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Highlights from the Canadian Small Modular Reactor Roadmap

2019 IEA Workshop on Nuclear Power
Session 4: Investment in Low Carbon Generation and Nuclear Power

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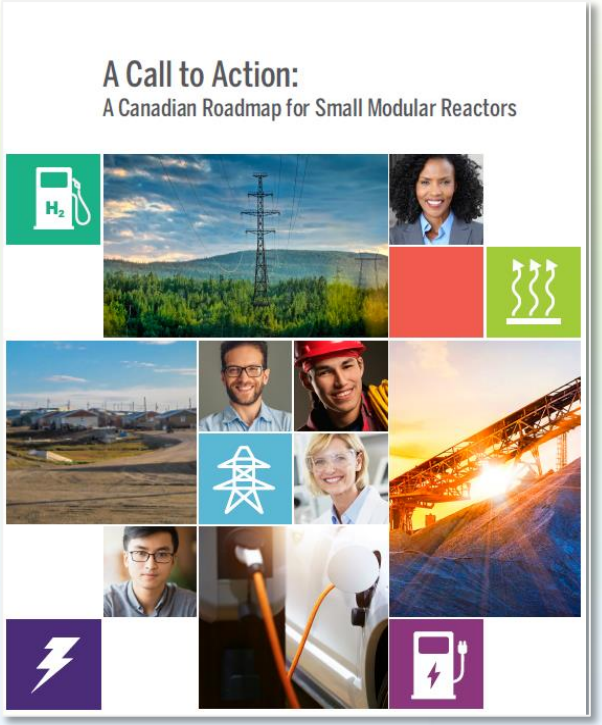
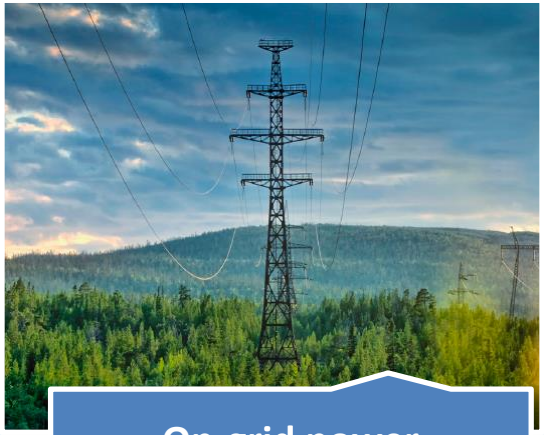
Canada

A Call to Action: A Canadian Roadmap for Small Modular Reactors (SMRs)

www.smrroadmap.ca



Highlight #1: Three distinct markets for Small Modular Reactors (SMRs) globally



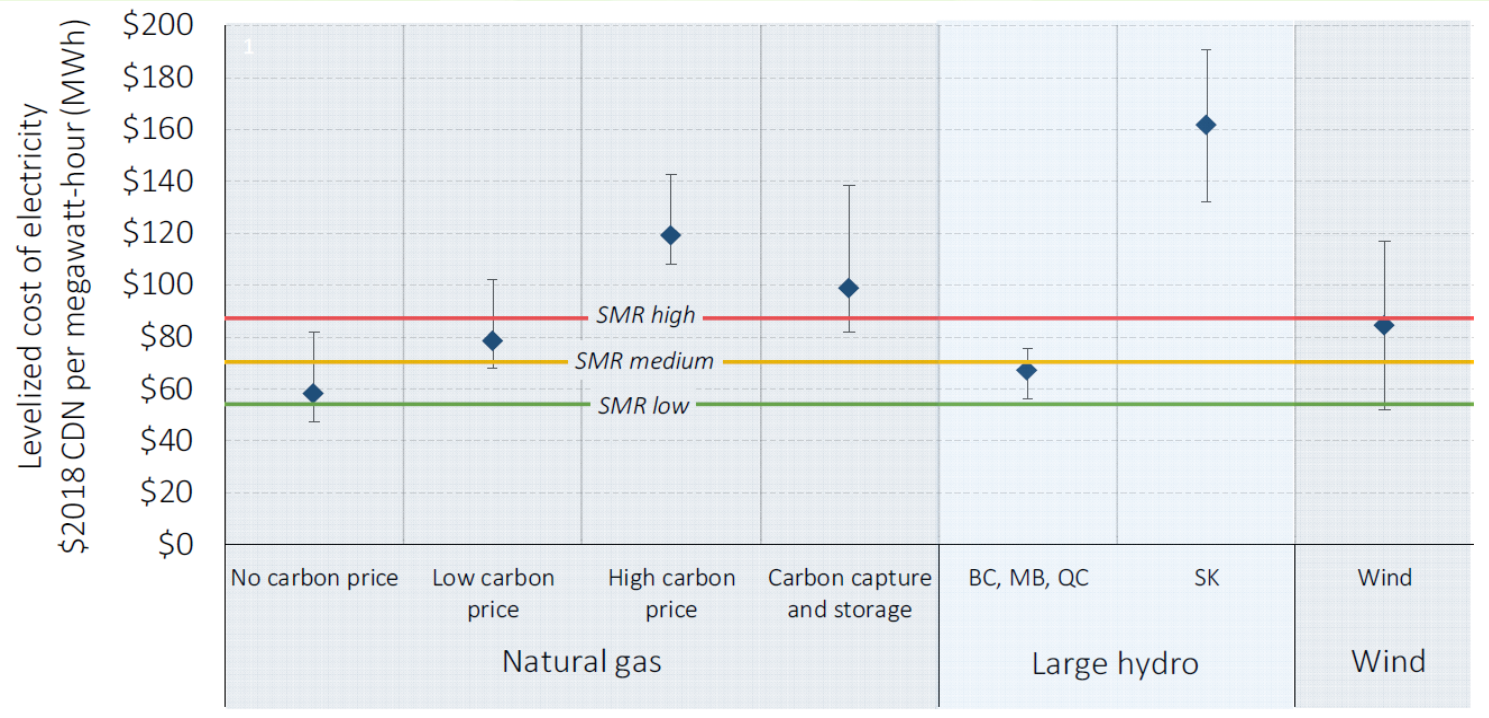
On-grid power
(150 to 300 MWe)

On- and off-grid heavy industry (10 to 80 MWe)

Off-grid communities
(1 to 10 MWe)

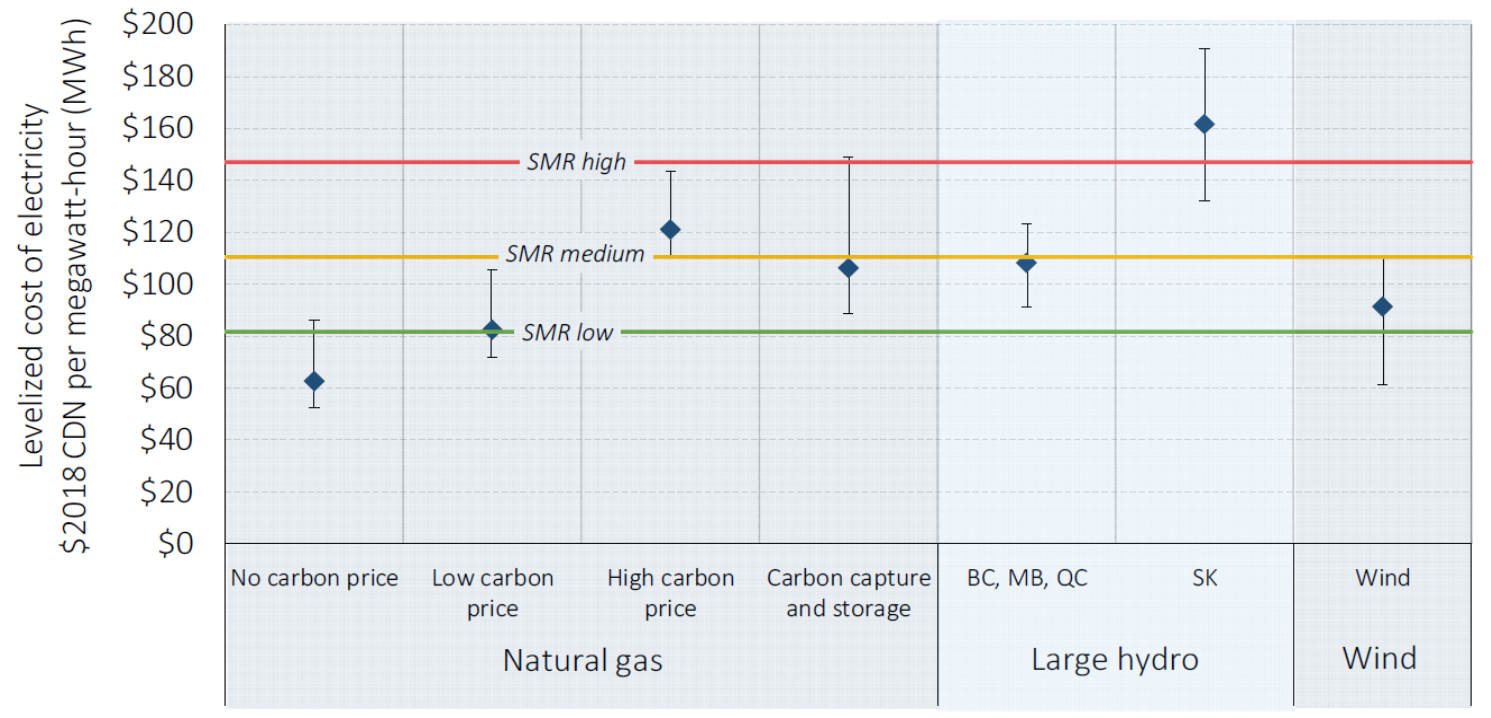
Highlight #2: SMRs can be competitive in all three markets

"Best case" levelized cost of electricity from on-grid SMRs:



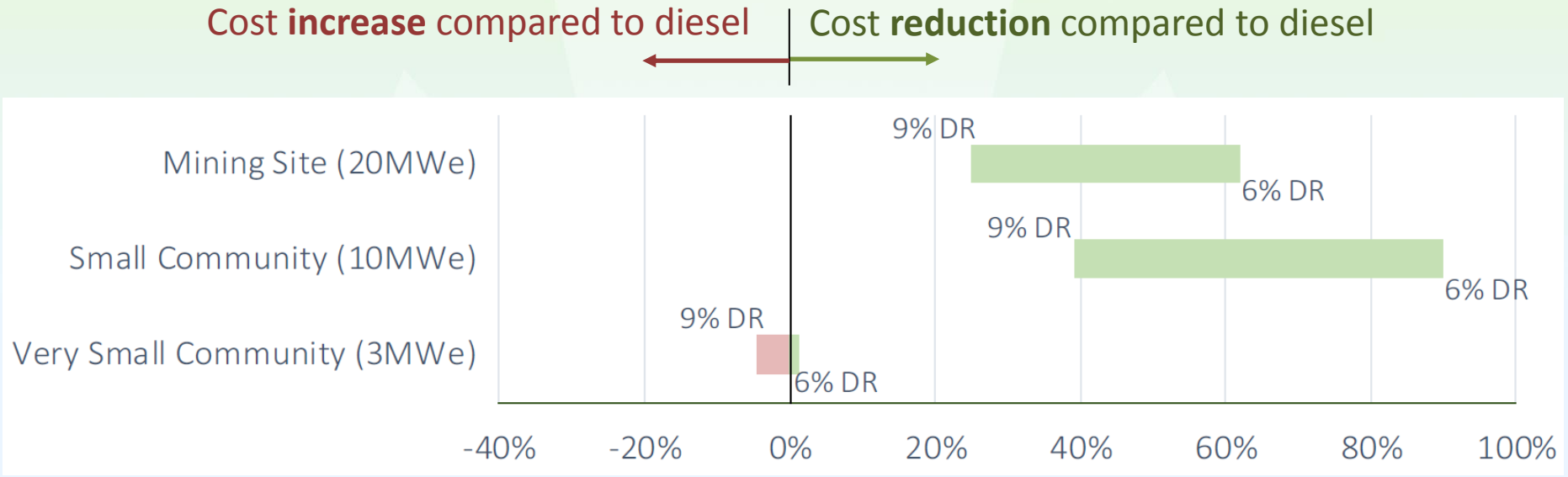
Highlight #2: SMRs can be competitive in all three markets

"Worst case" levelized cost of electricity from on-grid SMRs:



Highlight #2: SMRs can be competitive in all three markets

Cost advantage of SMRs over diesel at off-grid mine sites and communities:



Shown for 6 and 9 percent discount rates (DR)

Highlight #3: SMRs have significant market potential in Canada and globally

Oil sands

- Steam for SAGD and electricity for upgrading at **96 facilities**
- 210 MWe average size for both heat and power demands
- 5% replacement by SMRs between 2030 and 2040 could **provide $350-450M in value annually**

High-temperature steam for heavy industry

- 85 heavy industry locations (e.g. chemicals, petroleum Refining)
- 25-50 MWe average size
- 5% replacement by SMRS between 2030 and 2040 could **provide $46M in value annually**

Remote communities and mines

- 79 remote communities in Canada with energy needs > 1 MWe
- SMRs replacing costly diesel and heating oil could **reduce energy costs to the territorial government**
- **The high cost of energy from diesel is a barrier. SMRs could facilitate and enable new mining developments**
- 24 current and potential off-grid mines

Replacing conventional coal-fired power:

- 29 units in Canada at 17 facilities
- 343 MWe average size
- 10% replacement by SMRs between 2030 and 2040 could **provide $469M in value annually**

Bottom line: SMRs could conservatively yield **$5.3B in total value** between 2030 and 2040.

Highlight #3: SMRs have significant market potential in Canada and globally

Replace coal-fired power generation

- SMRs can further transition the power sector away from coal
- Even in a 2-degree scenario IEA projects 1100GWe
- Potential market over $100B/year

Remote island nations and off-grid communities

- Large potential in over 70k communities
- $30B/year market

Heat & power for mines

- SMRs powering of new mines between now and 2040 could yield total global value of $3.5B/year market

Steam for heavy industry

- Potentially $12B per year global market. Joint project from Idaho NL and NREL identified 850 facilities where SMRs could provide steam for US heavy industry.

Bottom Line: Estimated global value of $150B per year by 2040.

Investment risks

- Technology
- Regulatory
- Social

- **SMR business model:**
  1. Partnerships
  2. Marshalling investments
  3. Fleet approach and “order book”

Learn more about Canada's SMR advantage

Full report available at:
www.smrroadmap.ca

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