

Intelligence MEMOS



From: Neil Alexander

To: Natural Resources Minister Seamus O'Regan

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Re: **MOVING FROM ROADMAP TO ROLL-OUT FOR SMALL MODULAR NUCLEAR REACTORS**

In November 2018, Natural Resources Canada [published](#) a “roadmap” for small modular reactors (SMRs). It highlighted benefits through job creation, export sales, greenhouse gas avoidance, and affordable and reliable energy for rural and remote areas.

It pointed to Canada’s potential lead in the field, leveraging its many comparative advantages in nuclear technology including an established supply chain, domestic engineering expertise, licensed demonstration sites, established customer relationships globally, and a world-leading regulation system that enables innovation.

But, despite this vision, the nuclear industry still awaits concrete steps from Ottawa.

The provinces and industry are currently developing an action plan, but to move ahead, the federal government must also step up to signal its long-term commitment to nuclear technology and its potential to accelerate the world’s painfully slow progress on emissions reduction.

Large reactors have served faithfully as low-cost generators, but are only practical for large jurisdictions, limiting their use and leading to them being built in small numbers. In contrast, SMRs aspire for a Model T approach, allowing widespread deployment of repeatable designs that are cost-competitive with other zero-emissions technologies. Since renewables face intermittency – the wind doesn’t blow or sun doesn’t shine – and their own deployment problems, it is difficult to see a pathway to net-zero for Canada without nuclear. From [statements](#) by the Natural Resources minister, the federal government is also awakening to this conclusion.

SMRs remain in development, but the race is on for a commercially viable design. The Canadian nuclear industry has developed a “three stream” approach. A first stream seeks to rapidly roll out a relatively conventional reactor design to enable the planned phaseout of coal generation. A second stream aims to “test drive” advanced designs for longer-term grid deployment that are capable of recycling pre-existing used fuel from CANDU and potentially other reactors. A third focuses on smaller-scale designs suitable for an industrial facility (e.g., a mine) or a remote community.

The Canadian nuclear regulator has received 12 designs for pre-licensing review. One supplier has commenced plans to build a unit at Chalk River, leveraging an existing licensed site and an experienced workforce. Others have declared expectations that Canada will be their first market and possibly home base of their supply chain. Recently, the CEOs of some of the major Canadian power producers asked the federal government make a \$265-million investment in SMR site selection and technology development.

But Canada is far from the only country in the race. State-owned enterprises are leading development in China and Russia, and both the United States and United Kingdom have committed substantial funding to domestic initiatives.

Nuclear power is highly regulated, technologically complex, involves long-lived assets and needs an integrated ecosystem of suppliers and infrastructure. This differs from other industries and requires government commitment for companies to make the necessary investments. International leadership will not arise from the simple funding of technology development followed by leaving markets to do the rest.

The SMR concept helps with some of the economics and reduces some of the need for government involvement. But governments still have a role to play. SMRs must be deployed in fleets to be economical. Customers will be concerned about the cost of building a “First of a Kind” reactor and the risk of owning an orphaned facility. The nuclear sector needs national leadership to allay such fears.

Ontario, Saskatchewan and New Brunswick have telegraphed their commitment through a public agreement to collaborate on SMR deployment. Alberta is expected to join soon. These provincial governments are working with their power producers on plans for deployment. But since many of the challenges are national in scope and federal in jurisdiction, the provincial governments need federal buy-in to confidently move ahead.

The federal government has so far avoided any such commitment. Its caution is understandable. Nuclear power has some very vocal opponents and there are gaps in public understanding. Additionally, each SMR design has a different mix of costs and benefits. Reportedly, Ottawa’s decision-making has been slowed by sparring between different ministers, and their respective departments, over objectives and outcomes and how nuclear compares, from a policy point of view, with other low-emissions technologies.

The nuclear sector cannot wait forever. The industry is completing its action plan and progress over the next six to 12 months will determine whether Canada owns the SMR podium. The federal government should work with interested provincial governments to develop an integrated plan and then, if appropriate, commit to it. Without such an integrated plan, Canada risks squandering its comparative advantage and letting an opportunity to be a world leader pass it by.

Neil Alexander has held senior executive positions within the nuclear industry, led a nuclear-focused academic institute and is now an independent consultant.

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