

## International Nuclear Information Network Session

## Nuclear Energy in Canada

## (1) An Overview

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Canada sees nuclear energy as a strategic asset, a driver of innovation, a source of good jobs, and a key part of its growing non-emitting energy mix. Nuclear energy is considered reliable, safe, and environmentally responsible as long as it is developed in a robust regulatory framework to address safety, security, and waste management concerns. It has a role to play, alongside renewables, in bolstering economic growth, energy security and access, and environmental stewardship in support of clean energy goals.

This is why Canada joined the U.S. and Japan to launch a new nuclear energy initiative at the Ninth Clean Energy Ministerial (CEM9) on May 24, 2018 in Copenhagen, Denmark. The “Nuclear Innovation: Clean Energy Future” (NICE Future) initiative aims to promote and accelerate the use of nuclear energy as an important part of the global clean energy transition by ensuring that nuclear energy receives appropriate representation in high-level discussions about clean energy. Nuclear energy plays an important role in Canada’s energy mix, and will contribute to Canada’s overall strategy to combat climate change.

**2. Canada’s Policy Regarding Climate Change**

Canada’s plan to fight climate change at home – The Pan-Canadian Framework on Clean Growth and Climate Change – is effective: we are phasing out coal, putting a price on carbon emissions, making historic investments in public transit, green infrastructure and clean technologies, promoting energy efficiency, and protecting more of our nature for our children and grandchildren. Furthermore, Canada’s national “Generation Energy” consultations in 2017, in which over 380,000 Canadians participated, emphasized that our population wants to move toward a low-carbon economy. Four identified pathways to that clean energy future to mitigate climate change are: using more renewable fuels; switching to clean power; increasing energy efficiency; and, producing cleaner oil and gas. Canada will continue to reinforce its commitment to meet its obligations under the Paris Agreement through the ongoing implementation of this plan, including investing in innovation, clean tech and in the resilience of our communities.

Canada is also working together with its international partners to fight climate change on a global scale, including helping developing countries gain increased access to financing in their transition to low-carbon and climate-resilient economies. In November 2015, in support of the Paris Agreement, Canada’s Prime Minister pledged \$2.65B over five years to advance international climate change objectives. This support is being delivered through a variety of channels, including through the United Nations Framework Convention on Climate Change (UNFCCC) financial mechanism – the Green Climate Fund – as well as through a number of multilateral and bilateral initiatives.

Canada and the UK co-launched the Powering Past Coal Alliance on the margins of the UNFCCC’s COP23. The Alliance is a voluntary coalition of governments, businesses and organizations, established to help lead global efforts to end the use of unabated coal power – power generated by plants without technology to capture and

store carbon emissions. As of December 2018, a total of 80 members have joined the Powering Past Coal Alliance, comprising 30 national governments, 22 sub-national governments, and 28 businesses or organisations. Eliminating coal power and shifting to less-polluting energy is essential for clean air and healthy communities, a safe climate and cleaner economic growth.

### 3. Overview of Canada's Nuclear Sector

Nuclear energy plays an important part in Canada's energy mix and assists in meeting greenhouse gas emission targets (Canada has committed to have 90% of its electricity coming from non-emitting sources by 2030, up from 80% now). It is the second-largest source of non-emitting electricity generation in Canada, after hydropower, with 19 CANDU reactors located in two Canadian provinces producing 15% of Canada's electricity. Furthermore, Canada is the second largest exporter of uranium in the world, with uranium mining, milling, and processing operations concentrated mainly in the province of Saskatchewan. Canada's nuclear sector also includes research facilities, medical facilities, irradiation facilities, isotope producers and processing and fuel fabrication facilities. In total, the nuclear sector contributes \$6 billion annually to Canada's economy, and accounts for 30,000 direct jobs.

In Canada, nuclear energy falls within the jurisdiction of the federal government, whose role encompasses Research and Development (R&D), non-proliferation and nuclear security, and international engagement and collaboration, as well as the regulation of all nuclear materials and activities in Canada. The government places top priority on health, safety, security and the environment in relation to nuclear activities in Canada. While the federal government has important responsibilities relating to nuclear energy, the decision to invest in electric generation rests with the provinces. It is up to the provinces, in concert with the relevant provincial energy organizations/power utilities, to determine whether or not new nuclear power plants should be built.

### 4. Canada's Small Modular Reactor Roadmap

A stakeholder-driven roadmap identifying the opportunities for on and off-grid applications of Small Modular Reactors (SMRs) in Canada was published on November 7, 2018. It takes a pan-Canadian approach towards nuclear energy, which may help to guide important decisions on existing and emerging nuclear energy technologies. Canada has a promising domestic market for SMRs. Conservative estimates place the potential value for SMRs in Canada at \$5.3B between 2025 and 2040. Globally, the SMR market has an estimated value of \$150B annually in 2040. This represents a large potential market for Canada, which has already exported nuclear reactor technology to six countries.

Canada has a window of opportunity to lead as it has all the necessary elements:

- A strong international brand and flexible and performance based regulator,
- World class nuclear laboratories and demonstration sites—with a federal investment of \$1.2 billion to revitalize infrastructure at Canada's national nuclear laboratories in Chalk River
- Mature supply chain and domestic uranium mining industry—leveraging \$26 billion in investments to refurbish 10 nuclear reactors in the Canadian province of Ontario,
- Extensive nuclear operating experience, and strong science and technology in related areas (materials science, medicine, irradiation/sterilization, food safety).

The roadmap is a “call to action” for all key enablers in Canada. It includes 53 recommendations for action by governments, industry, and stakeholders. The roadmap proposes that these enablers respond to its recommendations with concrete commitments for action to seize Canada's SMR opportunity.

**5. Conclusion**

Canada will host the next Clean Energy Ministerial (“CEM 10”) and the Fourth Mission Innovation Ministerial from May 26 to the 29th, 2019 in Vancouver, and looks forward to working closely with member countries to accelerate progress towards a clean energy future. With respect to nuclear energy development and innovation, strategic partnerships will be key to success—both across the sector and internationally. Through the “NICE Future” initiative under the Clean Energy Ministerial, Canada is partnering with leading global economies to ensure appropriate representation of nuclear energy in broader clean energy discussions—including the role that SMRs could play in meeting climate change and clean energy goals.