

Role of Nuclear Power in Achieving a Net Zero Grid

Presentation to IPPSA

Steve Coupland

Director of Regulatory and Environmental Affairs, Canadian Nuclear Association

March 29th, 2022



The Alberta Challenge

- Although Alberta has made significant strides in reducing emissions (particularly from electricity) much work remains to be done. AESO estimates approx. 15MT needs to be reduced by 2035 to achieve a net-zero grid.
- This does not include the expected load growth due to greater electrification in areas such as the industrial sector, transportation and heating.
- The CNA anticipates that the federal government will continue to raise the carbon tax after the current period (2030) which will have a significant impact on the price of generation.
- In addition, the CNA anticipates increasingly stringent requirements being place on emissions from natural gas generation including a potential to ban new gas-fired generation.

Strengths of Nuclear Energy

- Nuclear energy is a clean energy source that provides reliable, affordable electricity 24/7 without emitting any greenhouse gases in its operations.
- Nuclear energy has the smallest environmental footprint when compared to other forms of non-emitting power (wind, solar, hydro). Estimates are solar energy requires 100-220 times as much land and as much as 500 times is required for wind to generate the same amount of energy.
- CNA believes that no one technology will enable net-zero but each technology must be applied either alone or in concert with others where it makes the most sense. For example: nuclear generation can increase the potential for hybrid energy systems that can integrate nuclear generation with wind and/ or solar generation.

Strengths of Nuclear (cont'd)

- Larger nuclear facilities such as the ones in Ontario are capable of producing vast amounts of baseload non-emitting electricity which can not only reduce emissions from existing generation but meet the expected increase resulting from increased electrification.
- SMRs are going to be able to play a key role in reducing emissions in the resource extraction and processing sector as well other industrial applications including carbon capture and hydrogen.
- SMRs are scalable to local needs and can be used to supply non-emitting energy for off-grid applications and for remote communities.
- Some SMR designs have the ability to do produce high quality-high temperature heat and hydrogen as well as electricity thus creating an opportunity for tri-generation.

Challenges for Nuclear Energy

- Alberta is a non-nuclear province and there are often public perception concerns usually around safety and radioactive waste.
- New nuclear facilities require significant regulatory approvals to construct which results in a lengthy timeline for construction. Current estimates are 11-12 years from decision to proceed to full operation. The industry expects this timeline to shorten as more projects move forward.
- Nuclear power projects require significant upfront capital which is challenging in an unregulated market. One of the advantages of SMRs is lower capital costs and the ability to “stack” units so you can begin to generate revenue as you expand generation.

SMR Update

Stream 1 – On grid

- OPG has selected GE-Hitachi for its first of a kind on-grid Stream 1 reactor to be deployed at the Darlington site in Ontario targeting first power in 2028.
- Sask. Power worked with OPG on the Darlington technology selection process and will be announcing their technology choice in the near future with a target for first power in the early 2030s



SMR Update (cont'd)

Stream 2 – Next generation reactors

- 4th generation, advanced small modular reactor designs that will be developed in New Brunswick
- New Brunswick will see the completion of an initial ARC Clean Energy demonstration unit by 2030, and Moltex Energy's waste recycling facility and reactor, operational by the early 2030s



SMR Update (cont'd)

Stream 3 – Micro reactors for mines, industry and remote communities

- 5 MW gas-cooled reactor project by Ultra Safe Nuclear Corporation (USNC) is underway at the Canadian Nuclear Laboratories' Chalk River site in Ontario and is expected to be in service by 2026.
- Bruce Power has been exploring opportunities with Westinghouse Canada's eVinci Micro-Reactor.
- eVinci recently received \$27m from ISED to move forward with deployment targeting 2026.



Thank You

Steve Coupland

couplands@cna.ca

www.cna.ca