

SMALL MODULAR REACTORS

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IPPSA

November 16, 2021



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What are small modular reactors?

Small – units are much smaller than traditional reactors and can be transported for on-site construction;

Modular – **factory constructed**, **portable** and **scalable** (ranging from ~10 MW to 300 MW units that can be stacked in smaller increments based on needs);

Reactors – using nuclear fission to produce **energy**: energy for electricity, hybrid energy systems, district heating and high-quality steam for heavy industry applications.



Multiple Canadian markets for small reactors

1. **On-grid** – likeliest on existing, licensed nuclear sites, or replacing coal-fired units in coal-mining towns
2. **Mining** – electricity and heat for remote but rich mining sites
3. **Process heat** – e.g. melting bitumen from the oilsands
4. **Remote communities** – electricity (+ heat?) for hundreds of isolated towns now depending on diesel



Stream 1 – On grid

- OPG and SaskPower are collaborating to complete design selection for an on-grid Stream 1 reactor in 2021 that will first be deployed at the Darlington site in Ontario targeting first power in 2028.
- The utilities will go through a rigorous review to determine who can best meet the Stream 1.



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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



Stream 3 – Micro reactors for remote communities and mines

- 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.



CNA study on SMRs in Canada's Heavy Industry

- CNA commissioned **EnviroEconomics** and **Navius Research** to conduct a study looking at the economic and climate implications of using SMRs in Canada's heavy industry.
- The Research found that across all scenarios, SMRs delivered low-cost emission reductions, driving down the cost of getting to net-zero as a nation.



Impact of SMR's

- SMRs can reduce GHG emissions in the Heavy Industrial Sector by **18 per cent by 2050**.
- SMRs could contribute to getting to net zero by **reducing GHG emissions by 14 Mt per year** on average, the equivalent of taking over **3 million cars off the road per year**
- In total, between 2035-2050, SMRs could reduce GHG emissions by over **215 megatonnes (Mt)*** in the heavy industrial sector alone (Canada-wide emissions are approximately 700Mt per year).
- SMRs could lower the country's cost of reaching net zero by **more than five per cent**.
- SMRs could contribute up to \$5 billion to GDP annually by 2050.
- Stream 3 reactors could be deployed in Alberta by the late 2020s

Thank You

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