About Energy Alberta

Energy Alberta is an Alberta-based company, founded in 2005, with a dedicated and experienced group of innovators, nuclear industry experts and leaders in environmental sustainability.

We want to utilize our country's proven nuclear technology to supply steady, sustainable and affordable electricity for the province.

Energy Alberta has assembled a team with extensive nuclear experience and initiated the planning required to advance a nuclear generation project in Canada, including early consultations with Indigenous communities, government, regulators and public stakeholders.

AtkinsRéalis

TORYS LLP

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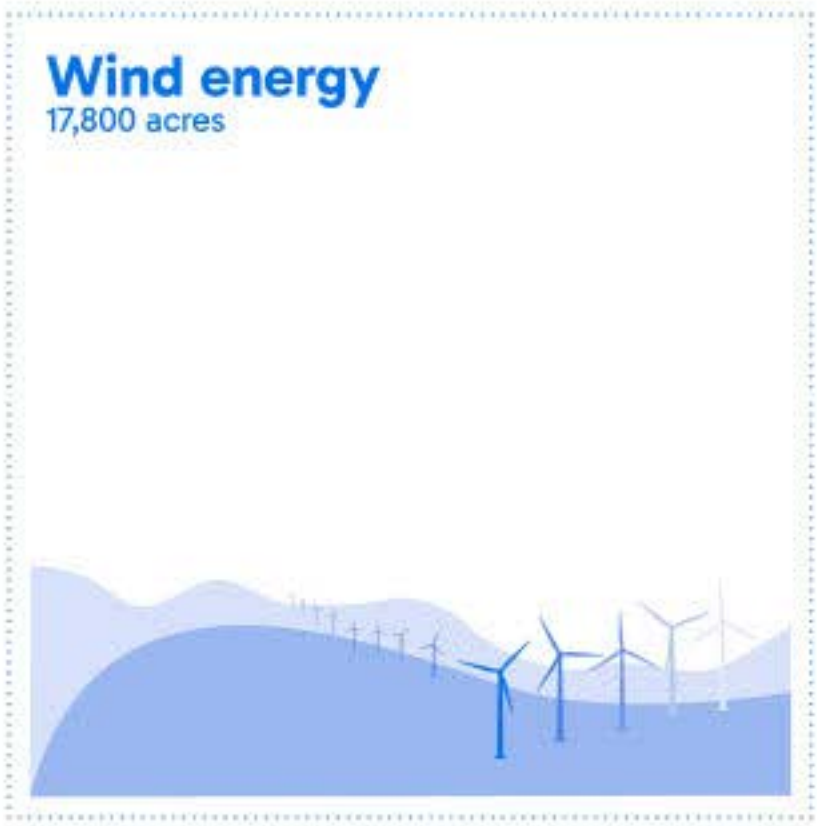
Project Overview

- Permitting 4800 Megawatts (MW) of nuclear power.
- Building two to four safe, reliable and zero-emission 1,000 MW-class CANDU® MONARK™ reactors north of Peace River.
- Energy Alberta is currently in the early development stages of the Project and initial engagement with local and Indigenous communities has begun and will continue through the regulatory, construction and operation stages of the Project.

How big will the facility be?

Reactors and main site facilities span approximately 42 hectares - about 2/3 of a quarter section of land (103 acres) or 0.42 km².



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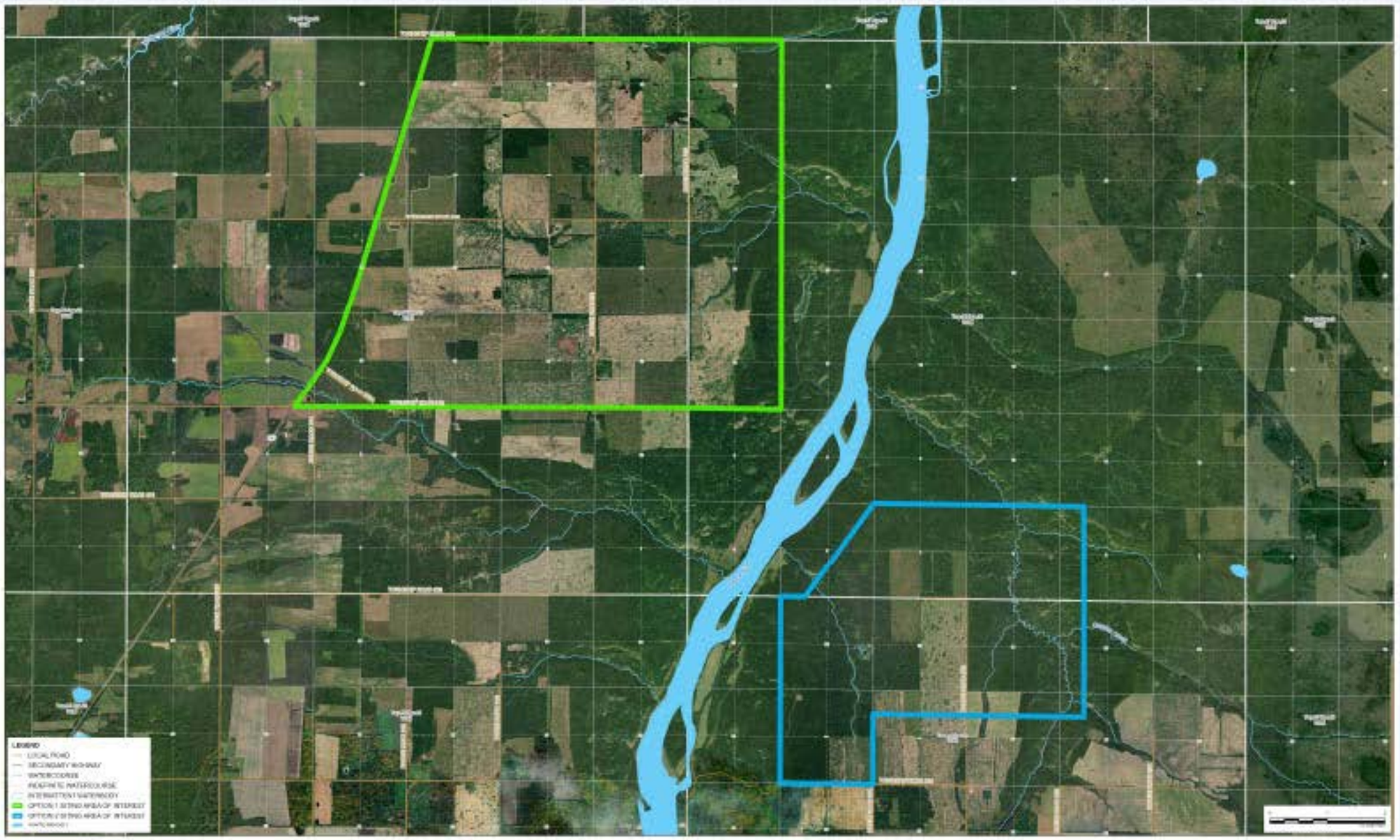
Project Area Options



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Proposed Regulatory Timeline

- Energy Alberta plans to submit an Initial Project Description in Q1 2025 – that will initiate the federal Impact Assessment (IA) process.

- The IA process is led by the Impact Assessment Agency of Canada (IAAC) and the Canadian Nuclear Safety Commission (CNSC) and will evaluate the potential effects of the Project on the environment, health, society and economy.

- The IA process considers the impact on Indigenous Peoples and their inherent rights.

- An IA is a phased planning process spanning multiple years, involving extensive Indigenous, community and public engagement, as well as comprehensive environmental and socio-economic studies.

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Site Evaluation Process

- Energy Alberta conducted an extensive regional and local site evaluation for the proposed site options with support from technical subject matter experts to determine the suitability of each option.

- The evaluation consisted of Technical, Social/Cultural and Environmental criteria to assess which option best meets the technical and safety requirements.

- The criteria come from a number of sources, including CNSC regulations outlining site suitability evaluation requirements.

Examples of factors considered in site suitability evaluation:

- External Natural Hazards – like forest fire risk

- Human Induced Events – like location of airports, other industrial facilities

- Technical needs of the Project – like access to water

- Environmental Criteria – like sensitive wildlife or aquatic habitat

- Social and Cultural Criteria – like workforce commuting distance and availability of emergency services

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Commitment to Water Management

Energy Alberta is proposing to build a nuclear power generating station along the banks of the Peace River.

- The facility will withdraw water from the Peace River to use for cooling requirements and other processes required for safe operations.

- Advanced technology will be utilized to recycle the cooling water and reduce the amount of water needed.

Regulated water management process

- Regulated by local, provincial and federal governing bodies for effective conservation and stewardship of water.

- Environmental programs to monitor, track and analyze surrounding ecosystems to safeguard the health of people and the environment.

- A Water Act license is required to monitor the facility's water use and compliance.

- A study of the area of the Peace River that would require the withdrawal of water is currently ongoing as the initial step to apply for a water license.

Water Use

A consistent water source, primarily used for cooling,
is an integral part of the Peace River Nuclear Power Project.

How does the Cooling System work:

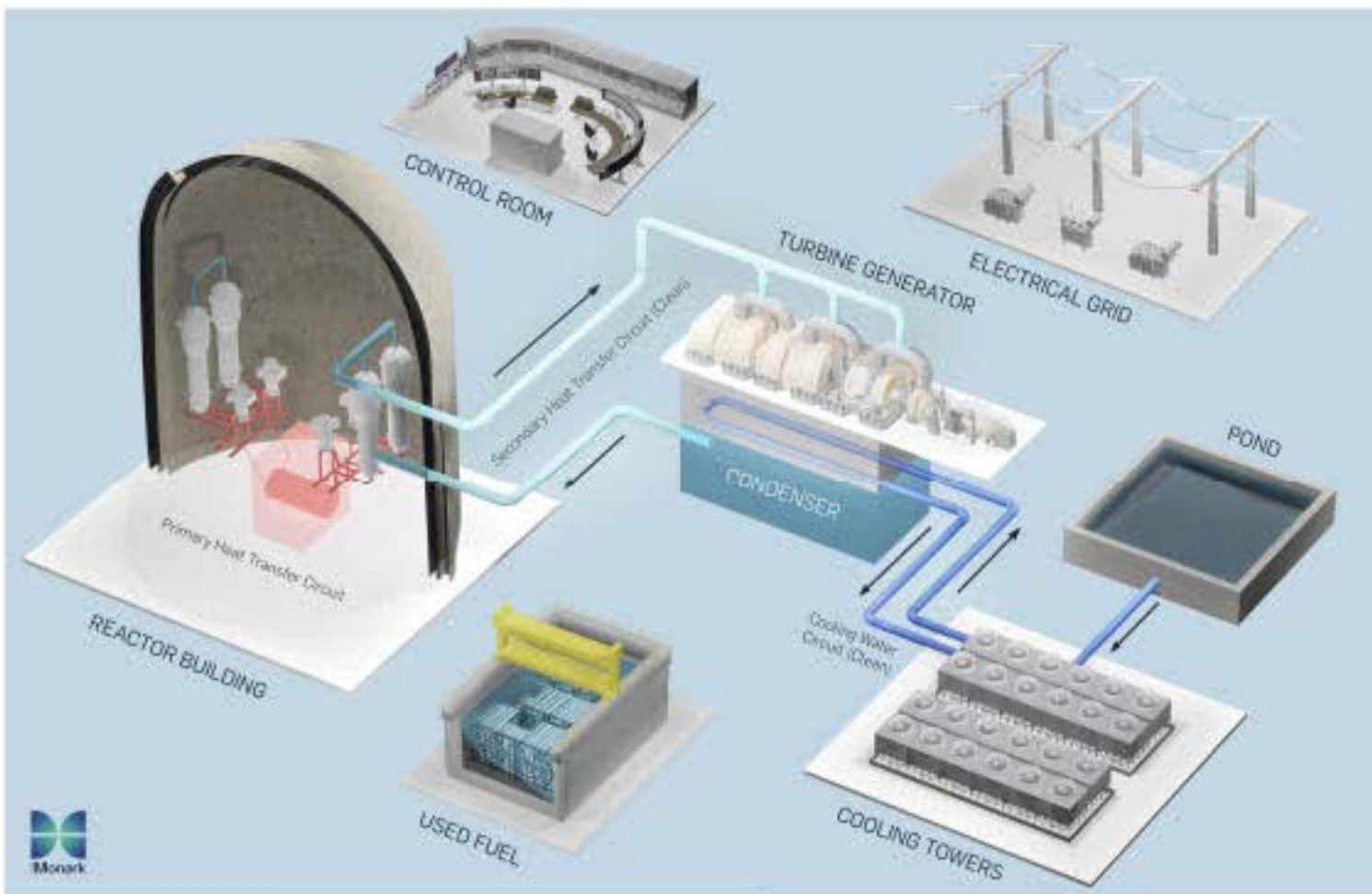
- Water is withdrawn from the Peace River, stored in a water reservoir on-site and used to cool the facility.

- A separate water circuit is used to generate steam in the reactor building.

- Water is evaporated through the cooling process and will not be returned to the Peace River.

- The volume of water is used to replenish water lost to evaporation from the cooling towers and the reservoir.

The volume of water will be refined as technical and project planning details evolve.



3D Rendering of Water Cooling System

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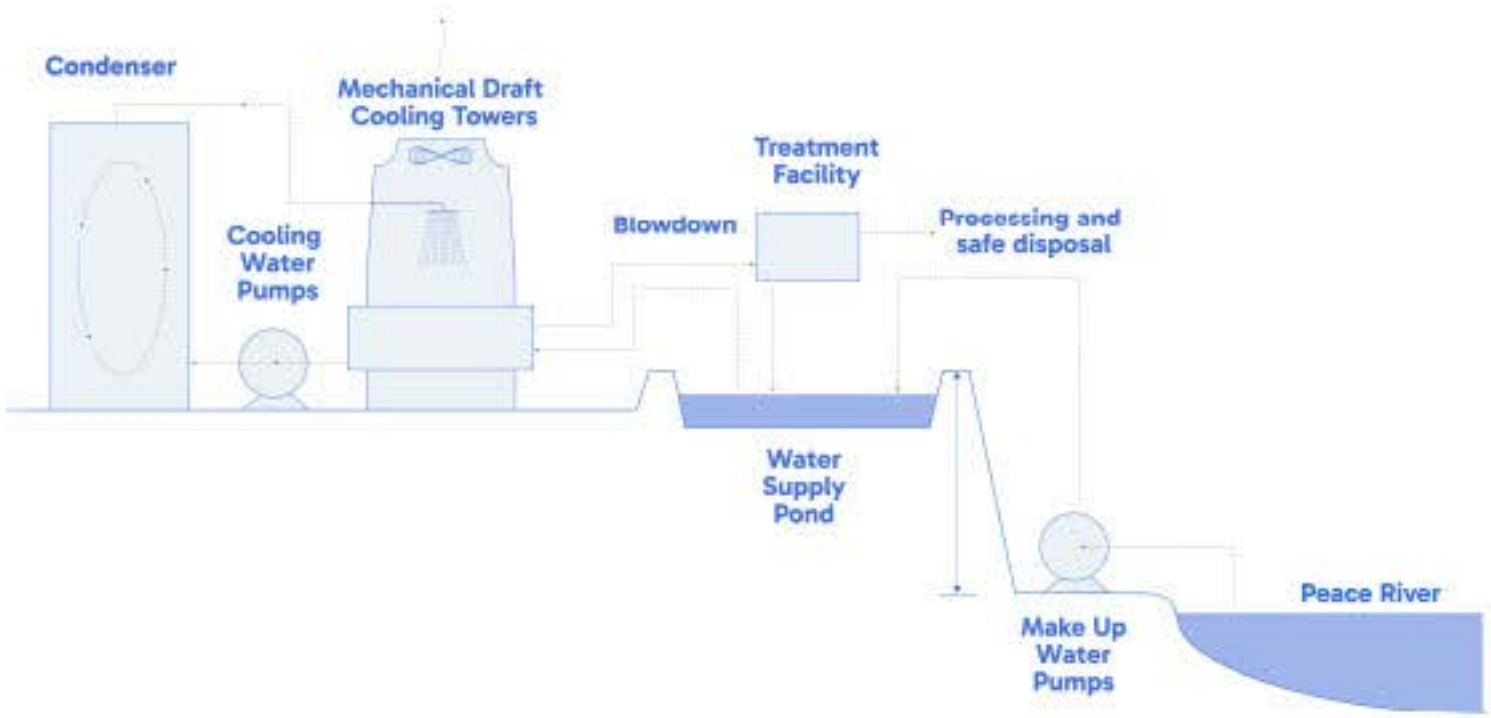
Water Use



*Designs reflect current details and are subject to change.

Cooling Water Infrastructure:

Key components of the facility's cooling water infrastructure include:

- Water intake, pipeline and access road to the river
- Mechanical draft cooling towers to transfer heat from the steam driving the turbines to the air
- Water ponds for power production needs if the volume from the river is reduced due to ice conditions or low water levels in the river

Nuclear Waste Management

In Canada, the Canadian Nuclear Safety Commission (CNSC) and the Nuclear Waste Management Organization (NWMO) oversee and regulate every stage of nuclear waste management, from handling and transport to storage and final disposal. These governing bodies ensure nuclear radioactive waste is disposed of in a controlled, consistent and safe manner.

During operations, waste will be stored and managed on-site and removed as part of decommissioning.

Canada's Long-Term Plan

The NWMO has selected Wabigoon Lake Ojibway Nation and the Township of Ignace in Ontario to host future deep geological repository sites.

Deep Geological Disposal has been extensively studied for several decades, including the construction and operation of underground research laboratories where large-scale in-situ tests are being conducted.

Types of Nuclear Waste

Every nuclear facility generates some form of each level of waste.

- **Low-Level Waste:** Minimal radioactivity can be safely handled with minimal protection such as used protective clothing, tools and lab waste.
- **Intermediate-Level Waste:** This waste requires shielding during handling and storage and includes reactor components or resins from water treatment.
- **High-Level Waste:** This waste primarily comes from used nuclear fuel after it has been used in a reactor. Highly radioactive, this waste requires robust containment and cooling measures.
- **Used Nuclear Fuel:** Used uranium fuel rods from reactors that have accumulated radioactive isotopes through fission.

Used Nuclear Fuel

- Radioactivity decreases over time. With modern containment strategies, risks are minimized while technology continues to improve long-term storage solutions.

- Properly managed waste does not pose immediate threats. Safety protocols and containment measures are strictly followed to protect people and the environment.

How much will this facility generate?

- At the end of its 70-year lifespan, the Peace River Nuclear Power Project will have produced approximately 1.95 million bundles of used fuel.

- If stacked like firewood, all this used nuclear fuel could fit into about 5.5 NHL hockey rinks from the ice surface to the top of the boards.

~1.95 million
5.5 NHL
Hockey Rinks

*Designs reflect current details and are subject to change.

Did you know?

One soda can is equivalent to all the used fuel waste generated from one person's lifetime power consumption, if they were to use nuclear energy their entire life.

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Radiation Safety

For over 60 years, Canada has been a global leader in nuclear energy research, technology and development, and as such, Canada's nuclear industry is subject to some of the strictest radiation safety standards in the world.

Rigorous Radiation Safety Standards

Nuclear power facilities adhere to rigid radiation protection regulations under the Nuclear Safety Control Act, as well as recommendations from international organizations that provide global safety standards for radiation exposure.

Safety Measures in Canadian Nuclear Facilities

- Containment structures
- Radiation shielding
- Monitoring systems

Types of Radiation

- **Ionizing Radiation:** Produced by nuclear power facilities and medical x-ray machines
- **Non-Ionizing Radiation:** Produced by microwaves, or Wi-Fi
- **Naturally Occurring Radiation:** Naturally produced, present in everyday foods like bananas

Did you know?

Radiation is all around us. Radioactive elements such as potassium-40 and carbon-14 are present in some of the foods we eat every day, like bananas and potatoes.

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Radiation Safety

Radiation Dose Examples:

*Canadian Nuclear Safety Commission (modified)

Radiation dose
millisievert: mSv

1,000
500
100
50
10
1

1,000 mSv
Dose that may cause some symptoms of radiation sickness

50 mSv
Annual dose limit for nuclear energy workers

7 mSv
Typical chest CT scan

1.8 mSv
Average annual dose from natural background radiation in Canada

1 mSv
Annual public dose limit

1 mSv
Typical annual dose received by a worker in a uranium mine or nuclear power plant in Canada

0.1 mSv
Typical chest x-ray

0.02 mSv
Typical cross-Canada flight

0.005 mSv
Dental x-ray (intraoral)

0.001 mSv
Typical dose from living within a few km of an operating nuclear power plant in Canada for one year

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Technology Provider - CANDU® Energy

Canadian nuclear generating stations utilize CANDU® reactors – heavy water reactors developed by Canadian scientists and engineers. CANDU® stands for Canada deuterium uranium, reflecting its use of deuterium oxide (heavy water) as a moderator and coolant and uses natural (not enriched) uranium as a fuel. Canada is also one of the largest producers of uranium in the world.

CANDU®: A Proven Technology

- CANDU® reactors have accumulated more than 900 years of safe operating experience in seven countries around the world.

- There are 19 operating CANDU® reactors in Canada – 18 in Ontario and one in New Brunswick.

- Canada has exported CANDU® technology around the world with 30 reactors in operation globally. India operates 16 reactors that are based on the CANDU® design.

Better than before: the CANDU® MONARK

- The CANDU® MONARK™ 's robust Generation III+ Design is an evolution on the Canadian-made technology used around the globe.

- The reactor and its surrounding facilities are compact, allowing for a smaller footprint that ensures safety is paramount in every feature.

- This design is quieter than the previous generation of CANDU® reactors, minimizing disruption to surrounding communities and residents.

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CANDU®
Safety Features

- CANDU® MONARK™ is designed to resist high levels of seismic activity in alignment with international regulations.

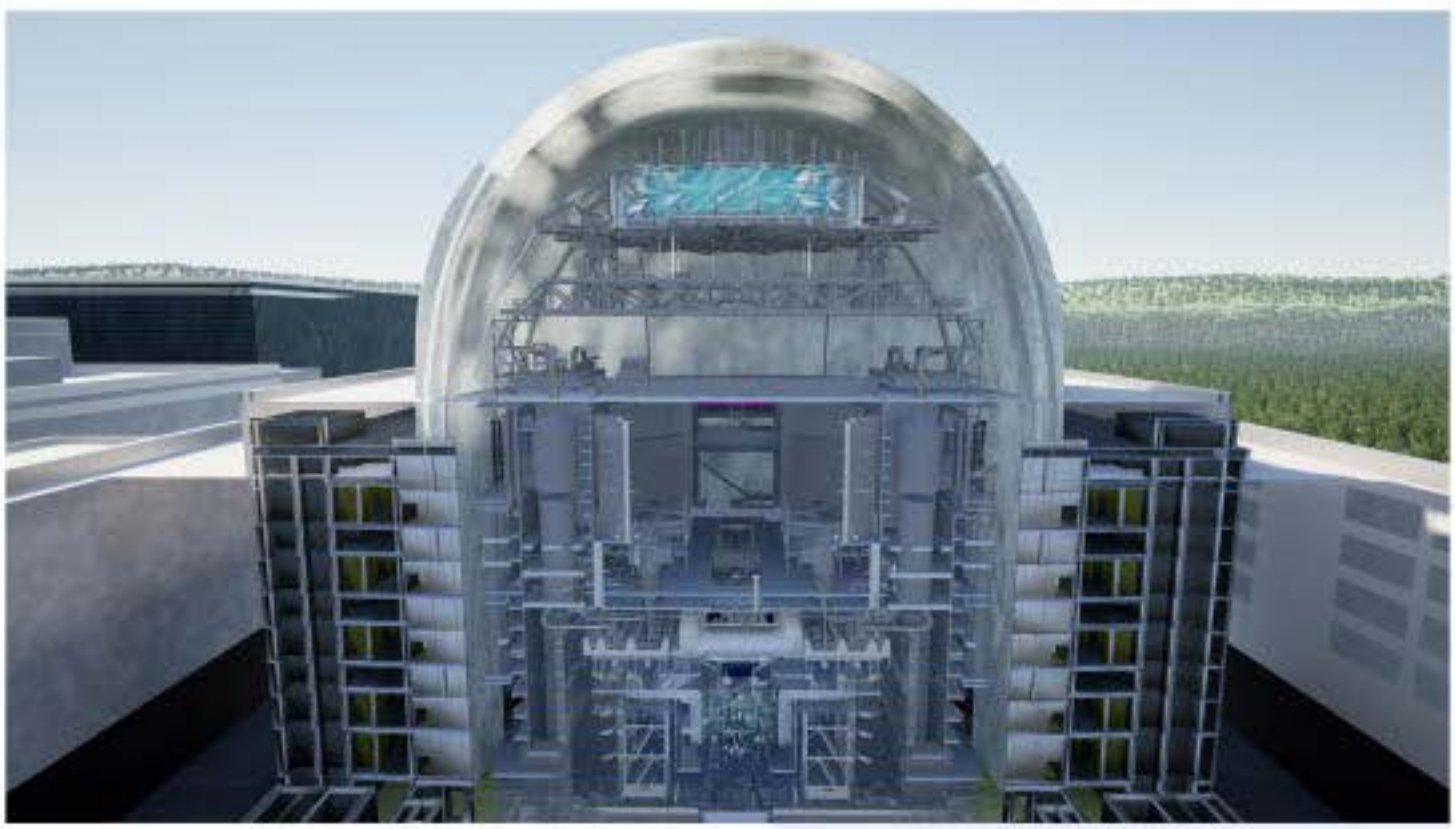
- Designed to withstand unlikely, high risk events including aircraft impact and extreme weather.

Passive Safety Systems

- CANDU® MONARK™ has multiple redundant safety features, and these have continued to improve over time, which include:

  - An elevated reserve water tank that will release, passively cooling the core without operator intervention for 72+ hours achieving what is called 'Walk-Away-Safe' design.

  - Systems that allow for the facility to continue safe cooling even under the most extreme accident conditions.



3D Rendering of Elevated Water Reserve Tank

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Technology Provider - CANDU® Energy

Medical Isotope's life-saving components

- CANDU® MONARK™ is the ONLY power reactor able to co-produce life-saving medical isotopes.
- Medical isotopes are used for medical equipment sterilization, cancer diagnosis and life-saving cancer treatments.
- CANDU® reactors in Ontario currently produce 50% of the world's supply of Cobalt-60 which is used to sterilize 40% of the world's single-use medical devices.

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Benefits of Nuclear Energy in Canada

Nuclear energy is one of Canada's safest and cleanest energy sources and is recognized globally as a critical tool in reducing greenhouse gases and fighting climate change.

Not only is it clean, but it also provides stable pricing and a reliable energy supply to help address Alberta's energy security.

Canada's nuclear industry is an economic engine, offering high-paying jobs to skilled workers, and significant revenue for Canadians.

*Source Canadian Nuclear Association and Government of Canada.

Jobs
89,000 people employed.

Revenue
$22 billion in annual GDP contribution.

Output
15% of Canada's electricity.

Environmental Advantage
80 million tonnes of CO2 emissions per year are avoided.

Energy Security
Nuclear Energy runs 24/7, 365 days a year.

Supply
Canada is the second largest uranium producer in the world.

Nuclear in Canada

15%
of Canadian electricity is from nuclear energy - 59% in Ontario.

$17
billion annual contribution to Canada's GDP - 76,000 jobs.

45
million tonnes of avoided CO2 emissions annually.

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Connect with Us

We'd love to hear from you. Whether you're curious about the Project, need media assistance or are interested in working with us - we're ready to answer your questions.

You can reach us by using the contact form or information listed below.

Email:

Info@EnergyAlberta.com

Media Inquiries:

Media@EnergyAlberta.com

Procurement

Energy Alberta is focused on building relationships with Indigenous, local and regional businesses. Register as a potential supplier by adding your name to our vendor list.

www.energyalberta.com/procurement-registry

Work with us

Energy Alberta will support employment and skills training opportunities for Indigenous, local and regional workers. Register today to receive updates on future opportunities to join our team.

www.energyalberta.com/jobs-registry

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