



Staff Report to Council - for Information

Title: Municipal Support Resolution for CANDU Reactors

From: Claire Dodds, Commissioner of Community Development

Date: October 17, 2024

Report Number: CDO-2024-017

Report Purpose:

This report is for information.

Report Summary:

CANDU Nuclear reactors have been foundational to the development of nuclear energy generation in Canada. Bruce County is home to eight of the nineteen CANDU nuclear reactors in Canada and plays a critical role in Ontario's energy strategy. CANDU technology, with its use of natural uranium, operational longevity and role in production medical isotopes has been a reliable economic driver in Bruce County. This report outlines the current use, impact and potential future of CANDU technologies.

Background/Analysis:

The information included in this report may assist Council in considering the notice of motion tabled at the October 3rd Council Meeting.

Bruce County is currently home to eight of the nineteen CANDU (Canadian Deuterium Uranium) Nuclear reactors that are operational in Canada, making it the largest of the CANDU fleet domestically. CANDU reactors, as Canadian technology, have now been deployed on a global scale including in countries such as South Korea, Romania and Argentina.

CANDU nuclear reactors have played a critical role in delivering Ontario's long-term energy strategy since their development post-World War II Canada. Douglas Point was the first commercial CANDU reactor build in the 1960's which paved the way for further Nuclear Development in Canada.

The development and operation of CANDU reactors at the Bruce Power site have had a significant economic impact, particularly in Bruce County. Bruce Power's presence in the region provides thousands of high-skilled jobs and through the production of 30% of Ontario's energy it contributes to economic growth. The current \$13 billion investment in the Major Component Replacement (MCR) Project by Bruce Power will extend the on-site CANDU reactors until the mid-2060s.

The CANDU reactor has several key advantages including its proven track record, the ability to use natural uranium and its operational longevity. One of the more recent advantages is

its use as an irradiation source for medical isotopes. While Cobalt-60 has been produced for many years, recent advancements through Isogen's (a joint venture between Framatome and Kinectrics) Isotope Delivery System has been used to irradiate Lutetium-177.

The CANDU Technology was developed and is owned by the Atomic Energy of Canada Limited (AECL) and was licensed to CANDU Energy, a subsidiary of Atkins Réalis. In November 2023, the company released the newest design, the CANDU MONARK, a 1,000 MW reactor. CANDU energy has a local presence in Bruce County and is actively involved in the replacement and maintenance of the existing CANDU fleet.

The CANDU MONARK, continues to utilize natural uranium as their nuclear fuel. Natural uranium is what is currently used in reactors across Canada. The process currently being undertaken by the Nuclear Waste Management Organization (NWMO) to site Canada's long-term solution for nuclear waste is built on several assumptions. Fuel waste placed in the proposed repository will have to meet certain criteria based on their regulatory approvals. To date, NWMO has largely built their assumptions around storing existing spent nuclear fuel from CANDU reactors that utilize natural uranium as their nuclear fuel.

At this time a technology has not been selected to be evaluated during the initial project description for Bruce C. In October 2023 Bruce Power launched an Expression of Interest process to further understand nuclear technologies that could help meet growing demand for clean electricity and advance decarbonization efforts in Ontario. This EOI process provides an opportunity for nuclear technology suppliers, of which CANDU Energy is one, to engage and express their interest in the potential Bruce site expansion.

The Initial Project Description (IPD) that was submitted by Bruce Power to the Impact Assessment Agency of Canada is clear that the proposed Bruce C project is technology-neutral. Through the IPD, Bruce Power has committed to undertaking a Plant Parameter Envelope process. This process will evaluate the potential impacts of the Project by considering multiple reactor technologies. A Plant Parameter Envelope is a set of values that define the characteristics of a reactor that might later be built at a site.

The IPD includes a list of technologies that are included as part of the initial evaluation. The list included is non-exhaustive, meaning that it is subject to change based on the ongoing technology evaluation process. The technologies being considered at this time are:

- Atkins Réalis - MONARK;
- Électricité de France - European Pressurized Water Reactor (EPR);
- Hitachi-GE Nuclear Energy - Advanced Boiling Water Reactor (ABWR);
- GE Hitachi Nuclear Energy - BWRX-300; and
- Westinghouse - AP1000 Pressurized Water Reactor

In June of 2024, Atkins Réalis released an economic impact assessment completed by The Conference Board of Canada of the CANDU MONARK Nuclear reactor. This report has been attached for reference. The report outlined the following impacts from deploying four new reactors:

- \$90.4 billion boost to Canadian GDP over the 88-year life of the 4 unit project. (\$40.9 billion during construction and \$49.5 billion during operations)

- 33,500 full-time equivalent jobs per year over 9 years created during construction. The power plant will sustain 3,500 full-time equivalent jobs per year over its 70-plus year operating life.
- \$29.1 billion in additional tax revenue across municipal, provincial and federal governments over the life of the project.
- The four reactors will add 4,000 MW of power capacity.

Overall, the CANDU technology has proven itself to be safe, reliable, as well as being an economic driver in Bruce County.

Financial/Staffing/Legal/IT Considerations:

There are no financial, staffing, legal or IT considerations arising from this report.

Interdepartmental Consultation:

The Office of the CAO was consulted on the development of this report.

Link to Strategic Goals and Objectives:

Growth and Innovation - Promote responsible growth

Link to Departmental Plan Goals and Objectives, if any:

N/A

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Departmental Approval: Claire Dodds, Commissioner of Community Development

Approved for Submission: Christine MacDonald, Chief Administrative Officer

Attachments:

Attachment 1 - An Economic Impact Assessment of the CANDU MONARK Nuclear Reactor report