NUCLEAR WASTE MANAGEMENT ORGANIZATION
SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

March 2018

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

In 2007, the Government of Canada selected Adaptive Phased Management (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.

Who will pay for the safe, long-term storage of used nuclear fuel?

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.

What factors influence the cost of the project?

The eventual cost of the APM project is impacted by many factors, including the volume of used nuclear fuel to be managed, location of the facility, 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 2.8 million bundles, and bundles continue to be produced as nuclear reactors generate electricity. The eventual number of bundles to be managed could be between 3.6 million and 5.4 million bundles, depending on factors such as the longevity and productivity of the nuclear reactors and decisions about refurbishments. If new reactors are built, the potential volume could rise to 7.2 million bundles.

For planning purposes, our cost estimate is based on an expected volume of about 5.2 million fuel bundles.

How much will it cost to manage these used fuel bundles over the lifecycle of the project?

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 – is $23 billion (in 2015 dollars). This figure covers many decades of lifecycle activity.

How much will it cost in today's dollars, starting now?

It is important to determine the amount that is required, in today's dollars, in order to have those funds available from now until the conclusion of the project. The funding required (using Jan. 1, 2018, present value) to manage 5.2 million fuel bundles from 2018 onwards is $8.9 billion. This takes into consideration expected investment income and does not include costs already paid for.

This funding requirement includes $2.7 billion in pre-construction costs (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). These pre-construction costs are paid for by the waste owners based on business plans approved by the Board of Directors.

Also included is $6.2 billion in post-construction costs (to complete construction, transport the fuel to the repository, and operate, close, and monitor the repository).

How much funding is already in place?

In accordance with the *NFWA*, waste owners have been making annual deposits to trust funds since 2002. These funds will be used for activities from the start of the construction phase forward. As of the end of 2017, the cumulative balance of the trust funds is $4.2 billion. Taking into account the time value of money and interest to be earned on trust fund balances, this will fully cover the cost of managing the used fuel bundles already produced (2.8 million bundles).

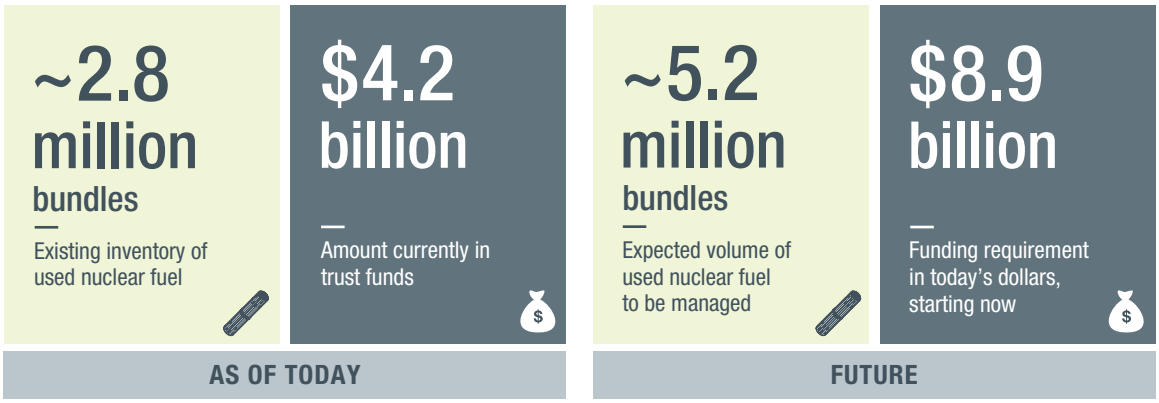
Under the funding formula, annual trust fund contributions will continue as long as used fuel bundles are being produced.

There is enough funding in place to cover the costs of long-term management for the country's existing inventory of used nuclear fuel.

Is this expensive relative to the cost of electricity?

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.



How long will the project take to implement?

Based on our latest plans, we expect to be in a position 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.

How can the public be sure that funding is in place?

There is a strong legislative framework in place to ensure funding will be available when needed to implement the APM project:

- The *NFWA* (2002) addresses funding of the APM project, and assigns roles and responsibilities.
- Waste owners must fund the APM project through annual deposits to trust funds at levels set by the NWMO.
- The Minister of Natural Resources approved the APM funding formula in 2009.
- Waste owners are also required under the *Nuclear Safety and Control Act* to provide to the Canadian Nuclear Safety Commission financial guarantees dedicated to nuclear waste management and decommissioning.

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

- Trust fund balances at the end of 2017 were $4.2 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.

Some companies produce more waste than others. How does the funding formula work?

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.

How much are the waste owners contributing in 2018?

In 2018, the four waste owners are required to make a total trust fund deposit of $67.7 million. This deposit represents the 2018 contribution towards the cost of the long-term management of the 2.8 million fuel bundles produced up to June 2017, as specified in the APM funding formula.

How can I stay up-to-date on long-term funding provisions for the APM project?

You can follow the growth in trust funds over time. As required by the *NFWA*, the NWMO makes public the audited financial statements of the trust funds when they are provided by the financial institutions annually. They are posted at www.nwmo.ca/trustfunds. In addition, in each annual report, the NWMO is required under the *NFWA* to provide a range of financial information. NWMO annual reports are posted online at www.nwmo.ca/reports.

For more information, please contact:

Nuclear Waste Management Organization
22 St. Clair Avenue East, Sixth Floor
Toronto, Ontario M4T 2S3, Canada
Tel.: 416.934.9814 Toll Free: 1.866.249.6966
Email: contactus@nwmo.ca
Website: www.nwmo.ca

© 2018 Nuclear Waste Management Organization