

# Innovation Strategy Consultation Session: Advanced Manufacturing and Natural Resources Sectors

## Introduction

The Canadian Science Policy Centre (CSPC) hosted an industry consultation session with the advanced manufacturing and natural resources sectors as part of its National Conversation on Canada's Innovation Strategy initiative. The consultation aimed to gather insights for shaping a flexible and adaptive innovation strategy that addresses both current and future needs of the sector. The discussion focused on three core topics:

- Emerging trends and challenges in the sectors
- Designing an innovation strategy to adapt to the emerging trends and challenges
- Priorities for a national innovation strategy

## Emerging Trends and Challenges

Critical labor shortages, skills gaps, regulatory inefficiencies, misaligned policies and poorly developed domestic supply chains are key barriers to innovation and competitiveness in the advanced manufacturing and natural resources sectors.

**Labor Market Shortage:** The shortage of skilled industrial tradespeople was identified as a critical challenge. Meeting Canada's sustainability and emissions reduction targets will be difficult without adequate skilled trades. Recruiting to these sectors is particularly challenging with the negative perceptions of the natural resources sectors. The aging workforce, with baby boomers retiring, compounds this issue.

**Regulatory and Policy Challenges:** Lack of clarity and consistency within the regulatory framework are causing delays, especially concerning approvals for mining and renewable energy projects, which are limiting Canada's ability to meet increasing demand for critical minerals and other resources, threatening international investment and impacting sector competitiveness. Policy misalignment was identified as a challenge, with existing regulations sometimes conflicting with innovation goals.

**Inadequate Domestic Supply Chain Capacity:** There are concerns that current domestic supply chain capacity is inadequate to fully capitalize on opportunities presented by large-scale anchor projects. Participants emphasized that while efforts are being made to attract gigafactories (e.g., for EVs), the domestic supply chain needed to support these large

anchor organizations is underdeveloped. Small and medium-sized enterprises (SMEs) in Canada lack the scale and capacity to meet the high-demand requirements of these large-scale operations. Large anchor organizations (e.g. original equipment manufacturers (OEMs)) often pressure their suppliers on costs, making it difficult for SMEs to invest in innovation and growth. There is a lack of clear industrial policy and strategic plans to build out the supply chains required for gigafactories. Support has been focused on attracting large OEMs, but insufficient attention has been given to scaling up SMEs to become viable suppliers. Without strong domestic supply chains, anchor organizations are compelled to rely on established international supply chains, limiting the local economic benefits of large projects.

**Sustainability Challenges:** The dual challenge of reducing emissions while maintaining global competitiveness is a barrier to innovation. Domestic industries are disadvantaged by stricter regulations compared to international competitors.

## Designing an Innovation Strategy to Address Challenges

There was consensus on the need for a practical, flexible innovation strategy designed to build workforce capacity, facilitate collaborative innovation ecosystems, strengthen industry-led partnerships with academia, and align high-level goals with realities faced by the sectors.

**Strategic Workforce and Skills Development:** A key component of a national innovation strategy is a workforce and skills development plan to build labour capacity in traditional trades, digital/technological areas (e.g. engineers) and management/leadership. A workforce development plan needs a strong focus on increasing apprenticeship completion rates in industrial trades, as well as upskilling the workforce to adapt to new technologies, like automation and data literacy. There is also the need for closer industry-academia partnerships to ensure that training programs align with industry demands, especially in sectors facing labor shortages due to aging demographics and transitions toward clean technology.

**Collaborative and Adaptive Policy Frameworks:** A coordinated approach to an innovation strategy that involves all levels of government, industry, academia, and SMEs is critical. Government should have a supportive role, facilitating cross-sector collaboration to drive innovation. Industry-led initiatives with government support are key to building a robust ecosystem that supports innovation in the advanced manufacturing and natural resources sectors and enhances competitiveness in global markets.

An innovation strategy should set broad, outcome-focused goals that allow industries to innovate within flexible policy frameworks, avoiding overly prescriptive programs. The focus should be on market-driven solutions to achieve policy goals such as emissions reductions. The need for a clear, supportive policy structure to guide sectors toward high-

level objectives (e.g., decarbonization) is critical. An innovation strategy needs to align high-level aspirational goals (e.g. EV adoption targets) with policies that account for the sector-specific challenges and realistic timelines.

**Industry-driven Innovation Ecosystems:** There was consensus on the importance of strengthening Canada's innovation ecosystem by facilitating industry-driven partnerships with academia. The gap between research and commercialization is a systemic weakness of Canada's innovation ecosystem. A key element of an innovation strategy would be to bridge the commercialization gap by fostering industry-led partnerships that prioritize bringing discoveries to market. Current innovation programs tend to be too academically focused and do not sufficiently address commercialization.

**Domestic Supply Chain Capacity:** There is a need for a coherent industrial policy to build domestic supply chains that support anchor organizations and gigafactories. There is also a need for government to recognize the scale of challenges involved in building out supply chains, particularly for critical minerals required by gigafactories. Targeted funding to help SMEs scale up and meet the demands of large-scale operations is essential.

## Priorities for a National Innovation Strategy

The discussion underscored the need for a cohesive national innovation strategy that prioritizes capital investment, regulatory modernization, skilled trades training, effective government-industry-academic partnerships and a collaborative, sector-focused approach to drive innovation across Canada's economy. Incentive-driven policies facilitate creativity, innovation and investment in new technologies.

**Investment in Capital and Scaling Up:** There is a critical need for increased capital investment, particularly to help companies scale from startups to established, competitive businesses. Canada has strong research capacity and entrepreneurship but there is a funding gap that prevents companies from scaling domestically, leading many to leave the country. Enhance collaboration between government, SMEs, and OEMs to create integrated and competitive supply chains domestically.

**Regulatory Reform:** There was consensus on the need to streamline and modernize Canada's regulatory framework to make it easier for projects to gain approval. Canada's lengthy and complex approval processes create delays, increase costs, and deter investment compared to other countries. Simplifying regulations and reducing bureaucratic layers were seen as essential to promoting innovation and productivity.

**Labor Market and Training Initiatives:** Targeted labor market policies to address skill shortages and improve the training pipeline for critical skills in advanced manufacturing and natural resources sectors are a critical priority. Recognition of foreign credentials and support for unions and educational institutions to expand training in industrial trades potential options for building workforce capacity. Training programs must be aligned with

current and projected labor demands, particularly in trades that are essential to advanced manufacturing and natural resources sectors. Enhancing industrial apprenticeships and training systems to improve completion rates and adapt to the demand for digital literacy, interdisciplinary collaboration, and advanced technical skills is a priority.

**Sector-Based Strategy and Improved Government-Industry Collaboration:** A sector-based approach to innovation strategy would address the unique challenges and needs of different industries. Each sector faces distinct obstacles and opportunities, and government initiatives should reflect this diversity. Effective collaboration between government and industry was seen as essential for understanding and meeting industry-specific goals.

## Conclusions and Recommendations

### **Develop a Workforce Strategy Aligned with Sector Needs**

- Expand apprenticeship programs and increase completion rates to address the shortage of skilled tradespeople.
- Support training for advanced skills, including digital literacy and automation, through partnerships with industry and educational institutions.
- Recognize foreign credentials to help fill labor gaps in industrial trades and support industrial trade unions in delivering specialized training programs.

### **Align Regulatory Frameworks**

- Streamline and accelerate regulatory processes to reduce delays and costs
- Ensure consistency between regulations, procurement standards and other government policy goals to drive innovation
- Undertake a national review of regulatory frameworks to identify inefficiencies and inconsistencies and align them with productivity, sustainability and innovation goals.

### **Enhance Industry-Academic Partnerships for Commercialization**

- Prioritize industry-led partnerships to close the gap between research and commercialization.
- Support initiatives that foster entrepreneurship within universities, encouraging spin-offs and commercialization of Canadian innovations.
- Establish industry-driven innovation hubs, like engineering and demonstration centers, to support the practical application of research.

### **Adopt Flexible, Outcome-Focused Innovation Goals**

- Set broad, outcome-focused goals that allow industries to innovate within adaptable frameworks, supporting market-driven solutions.
- Ensure that policies are supportive and flexible enough to allow each sector to determine the best methods to achieve goals like emissions reduction.

- Focus on creating a balanced policy environment that supports both competitiveness and sustainability.

**Revitalize Sector-Based Strategies and Collaboration**

- Reintroduce sector-specific consultation approaches to address the unique needs of each industry and facilitate focused government-industry partnerships.
- Use successful past models, like the White Horse Mining Initiative, to guide federal-provincial-industry collaborations.
- Improve internal coordination, oversight and accountability to ensure effective and efficient policy implementation.