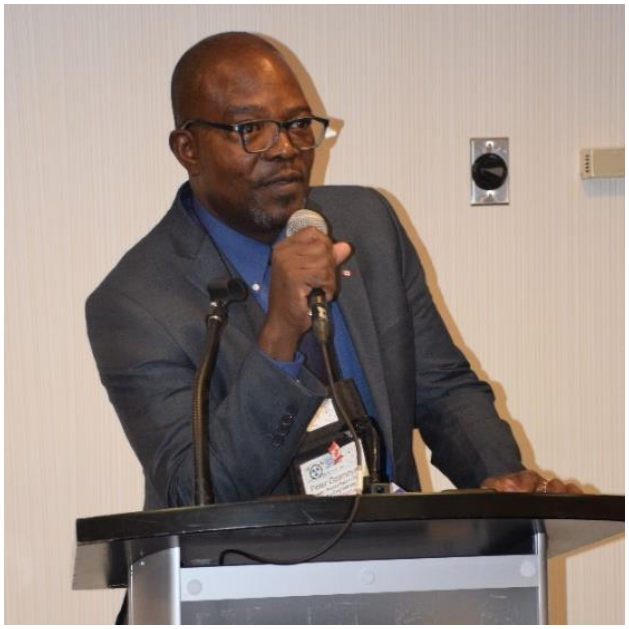
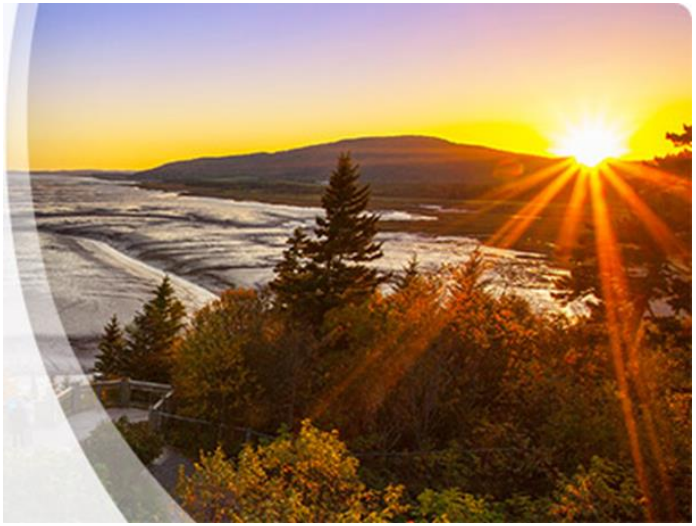
The Role of Canadian Nuclear Energy in Meeting Canada's Net-Zero Goals





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Canada's Net-Zero Goals -
To Achieve Carbon Neutrality by **2050**

- Reach net-zero greenhouse gas (GHG) emissions by 2050
- Have a net-zero electricity grid by 2035
- 50% of all new vehicles sold being zero-emission by 2030
- Cap emissions from the oil and gas sector at current levels (and reduce them over time)
- Protect and restore ecosystems to act as carbon sinks
- Support innovation in clean technologies
- New buildings to be net-zero carbon by 2030
- Partner with Indigenous communities to support clean energy projects and sustainable land management
- Push for the global phase-out of coal power

Canada's Energy Landscape

- Energy Mix comprises
  - Fossil Fuels
  - Hydropower
  - Nuclear Energy
  - Renewables

- Nuclear Energy
  - Supplies 15% of Canada's electricity (60% for the Province of Ontario), with an installed capacity of 13.5 GW
  - Provides reliable alternative
  - Reduces dependency on fossil fuels

Canada's Nuclear Energy

Provide electricity that is:

- Clean
- Reliable
- Of low-carbon

This is crucial in transitioning to a low-carbon economy

19 CANDU (Canada Deuterium Uranium) reactors

- unique and innovative design
- safe, efficient, and flexible in fuel use
- uses natural uranium as fuel – enrichment not required
- online refueling – no need to shut down to refuel
- proliferation resistance – using natural uranium & design is less likely to produce weapon-grade plutonium

Canada's Nuclear Industry Roles in Meeting The Net-Zero Goals

- Decarbonizing the Electricity Grid and Heavy Industries
- Reducing Oil and Gas Emissions
- Supporting Renewable Energy Integration
- SMR Deployment
- Hydrogen Production for decarbonization of various sectors
- Proper Nuclear Waste Management
- International Collaboration and Nuclear Technology Exportation
- Workforce Development, Job Creation and Economic Growth

Roles In Meeting The Goals

Roles in Meeting the Goals

Decarbonizing the Electricity Grid and Heavy Industries

Nuclear energy:

- generates zero greenhouse gas (GHG) emissions during operation and can complement renewable energy sources by providing reliable base-load electricity
- help decarbonize energy-intensive industries like steel, cement, and chemical production, which are among the hardest to decarbonize due to their reliance on fossil fuels for heat and power
- SMRs can provide the high-temperature heat needed for industrial processes, thus offering a clean alternative to fossil fuels

Reducing Oil and Gas Emissions

Currently, nuclear energy helps avoid the emission of **about 80 million tonnes of CO_2** per year, equivalent to removing **15 million cars** from the roads

Nuclear energy:

- especially SMRs (when ready), could be deployed to power oil sands operations and reduce the carbon footprint of extraction and refining processes (The oil and gas sector is a major contributor to GHG emissions)
- support carbon capture, utilization, and storage (CCUS) technologies by providing the electricity and heat required to capture and store CO_2 emissions from industrial sources

Roles in Meeting the Goals (Contd.)

Supporting Renewable Energy Integration

Nuclear Energy acts as a stable backbone of the energy grid, providing consistent power output to ensure grid reliability thereby overcoming the intermittency of the renewable energy sources

SMR Deployment

When available and deployed, expected to reduce Canada's emissions by up to 6 million tonnes of CO_2 per year. SMRs can help:

- decarbonize remote and industrial sites, particularly in northern and off-grid communities
- decarbonize heavy industries such as mining, oil sands operations, and manufacturing
- when paired with renewable energy sources for hybrid energy systems, provide a stable, zero-carbon energy supply in regions where renewables alone cannot meet energy demand

Hydrogen Production for decarbonization of various sectors

Nuclear power can be used for low-carbon hydrogen production which is very useful for decarbonizing sectors such as transportation, heavy industry, and energy storage. Millions of tonnes of CO_2 emissions will be avoided in these sectors through this H_2 production method

Roles in Meeting the Goals (Contd.)

Proper Nuclear Waste Management

ensures that nuclear energy remains a clean and sustainable solution as part of Canada's net-zero plan

International Collaboration and Nuclear Technology Exportation

- Canada's exporting nuclear technology and participating in global nuclear markets can help other countries reduce their emissions
- leveraging its expertise in nuclear energy to collaborate and share nuclear technology and knowledge with other countries will help these countries in their own decarbonization efforts
- Canada's leadership in nuclear education, training, and R&D through their institutions and organizations such as UNENE and CNL will drive innovation and technological advancements which can be exported globally

Workforce Development, Job Creation, and Economic Growth

15,000 – 20,000 new workers will be needed over the next 10 years to support the growth in the industry (SMR, etc).

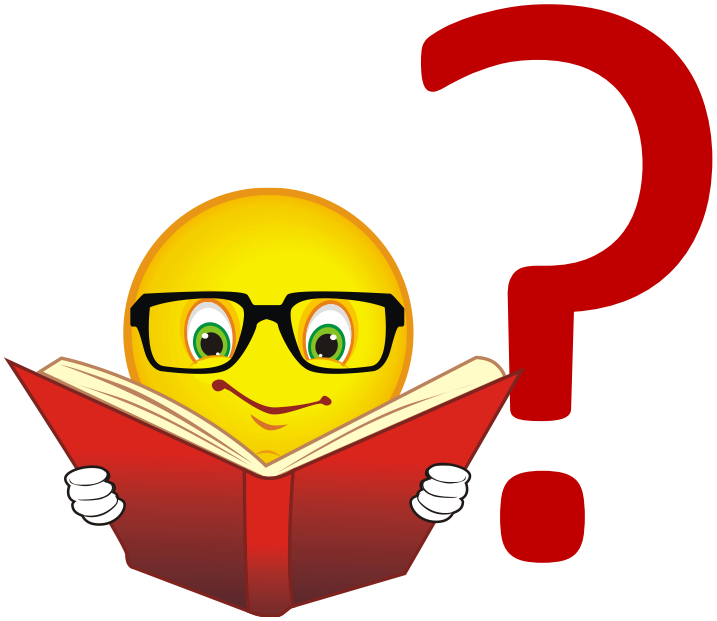
- Education and Training organizations (UNENE, COG, CNS, etc.) develop HQP needed to sustain the nuclear industry
- High-quality jobs created by the nuclear industry support the country's economic growth and aid its transition to a low-carbon economy.

CONCLUSION

Canada's nuclear industry will be integral to achieving the country's net-zero goals by:

- Providing **clean, reliable energy**,
- Enabling **industrial decarbonization**,
- Supporting **renewable energy integration**,
- Pioneering **innovative** (**SMR** and **hydrogen) technologies**.

Nuclear power's key role in the energy transition will significantly reduce Canada's carbon footprint and help Canada reach its 2050 net-zero targets



QUESTIONS COMMENTS