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Nuclear Energy Strategy for Canada

Canada

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Cat. No. M134-81/2026E-PDF (Online) / ISSN 978-0-662-34510-7

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2026

Table of contents

- [Foreword](#)
- [Executive summary](#)
- [Canada's nuclear advantage](#)
- [Guiding principles](#)
- [A vision for a thriving nuclear sector](#)
- [Pillar 1: Enabling new builds across Canada](#)
- [Pillar 2: Being a global supplier and exporter of choice](#)
- [Pillar 3: Expanding uranium production and nuclear fuel opportunities and supporting world-class long-term nuclear waste management](#)
- [Pillar 4: Developing new Canadian nuclear innovations](#)
- [Conclusion](#)

Foreword

Global energy systems are entering a period of profound restructuring. Countries are racing to secure reliable, low-carbon power while managing geopolitical exposure and meeting electricity demand growth driven by digitalization, electrification, and artificial intelligence. For Canada, this is not an abstract challenge — it is a direct test of whether the country can translate structural advantage into durable leadership.

Canada's nuclear heritage is among its most consequential national assets. On 17 August 1942, Minister C.D. Howe authorized Canada's entry into the nuclear age with characteristic directness: "Okay, let's go." Those three words launched one of the most significant scientific and industrial undertakings in the country's history. After the conflict ended, Howe made sure that what

followed was not a wartime anomaly; rather, he deliberately oriented nuclear research to peaceful, civilian purposes and the foundation of a sustained national capability: the CANada Deuterium Uranium (CANDU) reactor, developed through Atomic Energy of Canada Limited (AECL) in close partnership with Ontario Hydro and contributors across Canada's research and industrial base.

The CANDU build-out exemplified productive federal-provincial collaboration — each order of government contributing expertise and resources toward an outcome greater than the sum of its parts. Over the following decades, Canada constructed not just generating stations but a domestic supply chain, a world-class operating culture, and a workforce that came to define international best practice. Canadian reactors have powered homes, hospitals, and industry; supplied medical isotopes globally; and been exported to multiple continents, where they continue to operate under demanding conditions.

The past decade has reinforced this record. The successful on-time, on-budget CANDU refurbishments in Ontario — extending reactor life by at least thirty years — demonstrated that Canada's nuclear sector is commercially competitive and technically capable. That same project has produced one of the most future-ready nuclear workforces and supply chains on the planet.

2026 is a pivotal year. Ontario utilities are advancing plans for major large-reactor builds to complement the first Small Modular Reactor (SMR) in the G7. Alberta is developing a nuclear roadmap. Saskatchewan is pursuing both large and small reactor builds. New Brunswick is exploring expansion at Point Lepreau. The federal government is committed to working with provinces and

territories — who hold jurisdiction over electricity generation — to advance these ambitions in a coordinated, risk-shared manner.

This Strategy articulates how Canada will meet that moment: expanding nuclear capacity at home, asserting leadership in global export markets, securing the uranium fuel cycle, and investing in the innovations that will define the next generation of nuclear energy.

Tim Hodgson, P.C., M.P.

Minister of Energy and Natural Resources

Executive summary

Canada's electricity system is among the cleanest and most diverse in the world. It faces, however, a structural test: meeting a projected doubling of electricity capacity over the next twenty-five years driven by electrification of transportation, buildings, heavy industry, and data infrastructure. Nuclear energy is an essential component of that response, and accompanies the recent *National Agenda for an Electrified Canadian Economy*.

Canada is not starting from scratch. It holds structural advantages across the full nuclear value chain — from uranium mining through reactor technology to export track record — that virtually no other country can match. The global nuclear renaissance, in which 38 countries to date have endorsed the Declaration to Triple Nuclear Energy by 2050, creates time-limited opportunities that Canada is well-positioned to capture.

Building on these advantages, and in collaboration with provinces, territories, Indigenous communities, and the private sector, the

Government of Canada is advancing action under four strategic pillars:

1. [enabling new builds across Canada](#)
2. [being a global supplier and exporter of choice](#)
3. [expanding uranium production and nuclear fuel opportunities and supporting world-class long-term nuclear waste management](#)
4. [developing new Canadian nuclear innovations \(including fission and fusion\)](#)

This Strategy is both an energy plan and an economic one. It aims to accelerate nation-building projects, strengthen the domestic value chain, enhance energy security, and cultivate a high-value innovation ecosystem that underpins long-term national prosperity. It plans for workforce growth, positions nuclear — large reactors and SMRs alike — as an essential element of a modern clean grid, and recognizes the value of nuclear technology beyond electricity: research and development, medical isotopes, tritium management, and Canada's emerging role in the fusion fuel cycle.

The window to act is open. The commitments in this Strategy are designed to keep it that way.

[Back to Table of contents](#)

Canada's nuclear advantage

The global context

The world faces an energy inflection point shaped by geopolitical volatility, climate imperatives, and accelerating technological change. Nuclear energy has re-emerged as a strategic response: it delivers firm, low-carbon baseload power at scale and anchors energy security in ways that variable renewables alone cannot. The International Energy Agency estimates global nuclear investment reached approximately \$88 billion CAD in 2023 — nearly double the level of a decade earlier — and projects investment to reach between \$94 billion and \$202 billion CAD per year by 2030. At least thirty countries are actively pursuing their first nuclear builds.

Canada is a Tier One nuclear nation. It is one of a small group of countries worldwide with significant fuel-cycle capabilities — uranium mining, milling, refining, conversion, and fuel fabrication — combined with proven reactor technology, a deep R&D ecosystem, a skilled workforce, and a strong regulatory reputation. This convergence of assets places Canada in a qualitatively different position from most potential nuclear exporters.

Canada's domestic position

Approximately 13 percent of Canada's electricity is generated by nuclear energy using the homegrown CANDU (CANada Deuterium Uranium) reactor. The Government of Canada retains ownership of CANDU intellectual property through Atomic Energy of Canada Limited (AECL), which also oversees the Chalk River national

laboratory. AtkinsRéalis serves as the exclusive licensee for CANDU. More recently, Westinghouse — following its acquisition by Cameco and Brookfield — became Canadian-owned, broadening the country's technology base.

Canada is home to over 250 companies supporting a near-fully domestic supply chain, manufacturing high-precision components, providing operational services, conducting advanced research, and developing intellectual property. The sector generates approximately 90,000 direct and indirect jobs, and in the sector itself, 90 percent are high-skill roles. This workforce is currently leading the first SMR project in the G7 — the Darlington New Nuclear Project — while simultaneously completing on-time, on-budget CANDU refurbishments that set a global reference standard for project delivery.

Canada is the world's second-largest uranium producer and holds the world's largest deposits of high-grade uranium, concentrated in Saskatchewan's Athabasca Basin. It is the only country capable of producing sufficient uranium to supply its entire domestic reactor fleet. Because CANDU reactors operate on natural rather than enriched uranium, Canada's fuel supply chain is almost entirely domestic — insulating both Canada and other CANDU operators from the volatility of foreign enrichment markets. Nearly 90 percent of Canada's uranium production is exported, underpinning a significant strategic trade position.

Canada is also a recognized leader in radioactive waste management. Under the *Policy for Radioactive Waste Management and Decommissioning*, waste generators are fully responsible for managing and funding their waste liabilities. In 2024, Wabigoon Lake Ojibway Nation and the Township of Ignace agreed to take steps to host Canada's Deep Geological Repository for used

nuclear fuel — a milestone that reflects the sector's capacity for meaningful community engagement on complex, long-horizon decisions.

Canada's international offer

Canada's global nuclear value proposition is comprehensive. The deployed fleet of 26 CANDU reactors helps partner nations achieve energy security while avoiding over 30 million tonnes of CO₂ annually. Canada offers end-to-end integration: fuel supply, reactor technology, regulatory capacity building, ongoing technical support, industrial development opportunities, and waste management guidance — a package that few competitors can match in its entirety.

Several features of the CANDU design make it distinctively attractive in the export context. Natural uranium fuel eliminates dependence on geopolitically exposed enrichment supply chains. Reactor operation produces radioisotopes with significant health and scientific value. Membership in the Conexus operator network gives any CANDU operator access to the accumulated operating experience of all others.

Beyond reactor sales, Canada's manufacturing capabilities and service expertise are competitive across a range of technologies — including Westinghouse's AP1000 and GE Vernova Hitachi's BWRX-300 — positioning Canada as a reliable supplier of choice for countries seeking to diversify their nuclear supply chains regardless of technology selection.

Canada's federal financial agencies provide additional competitive leverage. Export Development Canada (EDC) offers financing, insurance, and risk management products for international

expansion. The Canadian Commercial Corporation (CCC) provides a government-to-government contracting framework that backstops Canadian suppliers and de-risks project delivery for partner governments. The Canadian Nuclear Safety Commission (CNSC), with over 80 years of regulatory experience, is regarded globally as among the most mature and credible nuclear regulators in the world — its approval carries significant weight in jurisdictions building their own regulatory frameworks. Canada has also significant experience developing nuclear-related standards to support the safe design, operation and regulation of nuclear facilities in Canada, and contributes to international standards, to ensure safety across many nuclear activities and support regulatory, policy and operational needs.

[Back to Table of contents](#)

Guiding principles

Principles for responsible nuclear development

Canada's approach to nuclear energy — at home and abroad — will be governed by the following principles. All government actions and investments will be assessed against them.

Safety, security, and safeguards

Canada maintains the highest standards of nuclear safety and security for people and the environment. This encompasses regulatory excellence through the CNSC, rigorous safeguards over nuclear materials, and continuous compliance verification.

Responsible development

Domestic and international nuclear development must uphold ethical and regulatory standards, respect Indigenous rights and Crown consultation requirements, and foster practices that minimize environmental impact while maximizing intergenerational benefit — including responsible radioactive waste management.

Non-proliferation

Canada is committed to preventing nuclear weapons proliferation and promoting peaceful uses of nuclear technology, consistent with its obligations under the *Treaty on Non-Proliferation of Nuclear Weapons*. These commitments apply to all Canadian nuclear technologies, materials, and exports, and distinguish Canada as a stable and principled partner for middle powers committed to peaceful nuclear energy.

Benefits for Canadians, including Indigenous peoples

Nuclear projects must deliver tangible economic, environmental, and energy security benefits for Canadians. This means creating high-quality employment, supporting long-term growth, and enabling Indigenous economic participation. Projects should prioritize Canadian intellectual property and reflect lessons from past resource development.

Principles of federal action

Electricity generation is a provincial and territorial jurisdiction. The federal government's role is complementary and enabling — bringing capabilities that individual jurisdictions cannot replicate at scale. Its primary levers are:

- **de-risking capital investment** through federal fiscal and financing capacity, prioritizing existing sources of government funding
- **regulatory modernization** to ensure federal processes are fit for the pace of deployment
- **pan-Canadian R&D ecosystem support** that serves all jurisdictions, including those not currently pursuing nuclear power
- **unified export promotion** through a Team Canada approach that presents a coherent, comprehensive Canadian offer to international markets

The federal government will seek to use available federal funding sources to the fullest extent when operationalizing this Strategy. The federal government will work in partnership with provinces and territories to respect each jurisdiction's unique context and needs, while pursuing complementary national objectives in energy security, industrial policy, and trade diversification. Moreover, given the shared interests and the need for collaboration, the Government will aim to maximize private sector and provincial investments to achieve the objectives in this Strategy.

[Back to Table of contents](#)

A vision for a thriving nuclear sector

Canada's Nuclear Energy Strategy will leverage the country's capabilities and competitive advantages to maximize economic, security, sovereignty, and trade diversification outcomes. It will expand Canada's global nuclear leadership through relationships built on fuel, expertise, and technology.

Enabling new builds at home

- centralize federal support for nuclear buildouts, after consulting with provinces, territories, and the nuclear ecosystem, to enable stronger coordination and prioritization of a national build-out with provinces and territories and with subject matter experts.
- target deployment of new large reactors, and SMRs in partnership with interested jurisdictions
- adopt a fleet approach to deployment concentrating regulatory and supply chain efforts behind a limited number of designs per application case
- facilitate financing through such tools as loan guarantees, green bonds, and risk-sharing frameworks between federal, provincial, and private partners
- modernize and sustain CANDU technology to ensure it remains viable and competitive for provincial and international buyers
- increase meaningful Indigenous participation in nuclear projects, including equity partnerships and capacity-building
- assess supply chain requirements for new builds, including heavy water production, heavy forgings, and nuclear-grade materials

- enable nuclear workforce expansion through coordinated training, academic, and experiential learning programs

Expanding Canada's global nuclear leadership

- adopt a unified Team Canada approach to organize trade priorities and present a structured, comprehensive Canadian offer to international partners
- develop standardized export approaches for trade promotion and diplomacy in partnership with federal agencies and the private sector
- secure the success of existing CANDU projects beginning with Romania's Cernavodă build and refurbishment programs
- win at least four new international CANDU markets by 2040 and engage six to ten new nuclear entrant countries over a fifteen-year horizon
- establish a Nuclear Export Strategy providing end-to-end lifecycle support with annual review of a priority-country pipeline
- position the Canadian supply chain beyond CANDU for participation in SMR and large light-water reactor projects globally
- develop a Canadian Nuclear Export Financing and Commercial Framework

Expanding uranium production and nuclear fuel opportunities and supporting world-class long-term nuclear waste management

- advance uranium resource development to secure domestic needs and support global fleet expansion
- secure fuel supply chains for all reactors in Canada, including enriched fuel for the BWRX-300 SMR
- review uranium mining and investment policies and assess energy security implications of foreign supply chain dependencies
- advance responsible waste management solutions by continuing to support waste projects such as the Deep Geological Repository project for used nuclear fuel

Investing in Canadian nuclear innovation

- strengthen R&D investment to increase sector competitiveness and leverage in emerging technologies, including in the uranium mining sector
- demonstrate a Canadian-controlled Generation IV microreactor by 2035 to support defence facilities and operations and, in the longer term, remote and northern communities
- sustain participation in multilateral nuclear innovation programs, including the Generation IV International Forum (GIF)
- invest in flagship research infrastructure and undertake a formal assessment of the case for a large-scale research reactor replacement
- anchor the fusion fuel cycle domestically through Canada's tritium expertise, supply infrastructure, and emerging fusion supply chain capabilities, and leverage it abroad

- develop a comprehensive Radioisotope Strategy to guide Canadian dominance in global isotope markets and build an end-to-end domestic value chain

[Back to Table of contents](#)

Pillar 1: Enabling new builds across Canada

In this section

- [Key objectives](#)
- [Federal commitments](#)
- [Context: Technology selection and sovereign capability](#)
- [Nuclear applications: A technology-use case framework](#)

Nuclear build-outs face well-documented barriers: regulatory timelines that undermine investor confidence, financing structures that have stalled major projects across the Western world, and supply chain gaps that constrain delivery capacity. Addressing these barriers is the primary function of Pillar 1. The federal government's role is that of an enabler and risk-absorber — bringing tools that private capital and individual provinces cannot deploy at the required scale.

Key objectives

1. **Ensure a modernized, cost-competitive CANDU design is available by 2030** in partnership with leading Canadian

organizations, sustaining Canada's sovereign reactor technology tradition.

2. **Enable construction of up to ten new large-scale reactors within Canada**, with two under construction by 2035 and five more planned or under development by 2040. At least one nuclear deployment (including SMRs) operational or under construction outside Ontario by 2035. A Canadian microreactor demonstrated by 2035 and deployed to remote communities in the late 2030s.
3. **Attract private financing to new builds**, including from pension and sovereign wealth funds, with an increasing share of private capital for successive projects.
4. **Increase Indigenous equity participation** in nuclear energy generation projects, alongside broader economic and leadership opportunities for Indigenous communities.
5. **Streamline the regulatory framework for nuclear projects** to ensure projects are reviewed in an efficient manner without compromising safety, security, and environmental protection all while upholding the rights of Indigenous peoples.

Federal commitments

- **Centralized federal support for nuclear buildouts and IP management.** After consulting with provinces, territories and the nuclear ecosystem, the Government will aim to centralize federal supports to execute a thirty-year deployment vision, coordinate prioritization with provinces,

territories, industry, and Indigenous peoples and track deployment targets as demand evolves. Particular attention will be paid to establishing a coordinated mechanism across the federal government, as well as reviewing the management and exploitation of Crown-owned IP, including consideration of adopting an IP management approach that aligns with the ambitious vision and objectives of this Strategy, with a view to ensuring to the best value for Canadians from historic government investments. Given nuclear projects' reliance on a mobile workforce, the Government will also coordinate with federal partners on workforce planning across major infrastructure programs, including Team Canada Strong.

- **CANDU viability.** The Government will work with provincial, utility, and industry partners to maintain the commercial viability of CANDU technology and ensure it remains a competitive option for provincial and international buyers.
- **Regulatory streamlining.** Impact Assessment and licensing processes for nuclear projects will be streamlined with a target of completing federal regulatory review within two years, while upholding Canada's environmental standards and the Crown's constitutional obligations to Indigenous Peoples. Further, the Government recently announced plans to take steps to make the CNSC the responsible authority for conducting impact assessments for all applicable nuclear projects under the *Impact Assessment Act*. The Government intends to review the nuclear regulatory and legislative framework to identify opportunities for further improvement.
- **Fleets-based approach.** Available federal funding will prioritize efficient roll-out of a limited number of reactor

designs per application (or use case) — on-grid, industrial heat, remote settings — to reduce regulatory burden, construction risk, and supply chain costs. Every project completed under this approach strengthens Canada's export reference base.

- **Federal Financing Policy.** A draft Policy on Federal Financing of New Nuclear Power Projects will be released by April 2027, by the Departments of Finance and Natural Resources Canada, outlining preconditions for federal support and the range of available financing instruments — including green bonds, Canada Infrastructure Bank participation, and loan guarantees. The policy will draw on recent public-private risk-sharing models such as the UK's Sizewell C structure, will align with financing approaches in the *National Agenda for an Electrified Canadian Economy*, the *Strategic Financing Framework* outlined in Budget 2025, and will set out frameworks for financial risk-sharing with provinces and private partners, beginning with Ontario.
- **Indigenous participation.** Indigenous capacity-building and equity participation — including direct employment in the nuclear workforce — will be a key consideration and priority for federal funding and financing decisions. The Government will coordinate potential supports across federal departments.
- **Supply chain assessment.** The Government will work with provincial, utility, and industry partners to assess supply chain requirements for new builds and identify priority areas for federal intervention and potential bilateral partnerships with other advanced nuclear energy countries with complementary capabilities — including domestic heavy water production, heavy forgings, and nuclear-grade alloys.

Canada's last heavy water production facilities closed in the 1990s; viable production pathways will be required to support a CANDU build-out. International partnerships will be leveraged where mutually beneficial.

- **Enable workforce expansion.** Leveraging Team Canada Strong, Canada will target doubling the size of its nuclear workforce to meet deployment needs through sustained government programs, investment in the Canadian Nuclear Learning Centre, support for academic and training programs, and coordination of professional training and experiential learning at Chalk River Laboratories — developed in partnership with provinces, territories, academia, industry, unions, utilities, and Indigenous peoples.

Context: Technology selection and sovereign capability

Provinces hold jurisdiction over technology selection for electricity generation, and their choices carry direct implications for how Canada benefits from its nuclear sector. The federal government will work with provinces to maximize use of Canadian intellectual property and supply chain capability wherever feasible, as well as to ensure safe, sustainable solutions are implemented for radioactive waste.

A large build-out will require a growing workforce. The International Atomic Energy Agency (IAEA) projects nuclear generating capacity could reach 2.5 times current levels by 2050, requiring a commensurate workforce; Canada must plan at that scale.

Where foreign-controlled technologies are selected, the Government will advocate for the majority of supply chain participation to accrue to Canada's domestic sector, and will

expect provinces and territories to have plans to manage the risks associated with foreign technology dependencies — including potential restrictions on exports, fuel fabrication access, and operational support.

Regardless of provincial technology choices, Canada will preserve the sovereign capacity to independently build, operate, and decommission reactors — sustaining the domestic industrial base and energy security position that underpin Canada's international credibility.

Nuclear applications: A technology-use case framework

Nuclear technologies serve multiple end uses. The 2018 SMR Roadmap identified three primary application categories for Canada: on-grid power, heavy industry, and remote communities. Technology readiness and provincial appetite have advanced significantly since then. The following framework illustrates the range of applications and technologies under consideration:

Table 1: Nuclear Technology Application Framework

Application (use case)	On-grid			Heavy industry	Remote communities
Technology category	Large-scale (>700 MWe)	Mid-scale (300-700 MWe)	Small-scale (<300 MWe)	High-temperature reactor	Microreactor (<15 MWe)
Generation	II/III/III+	II/III/III+	III/III+	IV	IV
Status	Operating and under construction	Operating and under construction	Under construction	Technology being developed and demonstrated	Technology in development

A fleets-based approach concentrates regulatory, procurement, and supply chain investment behind a limited number of technologies per use-case. This reduces cost and construction risk, accelerates domestic approvals, and generates the reference-plant track record that underpins export credibility. Federal funding will generally be directed to projects consistent with this approach, while accommodating the deployment of additional technologies where provinces and territories identify specific needs. As microreactor and other Generation IV technologies mature, the framework will expand to incorporate them.

[Back to Table of contents](#)

Pillar 2: Being a global supplier and exporter of choice

Pillar 3: Expanding uranium production and nuclear fuel opportunities and supporting world-class long-term nuclear waste management

- [Key objectives](#)
- [Federal commitments](#)
- [Context: Canada's uranium and fuel position](#)
- [Canada's nuclear waste ecosystem](#)

Geopolitical volatility has exposed fragility in nuclear fuel supply chains at every stage — mining, milling, refining, conversion, enrichment, and fabrication. Nuclear fuel supply chains are bifurcating, with Western and allied markets moving away from a hostile aggressor in favour of reliable actors. The United States, the largest nuclear market, enacted a law banning Russian supply. The European Union is also acting to end Russian nuclear fuel imports, but they have been challenged with the need to ensure alternative supplies. Canada is uniquely positioned to address this evolving demand, particularly in the upstream uranium stages, but there is also a compelling case for expanding downstream capabilities selectively.

Beyond leadership in uranium, Canada's nuclear waste management regime is among the most respected in the world – grounded in science-based regulation, transparent governance, and a polluter-pays framework that keeps responsibility with waste generators. Ensuring the ongoing stewardship of all nuclear waste generated from past, present, and future nuclear

activities is critical to the continued operation and growth of Canada's nuclear sector.

Key objectives

1. **Strengthen and secure fuel supply chains for all reactors in Canada by 2032**, including assured access to enrichment services from alliances and allied nations.
2. **Double uranium exports from 2024 to 2035**, supported by new mine production entering service by 2035.
3. **Ensure that proponents develop long-term plans for low- and intermediate-level waste management and disposal solutions under the Integrated Strategy for Radioactive Waste**, to ensure waste management pace matches the rate of new reactor deployment.
4. **Advance responsible waste management** solutions by continuing to support waste projects such as the Deep Geological Repository project for used nuclear fuel.

Federal commitments

- **Nuclear Fuels Table.** The Government will launch a Nuclear Fuels Table bringing together industry, provincial and territorial governments, and Indigenous groups to ensure Canada meets its fuel needs while sustainably growing exports in a context of rapidly evolving market and geopolitical dynamics.
- **Uranium investment policy review.** Canadian policies on uranium mining investment will be reviewed and updated as

necessary by 2027 to ensure Canada effectively attracts foreign capital while safeguarding Canadian interests and energy security.

- **Fuel supply chain security.** The Government will work with provinces, utilities, and suppliers to strengthen nuclear fuel supply chains for existing and planned reactors, including securing allied supply of uranium enrichment services. Further, Canada will advance discussions to explore a nuclear fuel alliance with allies to strengthen supply chains.
- **Nuclear Waste Management:** The federal government will continue to exercise oversight under *Canada's Policy for Radioactive Waste Management and Decommissioning* and the *Nuclear Fuel Waste Act* to ensure that safe and sustainable long-term management solutions are advanced for all radioactive waste in Canada.

Context: Canada's uranium and fuel position

Expanding uranium production and fuel capabilities is key to expanding Canada's nuclear sector both domestically and abroad. And as Canada and industry partners continue to expand their role in global nuclear fuel supply chains, there are opportunities to forge mutually beneficial alliances with trusted partners to ensure ongoing fuel supply security for all our nuclear reactors.

Saskatchewan's Athabasca Basin hosts the world's highest-grade uranium deposits — a geological advantage that allows substantially more uranium to be extracted per tonne of ore than anywhere else. Proven reserves are measured in hundreds of millions of pounds. Domestic producers and foreign investors are actively pursuing expanded production capacity, positioning Canada to assert itself more forcefully as a leading global

producer and exporter. This is a time-limited opportunity: the global nuclear build-out is accelerating, and securing long-term supply relationships now will lock in commercial and strategic advantages for decades.

Canada's CANDU fleet requires no enriched uranium, providing structural insulation from enrichment market volatility. With the deployment of the BWRX-300 SMR and any future light-water reactors, Canada will require modest ongoing enriched fuel imports. Some enrichment and fuel fabrication supply contracts with allied partners (European and American) are already in place, and Western enrichment capacity is expanding. Canada will continue to monitor the energy security implications of these supply chains and work with utilities and allies to maintain reliable access.

The longer-term question of whether Canada should develop domestic enrichment capability remains under assessment. The case would strengthen if the domestic non-CANDU fleet expands considerably, but in the meantime, forming deliberate partnerships with trusted allies – with Canada as the top supplier of uranium – will ensure our fuel security. The Nuclear Fuels Table will be the primary forum for tracking this supply chain analysis and to explore the scope of such an alliance.

Canada's nuclear waste ecosystem

The Government is committed to protecting the health and safety of Canadians and the environment, and ensuring Canada has continually effective disposal and management plans for radioactive waste of all levels. Maintaining this commitment as the sector scales is not optional: it is the foundation of public

confidence, Indigenous partnership, and Canada's international credibility as a responsible nuclear state.

Canada's nuclear waste management ecosystem follows the highest standards to ensure protection of people and the environment. Policy direction for waste management is set by the federal government. At the pinnacle, *Nuclear Fuel Waste Act* sets out obligations for the Nuclear Waste Management Organization (NWMO), established by energy producers, which is responsible for implementing Canada's selected approach for the long-term disposal of used nuclear fuel in a deep geological repository. As set out in Canada's Policy for Radioactive Waste Management and Decommissioning, waste generators and owners are responsible for the funding and safe management of all their radioactive waste. The Policy sets out that waste owners are required to collaborate on the development, implementation, and maintenance of an Integrated Strategy for Radioactive Waste, outlining an integrated, national plan for the management of all Canada's waste, particularly where gaps in long-term infrastructure planning exist. This work is facilitated through a Radioactive Waste Collaboration Committee.

The regulation of radioactive waste is governed by a comprehensive and mature regulatory framework centred on public safety, environmental protection, long-term stewardship, and Indigenous consultation. The Canadian Nuclear Safety Commission (CNSC), Canada's independent nuclear regulator, is responsible for licensing and overseeing the regulation of all aspects of nuclear waste management under the *Nuclear Safety and Control Act*, under which licensees maintain guarantees totalling \$25 billion in 2026. In addition, the *Nuclear Fuel Waste Act* requires waste owners to make annual contributions to trust

funds to fully cover the cost of implementing a Deep Geological Repository for used nuclear fuel, with these funds valued at \$6 billion at the end of 2025. Regulatory oversight, safety performance, and long-term waste management decisions are extensively documented and publicly reviewable. Parliamentary reporting, open Commission hearings, publicly posted decisions, and international reporting all contribute to a high level of transparency in Canada's nuclear waste governance system.

The CNSC and Transport Canada share the responsibility for ensuring the safe transport of nuclear substances and radioactive waste in Canada. Transporting these substances and waste is a highly regulated activity under the *Packaging and Transport of Nuclear Substances Regulations* and the *Transportation of Dangerous Goods Regulations*. These regulations incorporate related standards for the protection of people and the environment established by the International Atomic Energy Agency, which have been in place for more than 60 years and are used by most countries worldwide.

[Back to Table of contents](#)

Pillar 4: Developing new Canadian nuclear innovations

- [Key objectives](#)
- [Federal commitments](#)
- [Context: Canada's innovation imperative](#)

Canada's status as a Tier One nuclear nation was built on innovation: the CANDU reactor, successive research reactor deployments, and the pioneering of medical isotopes through cobalt-60 cancer treatment. Sustaining that status requires continued investment in the capabilities, facilities, and talent that generate next-generation technologies. Innovation capacity is not a luxury — it is how Canada maintains relevance in a field where the competitive landscape is shifting rapidly, and how it captures the long-term economic benefits that flow from being a technology leader rather than a technology adopter.

Key objectives

1. **Increase annual private-sector nuclear R&D investment** from approximately \$200–300 million (2019–2023 baseline) to \$500–700 million by 2032.
2. **Establish Canada as a leading jurisdiction in the emerging global fusion fuel cycle market** through international partnerships; Research, Development, and Demonstration (RD&D) expertise; and domestic infrastructure — including the Centre for Fusion Energy.
3. **Develop and demonstrate a Canadian-controlled Generation IV microreactor technology before 2035**, with a long-term view toward civilian commercial deployment.
4. **Invest in flagship research infrastructure**, expanding research reactor capacity by the early 2030s, alongside a formal assessment of the case for a large-scale research reactor replacement.

5. **Develop a comprehensive Radioisotope Strategy** to grow Canada's share of the global medical isotope market by at least 10 percent, support the expansion of the domestic value chain, and capture emerging opportunities.

Federal commitments

- **Industry-led applied R&D.** The Government will continue investment in industry-led applied R&D through a renewed and expanded program, with an immediate focus on advanced construction techniques that reduce project risk — a critical bottleneck for new build competitiveness. R&D efforts will also include continued support for emerging technologies, including innovations in the uranium mining sector.
- **Fusion energy initiative.** Leveraging Canada's extensive tritium expertise, the Government will implement a coordinated federal approach to anchor Canada's global leadership across the fusion fuel cycle. This coordinated effort will accelerate priority investments — including with the UK and G7 allies — building on UNITY-2 (the world's first fully integrated deuterium-tritium fusion fuel cycle test facility at Chalk River) and working with Ontario and other partners through the Centre for Fusion Energy.
- **Canadian microreactor program.** Through the Department of National Defence, the Government will finalize a feasibility program to support a decision on RD&D for a Canadian-controlled Generation IV microreactor and supporting systems to provide heat and power for defence facilities and operations — with a long-term view to civilian commercial deployment. Microreactor concepts in this class — graphite-

moderated, heat-pipe-cooled, featuring accident-tolerant fuel and passive cooling systems — trace their lineage to AECL's Nuclear Battery program of the 1980s and 1990s. Their inherent stability, extended refuelling cycles (approximately fifteen years), and suitability for off-grid and northern environments make them compelling candidates for both defence and remote civilian energy applications.

- **Nuclear innovation ecosystem review.** The Government will launch an independent review of Canada's national nuclear innovation ecosystem, with a focus on research infrastructure needs, regional requirements, and models for sustaining long-term operational costs. The review will consider deployment of smaller research reactors (such as SLOWPOKE-2 derivatives) in regions developing in-jurisdiction expertise to support their deployment ambitions.
- **Large-scale research reactor.** Complementing the independent review, the Government will leverage the Pan-Canadian Multipurpose Research Reactor Alliance to support consideration of the case for a large-scale research reactor to replace the National Research Universal (NRU) reactor — meeting the needs of the R&D community and industry across nuclear and non-nuclear applications.
- **Radioisotope Strategy.** Natural Resources Canada will lead the development of a comprehensive Radioisotope Strategy, in collaboration with federal partners, addressing Canada's role in growing global isotope markets and identifying actions to ensure Canada continues to lead. The Strategy will cover medical, industrial, agricultural, and next-generation technology applications (including quantum computing), and will encourage continued Indigenous equity partnerships in the isotope sector — building on models such as the

Gamzook'aamin aakoziwin partnership between Saugeen Ojibway Nation and Bruce Power.

Context: Canada's innovation imperative

Nuclear ecosystems need investment to enable a country's nuclear energy ambitions. In Budget 2024 the government committed \$2.2 billion over ten years in capital investments at the Chalk River Laboratories to allow AECL to combine the capabilities of outdated facilities into a modern facility and laboratory research complex that can support Canada's continued nuclear energy leadership, including for CANDU technology; nuclear safety, security and forensics; small modular reactors; reactor fuel development; and supporting utilities with reactor life extension and reliability. Beyond infrastructure, as the owner of IP for both CANDU and other reactor designs, technologies, processes, and innovations, AECL plays a key role in supporting cutting-edge nuclear research and development.

The shutdown of the National Research Universal reactor in 2018 removed a cornerstone capability — one of the world's largest research and test reactors since the 1950s — that had been critical to CANDU development, materials and fuel research, isotope production, and talent attraction. Replacing this infrastructure is a strategic priority, not simply a scientific one. Research reactors are foundational to maintaining Canadian expertise and competitive position as the next generation of nuclear technologies matures.

Canada's isotope position illustrates the broader challenge. For nuclear medicine alone, the global market was valued at \$12.6 billion in 2023 and projected to grow at 15 percent annually through 2026. Despite being a historical leader, Canada captures only a fraction of this value — largely because processing,

packaging, and high-value conversion occur offshore. Aging infrastructure, fragmented financing, regulatory barriers, and insufficient strategic focus have eroded a position that Canada built and should be defending. The Radioisotope Strategy is the vehicle for reversing that trajectory. Non-medical isotopes present a parallel opportunity: they support industries representing over \$770 billion of Canada's GDP, and global markets for specific isotopes are growing significantly, driven by quantum computing, fusion energy, and clean technology applications.

In fusion, Canada holds a structural advantage that few countries can claim. Decades of CANDU operation have made Canada a global leader in tritium production, handling, and supply — capabilities that sit at the centre of the fusion fuel cycle.

Investments in UNITY-2, the Centre for Fusion Energy, and allied partnerships position Canada to be an indispensable partner in early commercial fusion deployments, not merely an observer of a technology others are building.

Maintaining and extending Canada's innovation leadership requires sustained investment in intellectual property, graduate research, R&D intensity, and the facilities that attract top-tier international talent. The evidence linking these inputs to long-term GDP growth is robust. Canada built a Tier One nuclear position through decades of disciplined investment; sustaining that position in a more competitive and better-resourced global field requires the same commitment.

[Back to Table of contents](#)

Conclusion

Canada operates in a global environment that is more competitive and less predictable than at any point in the postwar era. Meeting that environment requires strengthening every source of strategic advantage available. Nuclear energy is among the most significant of those advantages — and unlike many strategic assets, it is one Canada has already built, proven, and exported.

Expanding nuclear capacity at home delivers firm, clean electricity for a grid facing decades of demand growth, reinforces energy security, and creates high-quality employment in communities and regions across the country. Growing Canada's presence in global nuclear markets generates durable bilateral partnerships, advances trade diversification, and positions Canadian firms and technologies at the centre of one of the most consequential infrastructure build-outs of the coming decades.

The four pillars of this Strategy — enabling new domestic builds, asserting export leadership, securing the uranium fuel cycle, and sustaining innovation — are mutually reinforcing. A successful domestic build program generates the reference-plant credibility that drives export wins. Export wins deepen supply chain investment that strengthens domestic delivery. A strong innovation ecosystem produces the technologies that underpin both. Uranium leadership anchors the entire value chain.

The global nuclear renaissance is creating a time-limited window. Other countries are moving quickly, investing heavily, and competing for the same markets and partnerships that Canada is well positioned to secure. Hesitation is not a neutral choice; it is a decision to cede ground that will be difficult to recover.

The Government of Canada, through this Nuclear Energy Strategy, is committed to moving with the urgency the moment demands. The country has done it before. The assets are in place. The opportunity is clear.