Canada’s Nuclear Advantage

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Canada’s Unique Position

- Existing expertise
  - Over 60 years of experience in the nuclear cycle
- Strong supply chain
  - Provides support to CANDU reactors globally
- Extensive innovation background with broad applications in energy and beyond
  - One of small number of countries to have developed reactor technology
- Renewed laboratories capabilities
  - $1.2B renew of Chalk River Laboratories
- Strong regulatory regime
  - CNSC is recognized internationally as a strong, independent regulator
- Market potential with remote resource extraction industries and remote communities
Established as federal Crown corporation in 1952

Creation of Canada’s nuclear technology and key enabler of its ongoing success

- First sustained criticality outside the United States
- Developed CANDU reactor technology – 19 operating in Canada and 30 internationally (CANDU and CANDU-like)
- Nuclear research and development spanning the full nuclear lifecycle (e.g. design of novel fuel reactor (WR-1), safety (RD-14M), waste management (Underground Research Laboratory))

Breakthroughs in medical isotopes (cobalt-60), production of other medical and industrial isotopes
Canada is one of the world’s most favourable markets to develop and deploy advanced reactor technology

**Canadian Nuclear Laboratories**
- Licensed sites, national laboratory expertise, proximity to important markets
- Vendors globally are interested in demonstrating technology on AECL sites
- CNL provides a “platform” for demonstration – vendor companies carry most of the early-mover risk

**Remote Northern Communities**
- 80% of communities have energy capacities under 2.5MWe. Immediate needs: $1-2 KWh

**Oil, Gas, and Mining Sector**
- Enable extractive sector (as much as 31% of GDP in the NWT)
- Lower energy production costs in oil/gas extraction
- Reduced carbon footprint and elimination of particulate and other pollutants from diesel power can meet Government of Canada regulations

**Supply Chain**
- Strengthen supply chain by growing Canada’s nuclear expertise
- Canadian supply chain gains early experience and early stake in any future market

**Well-Established Infrastructure**
- Regulatory policy, internationally-recognized regulator, and infrastructure in place to support to new vendor technology

**Environment**
- Supports COP21/22 commitments with low-carbon, greenhouse gas free energy.
- Support Mission Innovation, NICE Future initiatives, etc.
Canada’s Advantage

Uniquely positioned for technology development
• Credible and respected industry regulator
• CNL has expertise, nuclear campus and facilities
• Canada has strong market potential and supply chain
• Strong, existing supply chain
Market Survey (2017):
• 80 responses
• 19 potential demonstrations
• Gathered input from vendors, end users and industry

Invitation to Site a Demonstration SMR (2018 - present):
• 4 applications received at first intake
• Process ongoing

Parallel Activities
• Public Engagement
• Building R&D Capabilities
• Environmental Assessment/Impact Assessment
• Licence Applications
• Developing partnerships
• Assess waste management approaches and nuclear liabilities
Stage 1: Pre-qualification (3 Responses)
Stage 2: Due Diligence (1 Response)
Stage 3: Negotiation of Land Arrangement and Other Contracts
Project Execution
4 applications were received at the first intake in June 2018

Evaluations were complete in Fall 2018

Starcore Nuclear and Terrestrial Energy have completed the pre-qualification Stage and are invited to enter the Due Diligence Stage

- StarCore Nuclear proposed a 14 Mwe high-temperature gas reactor
- Terrestrial Energy proposed a 195 Mwe integral molten salt reactor

Global First Power (GFP), with its key partners – Ontario Power Generation (OPG) and Ultra Safe Nuclear Corporation (USNC), has completed the Due Diligence Stage and has been invited to participate in non-exclusive discussions regarding land, contractual terms, etc. in Stage 3.

Any projects that would go forward would be subject to regulatory requirements
• Roadmap was led by provinces, territories and utilities
The Roadmap included key findings in the areas of technology, waste management, economics, regulation and communications.

These findings were organized along four pillars:

- **Pillar 1: Demonstration and Deployment**
- **Pillar 2: Policy, Legislation and Regulation**
- **Pillar 3: Capacity, Engagement, and Public Confidence**
- **Pillar 4: International Partnership and Markets**
SMR Roadmap – Key Messages

- SMRs are real and happening now
- Canada has what it takes to seize the opportunity
  - Strong independent regulator dedicated to safety and open to innovation
  - Full-spectrum nuclear industry and ramped-up supply chain
  - Revitalized nuclear S&T campus at Canadian Nuclear Laboratories
  - Sites for demonstration
  - Enabling frameworks
- SMRs can compete with other low cost forms of electricity generation
- Ongoing engagement will build on the dialogues with Northern and Indigenous communities and groups that began under the SMR Roadmap
- Success will rely on strategic partnerships
Other countries are moving ahead

There is a window of opportunity now to realize the early mover advantage

Climate change goals are also creating urgency

The time is now