

The *SMR Action Plan*, also released in December 2020, provides concrete actions for Canada to:

- ensure robust policy, regulatory and legislative frameworks are in place to protect people and the environment;
- accelerate innovation;
- continue meaningful engagement with Indigenous communities and all Canadians; and
- develop international partnerships and open up new markets.

Similarly, during the previous year the provinces of Ontario, Saskatchewan and New Brunswick entered into an *Interprovincial Memorandum of Understanding (MOU)* to collaborate on the development and deployment of SMRs in their respective jurisdictions. In April 2021, Alberta became the fourth province to sign on to the *Interprovincial MOU* and a report prepared by OPG, Bruce Power, SaskPower and NB Power entitled *Feasibility of SMR Development & Deployment in Canada* was released and divided near-term SMR opportunities into three streams:

- **Stream 1:** Proposes a first grid-scale SMR project constructed at the Darlington site in Ontario by 2028, followed by up to four subsequent units in Saskatchewan, with the first unit in Saskatchewan being in service in 2032. OPG is leading, with Bruce Power and SaskPower supporting, a technical/economic down-selection process that is expected to identify a preferred vendor by the end of 2021.
- **Stream 2:** Proposes that two 4th generation, advanced SMR designs be developed in New Brunswick through the construction of demonstration units at the Point Lepreau Nuclear Generating Station site. This would involve New Brunswick overseeing the completion of an initial ARC Clean Energy demonstration unit by 2030, and Moltex Energy's waste recycling facility and reactor, to be operational by the early 2030s.
- **Stream 3:** Proposes a new class of micro-SMRs designed primarily to replace diesel use in remote communities and mines. To advance this technology, a 5 MW gas-cooled reactor project by Ultra Safe Nuclear Corporation (USNC) in collaboration with OPG is being advanced at the Chalk River site in Ontario and is expected to be in service by 2026.

Ontario, given its size, deep nuclear experience and existence of the licence being sought for renewal as part of OPG's application under consideration, has been determined best-positioned to be leading the pan-Canadian approach to develop the first utility-scale plant. The 2028 timeframe does align with Ontario's requirement for at least 2,000 MW of incremental generating capacity as a result of expected demand growth, the mid-decade

retirement of the Pickering Nuclear Generating Station and looming generation contract expiration.

Of course, underpinning the review of this application is consideration of OPG's nuclear safety credentials as assessed under one of the most rigorous regulatory and safety regimes anywhere in the world. While OPG has not selected a technology at this time, and is not currently seeking approval for construction, OPG has indicated it will ensure the selected nuclear technology is within the bounds of the licensing basis for the nuclear power reactor site preparation licence, with detailed demonstration satisfactory to the CNSC during the subsequent licensing process for the construction phase of the DNNP.

In the more than five decades of OPG's active nuclear operations in Canada, no member of the public has been harmed as a result of a radiation emission from a nuclear station or waste storage facility. In this application, OPG's request is simply to renew the site preparation licence in its current form, without any increase in scope being sought relative to the original licence granted by the CNSC. For nearly a decade, OPG has been responsibly maintaining the power reactor site preparation licence and progressing long-lead regulatory commitments related to both the licence granted by the CNSC and OPG's Environmental Assessment (EA).

As part of the application process to obtain the power reactor site preparation licence in 2012, OPG undertook extensive studies, assessments and consultations with Indigenous communities and stakeholders to complete the site evaluation studies that led to the development of OPG's Environmental Impact Statement (EIS) for the DNNP EA. The site evaluation studies concluded that the DNNP site is suitable for a new nuclear plant while the EA concluded that the project is not likely to cause any significant adverse effects, provided the mitigation measures proposed and the commitments made by OPG are implemented. These findings were subsequently reviewed in depth and accepted by a Joint Review Panel (JRP) consisting of representatives from the CNSC and Canadian Environmental Assessment Agency (CEAA).

The DNNP site evaluation and licence application has been extensively reviewed against applicable regulatory requirements, current codes, standards and practices as well as current site baseline data. Based on the rigour of this process and the lack of any meaningful increase in scope being sought relative to what has already been assessed and approved, NuScale Power would submit that the DNNP site remains suitable for a new nuclear generation and OPG's site preparation activities allowed under this licence would not pose any unreasonable risk to the public, personnel, or environment.

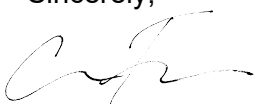
NuScale Power has extensive experience with the regulatory environment and safety standards overseen by the United States Nuclear Regulatory Commission (NRC), with the NuScale SMR technology being the first and thus far only application to receive NRC Design Certification Approval. The 12,000-page application took nearly 42 months to review and included more than 2 million pages of additional documents for regulatory audits. The final safety evaluation report issued by the NRC is also the first of its kind for a SMR and represents the technical review and NRC staff's acceptance of the NuScale SMR design. The outcome of this process allows utilities in the U.S. to develop NuScale power plants, knowing that safety aspects of the NuScale Power design are NRC-approved.

NuScale supports an application renewal by CNSC based on NuScale's US regulatory and CNSC Vendor Design Review Process experience. The CNSC regulatory process is in all respects world-class when it comes to oversight of the use of nuclear energy and materials to protect health, safety and security of Canadians, as well as Canada's environment.

Furthermore, OPG can reasonably be expected to satisfy all requirements of a renewed licence as determined by the CNSC.

It is for these reasons, as well as corresponding alignment with Canada's environmental commitments and climate objectives, and the necessity for maximum flexibility in Ontario's electricity system to accommodate clean, reliable and cost-effective power generation including new nuclear over this period, that NuScale Power endorses the renewal of OPG's power reactor site preparation licence for an additional ten years.

Sincerely,



Carrie Fosaaen
Director, Regulatory Affairs
NuScale Power, LLC