Nuclear Energy in Canada

Presented by:

Natural Resources Canada

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The Canadian Energy Policy

- Canadian energy policy addresses a number of goals:
  - Energy supply security
  - Ensuring Canadian productivity and competitiveness
  - Addressing air quality objectives
  - Fostering innovation
- Canada's energy policy is built on:
  - A diversified energy mix
  - A sustainable development approach
  - Open markets
  - Respect for provincial, territorial jurisdiction

The Structure of the Nuclear Industry

Canada has a full-spectrum nuclear industry

- Uranium mining, conversion and fuel fabrication
- Nuclear Utilities
- Reactor Design and Nuclear R&D
- Engineering, Manufacturing and Supply
- Medical and industrial applications
- Academic Institutions - Research Reactors

Canada's Major Nuclear Facilities

Nuclear Energy in Canada

- Canada has over 50 years of experience in nuclear power
- We have 22 reactors using unique CANDU technology, 18 are currently in operation
- Nuclear provides 15% of Canada's electricity requirements (50% in Ontario, 30% in New Brunswick and 3% in Québec)
- The Government provides ~$100M in annual appropriation to AECL for R&D and some funding for the development of the Advanced CANDU Reactor (ACR)

Role of Government

- Nuclear constitutionally federal jurisdiction
- Minister of Natural Resources responsible for Atomic Energy of Canada Ltd., Canadian Nuclear Safety Commission
- Federal responsibilities include:
  - Regulation *(Nuclear Safety and Control Act)*
  - Nuclear Research and Development *(Nuclear Energy Act)*
  - Nuclear Non-proliferation (NPT, IAEA obligations)
  - Waste *(Nuclear Fuel Waste Act)*
  - Liability *(Nuclear Liability Act)*

Impact of Canada's Nuclear Energy Program

- **Economics**
  - Production value $5B/year

  (including Uranium and Electricity)
  - Employment 30,000

- **Security of supply:** Nuclear energy provides 50% of baseload power in Canada's industrial heartland

- **Air quality and health:** Impact of fossil generation on health is a major concern in certain regions

- **Climate Change**
  - Prevents GHG emissions of 40Mt (gas) to 85Mt coal)/year

Overview of the Domestic Market

- We are witnessing a noticeable turn-around in the nuclear industry

- Refurbishment Decisions
  - Point Lepreau
  - Bruce A (4 units)
  - Others decisions to come – Québec and Ontario
  - Investment committed to date about $6B CDN

- New Builds
  - Ontario recently announced it will maintain its existing nuclear generating capacity (14,000 MW)
  - It will be achieved through the refurbishment of existing units and the construction of new units.
  - It could mean the addition of around 3,000 MW of nuclear capacity after 2015
  - Other long term possibilities, e.g., oil sands

International Market

- Eight CANDU 6 reactors are in operation abroad and one is under construction in Romania
- Likely refurbishment of older units (Korea and Argentina)
- We support AECL's initiatives abroad
- Canada is an active member of the International Generation IV R&D initiative

Challenges

- However, there are challenges as we move forward:
  - Aging R&D infrastructure and investment in R&D
  - Large reactor projects require innovative solutions and partnerships to finance new construction
  - Addressing regulatory challenges
  - Maintain and develop skilled workforce

Closing Remarks

- Canada considers that nuclear energy remains an important option for meeting Canada's future energy
- It is also important to meet our air quality objectives
- Canada is investing in new technologies such as the ACR and GEN IV
- We are supporting AECL's R&D and commercial activities