



**Submission to the House of Commons
Standing Committee on Finance**

August 4, 2017

Executive Summary

The Canadian Nuclear Association (www.cna.ca) is pleased to make this submission to the House of Commons Standing Committee on Finance as part of the Committee's pre-budget consultation.

Canada is one of a very small number of top-tier nuclear countries with capabilities across this spectrum. Our industry's strategic objective is to keep Canada in this top tier for the long term. This in turn will strengthen Canada's position in the top tier of competitiveness, productivity, and sustainable energy.

The Canadian nuclear industry provides better medical diagnostics and therapies, imaging that improves materials quality and safety (and thus advanced manufacturing competitiveness), and electricity without the emissions that drive climate change. The industry directly employs 30,000+ Canadians and another 30,000+ Canadians indirectly through our suppliers. Canada's nuclear fleet currently meets over 60% of Ontario's electricity needs and over 16% of Canada's, with clean energy and a very small ecosystem footprint.

According to the Canadian Manufacturers and Exporters association, the industry generates nearly \$7 billion of economic activity, exports \$1.2 billion in goods and services, and pays \$1.5 billion in federal and provincial taxes. Ontario's current \$25 billion clean investment in plant refurbishments is a massive endorsement of the value of our current reactor fleet.

The nuclear industry funds its own waste management and decommissioning, rather than externalizing these costs to others. When considering the entire power generation life cycle, nuclear is one of the cleanest energy technologies available, and can reliably generate electricity on a scale not matched by renewables, from a far smaller land base.

No other set of technologies in Canada holds as many solutions to the key policy objectives of Canada's federal and provincial governments. Some of these objectives are transformative – transitioning to a low-carbon, clean energy economy, for example. Other objectives have more immediate impact on the daily lives of Canadians in the form of middle-class employment, community growth, opportunities for indigenous peoples, environmental protection, synergies with advanced manufacturing, innovation in the essential 21st century sectors of automation, materials sciences and human health, and export growth.

The nuclear industry's budget-related requests fall into four areas:

- a. **Support for nuclear exports**
- b. **A national nuclear technology roadmap**
- c. **A national nuclear innovation council**
- d. **Supporting advanced materials and manufacturing**

A National Nuclear Strategy

The recent study of the House of Commons Standing Committee on Natural Resources (RNNR), “The Nuclear Sector at a Crossroads,” describes the position of this industry since the successful restructuring of the federal Crown corporation, Atomic Energy of Canada Limited (AECL).ⁱ

Canada’s Nuclear Leadership Forum has set its vision for Canada to remain among the handful of top-tier countries in civil nuclear technology. Government participation is needed to realize that vision. With the completion of AECL restructuring, the time is right for a renewal of government engagement in the long-term strategic direction of this industry.

The requests below align with Committee report’s recommendations.

Support for Nuclear Exports

The Canadian Nuclear Industry is pleased that Global Affairs Canada and Natural Resources Canada recently partnered with us to establish an International Markets Working Group on nuclear. We are working together to better inform and mobilize the Trade Commissioner Service for our industry. This has been a very positive advance, one that we look forward to sustaining.

As the IMWG has heard, our industry is currently pursuing a number of international opportunities in both CANDU and non-CANDU markets, including

- **Development and export of new CANDU reactors internationally** - There are several CANDU new build opportunities underway led by SNC-Lavalin. Operation and Maintenance (O&M) services to existing CANDU fleet and Light Water Reactors around the world. A number of key players within the Canadian Nuclear Industry provide O&M services to utilities both in Canada and abroad
- **Life extension of existing reactors** - Leveraging the experience of the Canadian and offshore life extension projects, the Canadian Nuclear supply chain is well positioned to support the life extension of both CANDU and non-CANDU reactors around the world. Canada has world-class expertise and best practices in emission control, environmental protection, and safety.
- **Research and development opportunities** - Canada’s strong background in nuclear research and development creates a number of international opportunities that can generate commercial revenue as well as advancing the country’s science and innovation agenda.
- **Medical Isotopes** - Canada is a world leader in the production and export of medical isotopes, nuclear medicine technology, and other applications of nuclear to the life sciences

The RNNR committee report specifically recommended “providing industry with the necessary regulatory and/or diplomatic resources to support their international exports and operations” and “considering the expansion of export credits to include the full scope of Canadian nuclear exports.” To fulfill these recommendations, we suggest that the role of government includes:

Export financing - Nuclear is capital intensive and requires long lead times, so the cost of capital is a critical factor. The availability of export credit from financial institutions such as Export Development Canada is essential for Canadian nuclear companies’ employment and to maximize Canadian economic impact. These financing transactions have supported Canada’s nuclear exports in the past and regularly exceed the capacity of EDC alone. In scenarios where transactions exceed \$500M the Canada Account program is accessed. Stronger linkages must be established between industry, EDC, and the Canada Account program. For example, a potential export opportunity in Romania could require export credit financing in excess of \$1.2B to support the Canadian industry. According to Canadian Manufacturers and Exporters, construction of a single CANDU reactor abroad has about \$1.3 billion in economic impact in Canada and drives over 2,200 person-years of employment.

Government political support in export markets - Nuclear technology sales have a strong political dimension. The customer country may, in effect, be committing to a century-long international partnership, one that cannot be divorced from foreign policy. This commercial relationship must fit into the foreign policy context, and it requires very clear government support from the vendor’s country.

A National Nuclear Technology Roadmap

Employment, skill, economic, health and diplomatic benefits accrue to Canadians from having a viable and successful nuclear industry and remaining a top-tier nuclear country through the 21st century. There are various views of what specific technologies must lie along that path for Canada in the decades ahead. Industry describes that pathway, and the technologies on it, as the “National Nuclear Technology Roadmap.”

A process is needed to reach national consensus, and industry has done substantial thinking about how to do this. Government participation is needed if the roadmap is to be truly national and strategic (currently, industry science and technology efforts are skewed somewhat toward resolving more immediate challenges with existing assets and technologies, such as reactor life extension). It is also clear that the roadmap must include building of new reactors of some kind – perhaps several kinds -- in Canada, as without such construction we cannot maintain our supply chain, our skill base, or our credibility in export markets.

The roadmap must be not only a description of where Canada's nuclear industry wants Canada to go, but also a basis of engagement between industry and governments and other stakeholders toward the shared vision of a clean energy Canada. The CNA has exchanged views with government officials and with the Parliamentary Secretary for Natural Resources on this concept. The collective intention is for this to be a Roadmap for Canada as a country (not just our industry), one that will be a living vision with multi-sector engagement.

Industry has suggested that the Nuclear Technology Roadmap will outline four pathways towards domestic reactor new build.ⁱⁱ It will identify key technological, financial, infrastructure, economic, social and licensing considerations and challenges posed by each pathway, while providing a snapshot of industry's current and planned activities in advancing along them. It will set out the respective policy and investment roles of governments (federal and provincial), in partnership with industry, to secure the objectives and benefits that nuclear technology provides and the close alignment of the industry's capabilities.

The Canadian nuclear industry's energy vision is to help governments and stakeholders provide the quantities of clean, reliable and virtually unlimited energy that will bring prosperity, jobs and growth in a decarbonizing economy. This continues a contribution that the industry has made since the 1960s, and the first step towards sustaining it is Ontario's current \$25 billion clean investment in plant refurbishments.

For Canada's indigenous and remote communities, too, our vision is how abundant energy from advanced small reactors would empower and uplift them – providing clean water, education, development and new quality of life. We foresee collaboration with such communities, as they take charge in selecting the energy sources that suits their needs best. For regions served by existing grid systems, we see nuclear as the stable, reliable heart of a decarbonized energy system nationwide.

CNA plans to spend in the range of \$40,000-90,000 for the first phase of this roadmap work in 2017. A matching contribution by government would allow us to scale up and accelerate this effort. *This aligns with the recommendations of the RNNR committee report.*

A National Nuclear Innovation Council

The longer-term development of the Nuclear Technology Roadmap will require a multi-stakeholder governance structure. The CNA has acquired a consultant's study on Canadian models for such an entity, and the lessons learned in developing those models (case studies came from aerospace, forestry, electric power, oilsands and pipelines).ⁱⁱⁱ These models have been successful in driving profitable innovation, and most of them had government participation.

The RNNR report's final recommendation is that "industry, along with academia and innovators, establish a nuclear innovation council with representatives from the federal and provincial governments". Industry would like to invite the Government to an exchange of views on the Roadmap process, the consultant's study, and the most appropriate governance and funding models for this sector. A useful complementary step, suggested by government interviewees, would be a gap analysis of the current state of nuclear sector research and development. Matching contributions by CNA and government of \$40,000 each could fund this work.

Supporting Advanced Materials and Manufacturing

The impending closure of the National Research Universal (NRU) reactor at Chalk River, Ontario in early 2018 creates challenges for researchers' access neutron beam facilities, which in turn affects important segments of Canada's science, technology and innovation ecosystem. CNA is a participant in the Canadian Neutron Initiative, a collaborative effort to address these challenges. CNI is making a separate submission to the Standing Committee on Finance, requesting \$24 million over three years for a university-led framework.^{iv} CNA endorses the CNI request.

This aligns with both the second recommendation of the RNNR report, which says inter alia that the Government should "continue its support for Canadian nuclear R&D and innovation in the short, medium and long term, by considering long-term options to provide a reliable, high-flux neutron source for Canadian researchers," and the fifth recommendation, that the Government should "sustain and improve Canadian expertise in the nuclear sector by supporting efforts by Canadian universities and research/training organizations to build new facilities and equipment."

Conclusion

Canada's nuclear sector supports our country's clean energy, diplomatic influence, health care, manufacturing, agriculture, and trade. Federal public and fiscal policy that recognizes and supports nuclear technology is an investment in Canada's future and our strategic influence abroad -- and can help ensure clean prosperity for all Canadians, for decades to come. The requests above are for essential enablers to help Canada achieve its social, energy, environmental and economic goals.

Finally, we reiterate our past argument that nuclear technology should always be included in the government's vision of clean technologies and infrastructure.

ⁱ House of Commons, Standing Committee on Natural Resources, “The Nuclear Sector at a Crossroads,” June 2017.

ⁱⁱ Canadian Nuclear Association, “A Project Proposal for a Canadian Nuclear Technology Roadmap: Innovation for a Decarbonized World,” July 2017.

ⁱⁱⁱ Stratos, “Analysis for a Nuclear Sector Science, Technology and Innovation Collaboration,” July 2017.

^{iv} Canadian Neutron Initiative, “Submission to the House of Commons Finance Committee,” August 2017.