NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

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Funding Canada's plan for the safe, long-term management of used nuclear fuel

Canada has a plan for its used nuclear fuel. It is called Adaptive Phased Management (APM), and it is up to the Nuclear Waste Management Organization (NWMO) to lead its implementation. Both the plan and the NWMO are funded by the waste owners.

Federal law requires waste owners to pay into trust funds each year. These funds cover the future cost of constructing and maintaining a deep geological repository for used nuclear fuel well into the future. Waste owners are also responsible for funding the day-to-day operations of the NWMO.

Waste owners are responsible for paying for Canada's plan

The development and implementation of Canada's long-term plan for used nuclear fuel is funded by the owners of used nuclear fuel in Canada: Ontario Power Generation, New Brunswick Power, Hydro-Québec, and Atomic Energy of Canada Limited.

The *Nuclear Fuel Waste Act* (*NFWA*) requires each of these four companies to establish independently managed trust funds and make annual deposits to ensure the money to fund this project will be available when needed. Effectively, this means the consumers who benefit from the electricity will, over time, fund the long-term management of the waste that is generated.

Each waste owner pays a fair share of the costs for Canada's plan

Each waste owner's deposit is calculated based on the number of fuel bundles it has produced to date. The amounts cover estimated fixed costs for the NWMO to construct and operate a deep geological repository, as well as variable costs associated with managing each fuel bundle.

The Minister of Natural Resources approved the funding formula in April 2009, and the NWMO has the responsibility for maintaining it.

Canada's plan for used nuclear fuel protects people and the environment

In 2007, the Government of Canada selected APM as Canada's plan for the safe, long-term management of its used nuclear fuel. APM emerged from a three-year dialogue with Canadians, and reflects their preferences and priorities. In these conversations, citizens shared a strong sense of responsibility. They made it clear that our generation has an ethical responsibility to put in place a long-term management approach for the used nuclear fuel we have produced and not leave it as a legacy for future generations.

The NWMO is responsible for administering Canada's plan. Each year, the NWMO releases updated figures about the amount of existing and projected waste, and long-term cost estimates every five years.

Funding is in place for the entire lifecycle of Canada's plan

Many factors will affect the long-term cost of Canada's plan: the volume of used nuclear fuel to be managed, where the deep geological repository is located, surrounding infrastructure, rock type and characteristics, design of the repository, and length of time allocated to monitoring the site following fuel placement.

The existing inventory of used nuclear fuel in Canada is approximately 2.9 million bundles, and more bundles are produced each year as nuclear reactors generate electricity. Based on the expected volume of 5.2 million fuel bundles, the total lifecycle cost of APM – from the beginning of site selection in 2010 to the completion of the project decades from now – is approximately $23 billion (in 2015 dollars) over the course of the entire project. This figure covers many decades of lifecycle activity – stretching well into next century. That does not mean, however, that we need $23 billion in trust funds today. Instead, we must calculate how much money needs to be in trust today so that it can continue to generate enough income over time to cover the costs of Canada's plan.

We know these funds will grow over time as waste owners pay into trusts and investment income provides returns. So how much do we need in trust today to cover the project's costs tomorrow and decades from now?

Based on best estimates, in 2019 dollars, the funding required to manage 5.2 million bundles from 2019 onwards is $9.2 billion – a sum that will grow and compound as the project advances so it is always available to cover the costs of Canada's plan.

Funding for Canada's plan covers pre- and post-construction and operations costs

Funding for Canada's plan must look decades into the future and base future costs on today's dollar value. The NWMO's detailed cost estimates ensure waste owners will fund the entire cost of planning and building the repository – as well as the costs of getting the used fuel to the facility and operating it for decades to come.

Included in the $9.2 billion funding requirement is $2.8 billion to select a site for the repository, complete a detailed design, develop the Centre of Expertise, acquire the site, evaluate environmental impacts, and obtain a site preparation and construction licence from the Canadian Nuclear Safety Commission (CNSC).

These pre-construction costs are paid for by the waste owners based on the annual budget as approved by the Board of Directors.



Funding for Canada's plan will also cover the costs of constructing a Centre of Expertise near the deep geological repository. This hub will be designed in co-operation with the eventual host communities.

The additional $6.4 billion included in the estimate will allow the NWMO to complete construction, transport the fuel to the repository, as well as operate, close, and monitor the repository. The *NFWA* requires that these post-construction costs be funded by waste owner contributions to the *NFWA* Trust Funds.

Trust funds are in place with regular contributions being made to meet project implementation costs:

- Trust fund balances at the end of 2018 were $4.3 billion.
- Waste owners are required to continue annual contributions to trust funds, ensuring the funds necessary for constructing the facility will be available by the time construction begins.

How much do waste owners contribute to trust funds for managing Canada's plan?

In 2019, the four waste owners are required to make a total trust fund deposit of $64.9 million.

This deposit represents the 2019 contribution towards the cost of the long-term management of the 2.9 million fuel bundles produced up to June 2018, as specified in the APM funding formula.

In addition to these trust fund contributions, waste owners were also responsible for funding the NWMO's annual operating budget.

Waste owners are also required under the *Nuclear Safety and Control Act* to provide to the CNSC financial guarantees dedicated to nuclear waste management and decommissioning.

Managing used fuel costs less than a tenth of a cent of the cost of producing a kilowatt

Paying for the long-term management of used nuclear fuel is a relatively small portion of the cost of electricity. The cost of the APM project is only about 0.1 cent per kilowatt hour of electricity produced.



The NWMO's financial plans are audited and approved every single year to ensure Canada's plan is well funded and will not be a burden on future generations.

Canada's plan looks a century into the future, and beyond

The NWMO expects to identify a preferred site by about 2023. After that, detailed site characterization and licensing activities could take about eight years. Construction is expected to take about 10 years. In this scenario, it is assumed that operations could begin between 2040 and 2045.

Operations are expected to last for about 45 years, depending on the volume of used fuel to be managed. After that, the repository will be monitored for an extended period of time – we have assumed 70 years for planning purposes

The NWMO provides regular updates on the progress of Canada's plan

The NWMO is required to produce annual reports on our progress, which are made public. We also maintain a social media presence on Facebook, Instagram, Twitter, and LinkedIn that provide up-to-date information. Our website (www.nwmo.ca) includes news stories about ongoing activities, as well as an archive for anyone interested in learning more about Canada's plan for used nuclear fuel.

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