



## Canadian Nuclear Society Société Nucléaire Canadienne

480 University Avenue, Suite 200, Toronto, Ontario, Canada M5G 1V2 <http://www.cns-snc.ca>  
Tel./Tél.: 416-977-7620 Fax/Télécopieur: 416-977-8131 E-mail/Courriel: [cns-snc@on.aibn.com](mailto:cns-snc@on.aibn.com)

December 21, 2006

Honourable Gary Lunn  
Minister of Natural Resources  
580 Booth Street, 21st Floor  
Ottawa, ON  
K1A 0E4

Honourable Jim Flaherty  
Minister of Finance  
140 O'Connor Street  
Ottawa, ON  
K1A 0G5

Honourable John Baird  
President of the Treasury Board  
140 O'Connor Street  
Ottawa, ON  
K1A 0G5

Dear Ministers:

### **Re: The Future of Nuclear Energy in Canada**

The Canadian Nuclear Society (CNS) understands that the Government of Canada soon will make policy decisions about investment in the future of nuclear energy, and we wish to contribute our insight to this topic. The CNS is a not-for-profit professional society of over 1000 members -- including scientists, engineers, and technical staff dedicated to research in nuclear science and technology, to application of nuclear techniques in medicine, to extraction of nuclear fuels, and to the design and construction of nuclear reactors for electricity production.

The following key points summarize our thoughts on this important subject. Further detail is provided in the attached notes, which follow the same subject headings.

#### 1. Electricity Demand

Conservation and efficiency measures will achieve some savings in the demand for electricity, but this will be offset by the effects of population growth and by added electricity requirements for new technologies. Thus there will be a continued growth in demand for electricity.

#### 2. Electricity Supply

New sources of energy supply will be required -- to replace existing capacity as it is retired and to meet the growing demand. This will require a mix of energy types, one of which will have to be nuclear power.

#### 3. Sustainable Technologies

Nuclear generation is the only base-load technology which is widely available and meets sustainability requirements. Canada has large uranium resources, and the Government of Canada has recently received recommendations from the Nuclear Waste Management Organization (NWMO). If adopted, these recommendations will serve to resolve the long-standing public concerns about what to do with radioactive waste.

#### 4. Nuclear Capability in Canada

Canada has an indigenous nuclear capability developed through a long history of technical initiatives and successes. Regardless of what reactor technology might, in future, be adopted, we need to maintain this capability in order to respond to the immediate, zero-emissions electricity requirements of Canadian provinces and those of the developing world. Thus, re-investment and maintenance of funding in the facilities and operations of the Chalk River laboratories is essential.

I will be pleased to respond to any questions you may have on this important issue.

Sincerely yours,

Daniel A. Meneley, President

CNS Background Notes re:  
The Future of Nuclear Energy in Canada

1. Electricity Demand

The growth rate for electricity demand has traditionally followed the growth of the Gross Domestic Product, which in turn has tended to follow population growth. However, uncertainties do exist. For example, a major and successful campaign to conserve electricity, and to improve efficiencies, can reduce the rate of growth. An opposing uncertainty is the future cost of fossil fuels, which are used for both heating and transportation. Supply shortages and cost increases could lead to a significant shift towards greater electricity consumption for home heating and hybrid vehicles. Thus electricity demand forecasts will exhibit a range of possibilities. However, to avoid future electricity shortages, generation planning (which requires a long lead-time) should accommodate the higher end of the demand forecasts. Overall, we expect that a substantial amount of new electricity generating capacity will be required.

2. Electricity Supply

Uncertainty is also a common factor in all generation forecasts. The most important uncertainty arises from the fact that natural gas is now in very short supply in Canada, and indeed in all of North America. Further, world oil production appears to be past its peak, with large and increasing imports being required from unstable areas of the world. Within the next few decades, shortages of both natural gas and oil must be expected, with consequent price increases. This situation, combined with the need to reduce the emission of greenhouse gases, will restrict the growth of electricity generation using fossil fuels.

In a few selected areas of Canada, opportunities exist for the construction of large-scale hydro-electric generating stations, but these locations are long distances from the major centers of consumption, resulting in high transmission costs. And hydro-electric developments are increasingly subject to environmental restrictions and public objections.

Alternate sources of energy supply will be required -- to replace existing capacity as it is retired and to meet the growing demand. This will require a mix of energy types, including wind, solar, bio-mass, and small hydro. However, these options are expensive and generally exhibit low capacity factors. There will be a significant growth in these renewable energy sources over the next few years, but their contribution to total electricity supply will remain relatively small.

Existing nuclear technology is ready and able to fill any supply shortage, subject to the necessary lead time of five or six years from project commitment to full service. Project costs are well established and competitive. The recently completed Qinshan-3 CANDU project in China is offered as a clear example of this capability. That project was finished ahead of time and under budget at a price highly competitive with other Chinese nuclear-reactor projects carried out by French corporations. There is no reason why well-managed, fixed-price nuclear projects in Canada would not achieve the same results. And nuclear projects have a

high domestic content. Based on experience with previous domestic nuclear projects, it is expected that any new project in Ontario which uses Canadian technology would be completed with over 90 percent of the project cost spent in Canada.

The Government of Ontario has already decided to build new nuclear plants. The Government of Alberta is expected to approve the use of nuclear energy to augment the energy supplies required for extraction and upgrading of heavy oil and bitumen from Alberta's oil sands. And the province of New Brunswick is likely to commit to a second nuclear plant at some time in the next few years. Canadian nuclear technology is economically competitive and can meet the above requirements in a timely fashion. The choice of Canadian technology will provide lasting economic benefits for Canada and Canada's workers and businesses.

### 3. Sustainable Technologies

Nuclear energy is properly classified as a Renewable Energy Source. This source of energy is inexhaustible, since it is fully capable of supplying the total world energy requirement for thousands of years (D. Lightfoot et al., Proceedings of the EIC Climate Change Conference, Ottawa, May 2006). It is clean and safe, and therefore provides a sustainable replacement for declining fossil energy sources in the medium- and long-range future.

Nuclear generation is the only widely-available base-load technology which meets sustainability requirements. Canada has large uranium resources which can be mined in a manner which is environmentally acceptable. The Government of Canada has recently received waste management recommendations from the Nuclear Waste Management Organization (NWMO). The Canadian Nuclear Society supports these recommendations. If adopted, these recommendations will serve to resolve the long-standing public concerns about what to do with radioactive waste.

### 4. Nuclear Capability in Canada

Over the years, the federal government has invested a substantial sum of money in nuclear R&D. This has led to the development of a healthy nuclear industry in Canada, which has created revenues that greatly exceed the government funding. And these revenues have led to a significant increase in government tax revenue, from both corporate and personal income taxes. However, major government re-investment in Canada's nuclear research & development laboratories at Chalk River is long overdue. Re-investment and maintenance of funding in the Chalk River laboratories facilities and operations will help to support the current and future CANDU fleet.

Therefore, we believe there is a pressing need for continued support of Canadian nuclear reactor technology (for example the Enhanced CANDU 6 reactor) and next-generation reactor concepts such as the Advanced CANDU Reactor (ACR). This will enable Canada to maintain its excellent nuclear program, including its successful export record, over the next fifty years.

If such support is not provided, the CNS anticipates that our indigenous reactor concept will be replaced by some other foreign nuclear technology, with a significant negative impact on the domestic nuclear industry. In that event, the Canadian investment in nuclear reactor support at Chalk River Laboratories and other locations around the country will have to be retooled to support whatever foreign technology is chosen, at substantial added cost.

Finally, we wish to emphasize that CNS members, and the Canadian nuclear industry at large, are fully prepared and able to carry out the engineering and project activities to answer the electricity generating needs of Canada, now and in the future.

Canadian Nuclear Society, December 21, 2006