CANADA'S ECONOMIC STRATEGY TABLES

Resources of the Future

RF

The world is being disrupted by technology, urbanization and a rising middle class, which is not only resulting in a growing demand for natural resources but also changing *how* natural resources are being used. Natural resources have been the foundation for global modernization. Now as the world goes through digital disruption and transitions to a low-carbon economy, resources of *the future* are becoming more innovative, cleaner and digital.

> *"Resources have been the foundation of the Canadian economy. We have all the ingredients, talent and capacity to flourish in the new economy. But to continue to prosper and attract capital, we must create an innovative ecosystem that improves our economic and environmental competitiveness."*
>
> ***Lorraine Mitchelmore***
> *Chair, Resources of the Future*
> *Economic Strategy Table*

Canada has the third largest per-capita natural resource endowment in the world, accounting for 1.82 million jobs and contributing to 17% of the country's GDP.[1] These resources are Canada's enduring strength in a world where capital and talent are increasingly mobile. Canada's Indigenous peoples are a growing community with immense talent opportunity and potential for lasting business partnerships with industry. The country has a unique competitive advantage in Indigenous culture of sustainability and the resource sectors' ability to partner and embrace that culture.

As demand for natural resources grows globally, it is also putting tremendous pressure on the environment. Canada's advantage is that it already ranks in the global top-quartile in environmental performance[2] and ranks fourth among Organisation for Economic Co-operation and Development (OECD) member countries in environmental policy stringency.[3] Canadian safety standards are also among the highest in the world.

With all these strengths, Canada has an extraordinary opportunity to deliver the innovative resource products the world needs with the highest standards of environmental performance, health and safety—and, in doing so, to enable the creation of multiple adjacent new clean, digital and advanced manufacturing industries.

1 http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/files/pdf/10_key_facts_NatResources_2018_e.pdf

2 Canada ranks 25th out of 180 countries: https://en.wikipedia.org/wiki/Environmental_Performance_Index

3 https://stats.oecd.org/Index.aspx?DataSetCode=EPS. Since 2012, only 16 countries have agreed to provide data to be evaluated for the OECD's environmental policy stringency index. Based on the data available, as of 2015 (the last available report) Canada ranks fourth among OECD countries and globally, behind the U.K., France and Italy. In 2012, the last time data was available for all 180 countries, Canada ranked seventh globally behind Denmark, Australia, Netherlands, France, Japan and Finland. Regardless of the amount of data available, Canada has maintained its position globally as having one of the top 10 highest environmental policy stringency. With Canada's environmental performance directionally on track, it is time to strike a balance with agile execution to boost the resource sectors' growth and competitiveness while continuing to improve on environmental performance.

However, this opportunity can only materialize if Canada is positioned to compete globally and be attractive to investment. Currently, the resource sectors face severe growth and competitiveness challenges[4] that are driving investment out of Canada and crippling the sectors' ability to thrive. While resource companies are committed to the highest environmental and safety performance, they are burdened with an inefficient and complex regulatory system that adds cost, delays projects and is not conducive to innovation. According to the World Bank's Ease of Doing Business index, Canada ranks 34th out of 35 OECD countries in the average time to get regulatory approval for a construction project. Infrastructure bottlenecks are preventing access to existing and new markets as well as many resource deposits. In addition, Canada's innovation ecosystem is lacking the focus and fiscal tools required to enable homegrown innovations to sustain growth and commercialization in Canada.

Timing is critical. There is a race for the global market share for resources of the future. Canada has the right talent, an abundance of resources required for the future, the capacity for innovation and environmental leadership, and is one of the most secure places to do business in the world given the private sector's strong ethics and accountability.[5] Despite these strengths, if the right economic conditions are not created for the resource sectors, Canada will lose this tremendous opportunity to claim its global market share for resources of the future.

Through the Resources of the Future Economic Strategy Table, all of the nation's key resource sectors—mining, forestry and energy—are strongly aligned in setting the following vision, target and the proposals to achieve the vision.

GLOBAL LEADERSHIP

Resources of the future means new ways of producing and using natural resources. For example:

- **Canada is the world's 10th largest producer of copper—a metal required for solar panels, smart grids, wind turbines, LED light bulbs and electric cars.**
- **Canada has 14 out of the 19 metals required for solar photovoltaic (PV) panels. Access to global markets could position Canada as a globally leading supplier for the build-out of solar power.**
- **Canada's renewable electricity generation capacity coupled with natural-gas-powered electricity generation can provide the entire country with the net cleanest electricity in the world with the right east-west infrastructure and SmartGrid deployment.**
- **Canada is a global leader in sustainable forest management with more forest land independently certified as sustainably managed than anywhere else in the world. It provides traditional products to world markets and an opportunity to be a leader in the bio-economy with development of non-traditional products such as biomaterials, biofuels and biochemicals.**
- **Canada's oil and gas sector has two out of the world's 15 carbon capture and storage (CCS) projects. CCS has the opportunity to decrease emissions by 20% globally, and the percentage can increase significantly with commercialization and adoption of utilization technologies. The oil and gas sector is a large-scale laboratory for such technologies.**

[4] What happened to Canada's economic competitiveness?" https://www.weforum.org/agenda/2017/10/royal-bank-canada-economic-competitiveness/

[5] World Economic Forum, http://reports.weforum.org/global-competitiveness-index-2017-2018/competitiveness-rankings/#series=GCI.A.01.02.02

VISION

By 2025, Canada is a global ***competitive*** *force in natural resources with a clear path to recognized economic, environmental and social leadership, making Canadians proud of the success we create for our talent today and in the future.*

Achieving the Table's vision for Canada's resource sectors means unlocking projects, markets and products, and, as a result, seeing significant growth in resource exports. To that end, the Table has set an ambitious exports growth target as the primary outcome of implementing the proposals put forward by the Table.

TARGET

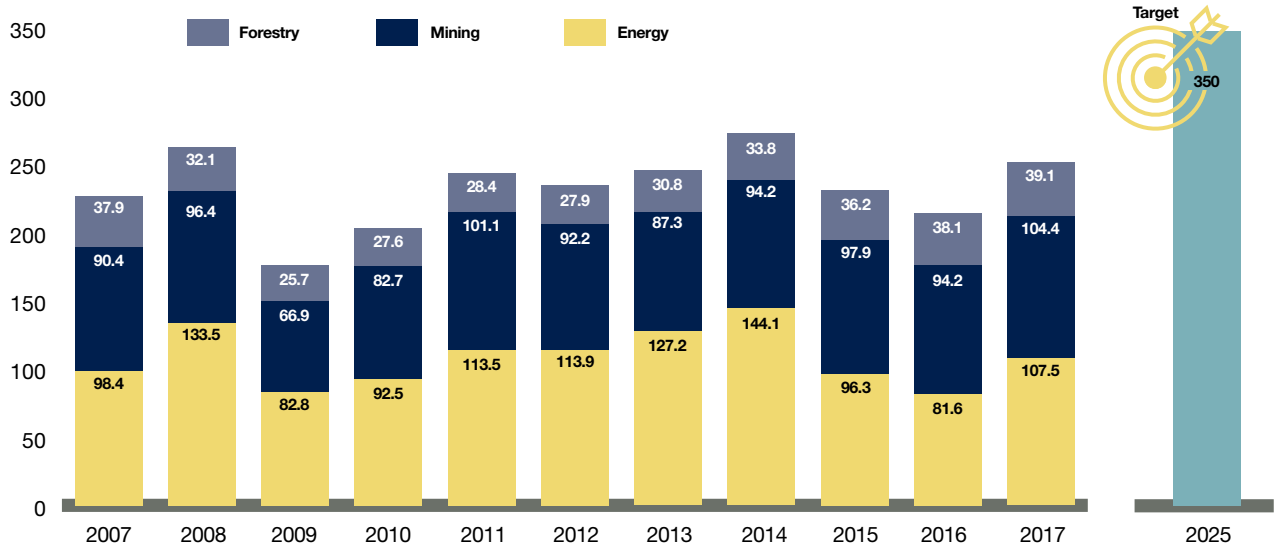
Increase natural resource **exports** by 40% to

$350B

Canada will grow its annual natural resource exports to $350 billion through innovation, decarbonization, agile regulations, infrastructure, talent and inclusion.

The target of $350 billion in resource exports represents a $100 billion increase from 2017, i.e., a 40% growth target. In 2014, resource exports were at their highest at $272 billion and have declined since then due to declining capital investment. This decline in investment is also making export growth forecasts uncertain. The Resources of the Future Economic Strategy Table set an ambitious but achievable target to align with the Table's bold vision, contingent on the implementation of the proposals in this document. The $100-billion growth includes growth in exports from all resource sectors as well as innovation exports from new homegrown, large market-cap companies headquartered in Canada enabled by the right innovation ecosystem created through the implementation of proposals. It should be noted that the resource sectors are also dependent on global market conditions for export growth. If Canada's competitiveness issues are not resolved with haste, the opportunity to secure global market share when conditions are right may be lost forever.

Value of Natural Resource Exports ($ Billion CAD)



"Creating an innovation nation starts with a clear understanding of what innovation is. It's not fundamentally about science or technology. It's about people. People who recognize a problem or opportunity and do something about it."

From *How We Can Win* by Anthony Lacavera and Kate Fillion

WHAT WE NEED TO OVERCOME

- Declining competitiveness of resource projects, created by regulatory complexity, insufficient infrastructure, and uncertainty around land base and land use decision-making
- Trade uncertainty created by lack of access to existing and new markets in a shifting global supply-and-demand environment
- Declining Canadian and foreign investment in resource projects due to high project development costs
- Significant demographic imbalance in resource jobs
- Lack of agility in technology adoption
- Evolving Indigenous landscape

"As a private energy investor, most of our capital comes from foreign sources and I cannot overstate the extreme disillusionment of foreign investors. We have one of the most sophisticated investment management businesses in the world, yet investors are rapidly pulling away saying, 'I can't be bothered to figure you out, Canada."

WHAT WE NEED TO BECOME

- Create a level playing field by establishing an internationally competitive fiscal environment
- Modernize Canada's regulatory system to keep up with the changing global environment
- Debottleneck infrastructure; expand regional, national and international markets; and open up existing and new markets for Canadian resource products
- Catalyze a vibrant innovation ecosystem that enables accelerated development and adoption of game-changing technologies so Canadian firms are a competitive force in a rapidly changing global environment
- Integrate Indigenous businesses into supply chain with government acting as a catalyst and continued industry partnerships as a significant step toward economic reconciliation
- Attract highly skilled talent into the resource sectors to enable the cultural shift required for resources of the future
- Inform Canadians and the world about the modernization of the resource sectors to regain trust in the sectors and inspire pride in the quality of Canada's natural resources

THE ACTIONS WE PROPOSE

Based on research, global best practices and insights shared at Table meetings, the Resources of the Future Table proposes the following to unlock the potential of Canada's natural resources sectors under five key themes.

Environmental performance, safety and inclusivity are the foundation for all of the following proposals:

OWN THE PODIUM TO COMPETITIVENESS

1 Agile regulations

- Make Canada's regulatory system outcomes-driven, stringent, flexible, timely and predictable; align with global best practices
- Pilot changes before broad implementation
- Create a 'regulatory Nexus card' to fast-track approvals for trusted operators with a proven track history of environment, health and safety performance

2 Strategic infrastructure

- Establish a 50-year rolling Canadian Strategic Infrastructure Plan with initial five-year milestones, updated annually

3 Innovation for competitiveness

- Create an innovation ecosystem through technology adoption centres and fiscal tools
- Create a national data strategy for global competitiveness

4 Indigenous people and communities

- Enable scale up and sustainment of Indigenous businesses
- Increase quality of and improve access to education for Indigenous people

5 Attracting and re-skilling talent

- Attract new entrants into resource sectors
- Re-skill existing workers at risk of being affected by job automation.
- Create highly-skilled trades and STEM opportunities for students through K–12 curriculum enrichment

REBRAND CANADA

Tracking success

$350 billion resource exports by 2025

- $1 billion public procurement of Indigenous businesses
- Debottlenecked infrastructure with at least one major pipeline to the coast and branch rail lines to access forestry/mining areas
- Canada ranks in the top-quartile among OECD countries in The World Bank Doing Business Right Index, for average time to get project approval
- 10 home-grown innovations that grow to >$2 billion market cap by 2025
- Canada ranks in the top-five on The World Bank Ease of Doing Business Index by 2025

Successfully rebrand Canada, attract youth to natural resource jobs

Top-quartile environmental, health and safety performance among OECD countries

PROPOSAL

Agile regulations

Streamline and modernize Canada's regulatory system to be outcomes-driven, flexible, stringent, timely and predictable in order to attract investment and stimulate innovation while continuing to achieve world-class safety, health and environmental performance

Canada's world-class rigorous regulatory system gives Canadians and our country's trading partners confidence that resource products made in Canada meet the highest safety, environmental and quality requirements. Canada is ranked fourth out of OECD countries[6] for its environmental policy *stringency* and 25th out of 180 countries[7] in environmental performance. However, the execution of this system is highly complex and prescriptive with no defined outcomes. This, layered with the multi-jurisdictional structure with no clear authority, often results in inefficiency, delays, administrative burden and unnecessary costs for resource companies deterring investment. Meanwhile, prescriptive regulations impede the deployment of innovative solutions that could both reduce costs and improve environmental and safety performance.

WHY THIS MATTERS

Without a modernized, efficient and agile regulatory system that achieves world-class safety, health and environmental performance, the resource sectors cannot grow.

Canadian natural resource sectors are committed to being global leaders in environment, health and safety. An agile regulatory system that rewards innovation and attracts investment in resource projects will boost the sectors' economic growth and global competitiveness while improving upon its environmental and safety performance. Agility can be created by being outcomes-driven, limiting wasteful duplication through intergovernmental collaboration, clarifying accountabilities and making way for world-class innovative technologies that Canadians want and need—especially to realize the vision of a low-carbon economy. Not acting today simply means Canadian projects will continue to lose investment and, as a result, lose the global market share for resources of the future. A lost opportunity due to an inordinately long and burdensome regulatory process will have immediate and long-term consequences for the Canadian economy, including affecting the quality of life of Canadians.

CASE IN POINT

Imperial Oil's 150,000 barrels per day state-of-the art oil sands project has been in the regulatory approval pipeline for five years with no approval certainty in sight. The project uses industry-leading solvent-assisted SAGD technology that is 25% more capital efficient and produces 25% fewer greenhouse gas emissions than traditional SAGD projects already in operation. This example is illustrative of a regulatory system that is neither designed to incentivize the highest environmental outcomes nor reward or keep pace with innovation. Instead, the approval process is bogged down by prescriptive requirements.

WHAT WE RECOMMEND

Introduce a charter for efficient and agile regulations with the option to be made into legislation

Form an arm's length Council of Innovative and Competitive Regulations with the mandate to report annually to the First Ministers' Meeting. The council should be made up of industry, subject matter experts, federal and provincial/territorial regulators and policy makers, and have the accountability to recommend the new approach to Canada's regulatory system to be outcomes-driven, stringent, flexible and predictable—designed to improve health, safety and environmental performance, stimulate innovation, boost sector growth and competitiveness, and reduce the negative cumulative impact of the current regulatory system.

6 https://stats.oecd.org/Index.aspx?DataSetCode=EPS

7 https://en.wikipedia.org/wiki/Environmental_Performance_Index

REGULATORY EFFICIENCIES IN ACTION

There are already several independent examples of highly effective, agile regulations in Canada created through pilots and sandboxes:

- **Outcomes-based forestry in New Brunswick:** A collaborative model between industry and government that increases the accountability of industry and provides certainty for capital investment while ensuring resource health and sustainability
- **Bitumen recovery pilot conducted by an oil sands producer and Alberta Energy Regulator:** Pilot initiated by industry to demonstrate value-add approach to regulator, which was then broadly implemented for all hydrocarbon projects in Alberta
- **Alberta Oil Sands Emissions Limit:** An outcomes-based regulation jointly developed by government, industry and environmental groups, designed to limit greenhouse gas emissions from oil sands projects while providing ample flexibility to innovate to maximize growth under the limit
- **Equivalency agreement:** Nova Scotia has an equivalency agreement with the federal government on climate policy based on achieving an emissions reduction target
- **Major Mines Permitting Office:** In British Columbia, the creation of the Major Mines Permitting Office in 2013 resulted in significant improvements in permitting timelines for major, complex mine developments and is an example of improved collaboration across permitting agencies and key Indigenous communities
- **Federal – provincial cooperation:** The British Columbia provincial government and the federal government worked together to not duplicate regulations for liquified natural gas (LNG) facilities, agreeing to use substitutions where available
- **Frontier and Offshore Regulatory Renewal Initiative (FORRI):** Intergovernmental partnership tasked with modernizing the regulations governing frontier and offshore oil and gas activities in Canada—a strong example of federal, provincial, regulator, industry, Indigenous and NGO stakeholders coming together to modernize regulations

The council will:

- Identify gaps in Canada's regulatory system by benchmarking regulatory best practices in competing jurisdictions
- Identify and oversee pilots on real-time projects to test and demonstrate best regulatory practices before regulations are amended and approved for broader implementation
- Pilot a regulatory "Nexus card" to acknowledge high-performing companies
- Provide a venue to boost federal, provincial and territorial (FPT) cooperation, to reduce overlaps and create regulatory consistency (particularly for projects regulated across multiple jurisdictions)
- Identify and oversee regulatory "sandboxes"[8] to accelerate and de-risk technology commercialization
- Conduct annual audits and ongoing reviews of regulations to ensure relevance as well as remove redundancy and reduce red tape
- Communicate with the public on the economic significance of building an agile regulatory system aimed at rebuilding public trust

[8] Regulatory sandboxes will be created for new technologies that are ready for a commercial-scale pilot or field demonstration but do not have a clearly defined regulatory approval process. Currently, the lack of clarity around the impact of operation of a technology prevents regulators from defining the regulatory approval requirements for new technologies. Within a sandbox, innovators, adopters (hosts for commercial pilot) and regulators would work together in a controlled setting to conduct a phased/gated approach to developing regulatory steps while advancing the technology pilot. This would enable a thorough approach to developing a regulatory process and at the same time accelerate development, deployment and adoption of the technology.

EARLY ACTION FOR REGULATORY PILOTS

IMPLEMENTING BILL C-69 EFFECTIVELY

Bill C-69, while the intent is directionally positive, implementation in its current form could limit greenfield projects. These projects are generally in Indigenous communities and are a significant opportunity for growth and equity partnerships for these communities. Pilot specific ways to streamline the assessment process within Bill C-69 to give project proponents the certainty they need to advance key projects while ensuring the bill's environmental, health and social intent. Ideas to test should include reducing uncertainty in the project assessment process (including timing and scope), conducting comprehensive, one-time, science-based regional impact assessments that can be applied to projects seeking approval to operate within the region, and setting standards and resolution mechanisms for consultation. The result should be an assessment process that is top-quartile among OECD countries on environmental, social and economic outcomes, and attracts investment in Canada's resource sectors.

SHORTENING THE PERMIT PROCESS FOR OFFSHORE EXPLORATION DRILLING IN NEWFOUNDLAND AND LABRADOR

Conduct a regional impact assessment pilot to shorten the permitting process for offshore oil and gas explorations while maintaining rigorous environmental standards. The pilot would eliminate duplication of project-specific assessments, particularly for standard activities that have proven mitigation measures; clarify the roles of all stakeholders while reducing multiple assessments; and provide clarity about investment timelines for project proponents. This would support the provincial government's Advance 2030 plan, increase Canada's reputation as an environmental leader, and encourage investments in the region's oil and gas sector.

CREATING A NEW REGULATORY PATH FOR ELECTRIC UTILITIES

Either through a pilot or by taking a phased approach, establish a new regulatory path for electric utilities to encourage investment in innovations that reduce greenhouse gas emissions, expand renewable energy options and move the Canadian economy to clean electrification. The goal would be to drive investment while respecting utilities' essential-service role and while keeping pace with customer expectations for savings and efficiencies. Actions to be tested include fast-tracking approvals for innovation, establishing a cost-shared innovation fund and defining the percentage of utilities' investments to be dedicated to innovation. The project should encourage cooperative national and regional implementation as well as eco-system collaboration with colleges, universities, applied research organizations and emerging providers of sustainable energy technologies.

STARTING A NATIONAL DIALOGUE ABOUT CANADA'S FORESTS

Pilot a consistent approach to address the impacts of climate change and species-at-risk populations and ensure resilient forests for future generations through a national dialogue process that brings together high-level decision-makers from industry; FPT and municipal governments; Indigenous communities; environmental groups; academia; and research organizations. The "Forest Forward" dialogue will develop a national call to action addressing challenges, opportunities and recommendations for forest ecosystems, forest management and forest operations.

PROPOSAL

Strategic infrastructure

Establish an annually updated, 50-year rolling Canadian Strategic Infrastructure Plan that includes milestones for its first five years

A Canadian Strategic Infrastructure Plan will create focus around funding and tracking of strategic infrastructure projects, rather than the current approach of funding them on an ad-hoc or first-come, first-serve basis. Canada's resources are at a pivotal point right now. Globally, the transition to a low-carbon economy presents significant opportunity to Canada's resource sectors to supply the rising global demand for products required for the transition. For example, solar panels, wind turbines, batteries, electric vehicles all require resources abundant in Canada. In addition, through innovative solutions, Canada can differentiate its resource products as the cleanest, lowest-carbon options in the marketplace.

Canada's ability to claim its fair share of the global resources will depend on its ability to access existing and new markets, through highways, rails, pipelines and access to ports. Furthermore, with adequate infrastructure to access global markets, Canada can implement successful market diversification strategies. Infrastructure is also required to access remote and northern areas to access Canada's resources in those areas.

"We need the whole of government as a partner in innovation because policy, regulations, fiscal tools and skills advancement are integral to the acceleration and scale up of technology and its adoption."

WHY THIS MATTERS

Without sufficient, functioning infrastructure that enable access to markets and resource deposits, the resource sectors cannot grow and compete globally.

The Table's ambitious exports growth target cannot be met without adequate infrastructure to access markets. The resource sectors' access to domestic and international markets is increasingly threatened due to insufficient and underperforming infrastructure and a single majority market in the U.S.[9] Competitive and predictable service and costs are critical to ensure goods from Canada's natural resource sectors reach their intended markets, failure of which results in lower domestic and export volumes and associated reductions in revenues, jobs and investments. This also limits the resource sectors' tremendous market diversification opportunities. The Financial Post reported a "massive capital exodus" from Canada's energy and clean technology sectors driven by the lack of adequate infrastructure.[10]

9 https://www.gbm.scotiabank.com/scpt/gbm/scotiaeconomics63/pipeline_approval_delays_2018-02-20.pdf

10 http://business.financialpost.com/news/economy/investment-outflow-from-canada-already-underway-in-real-time-rbc-head

WHAT WE RECOMMEND

The federal government, with support from provinces, territories and industry, should clearly identify Canadian strategic infrastructure needs using a defined set of criteria, starting with the highest impact projects.

A federal government-led task-force should be created to annually maintain the rolling infrastructure plan, as well as identify and track milestones to ensure that these projects are being completed. This taskforce should be mandated to report annually to the First Ministers' meetings.

CASE IN POINT

In 2018, Scotiabank reported that Canada is losing $10–$15 billion in annual revenues due to inadequate pipeline capacity. Imagine the health and social programs that level of revenue could fund!

Inadequate rail service is estimated to cost Canadian forestry companies at least $500 million annually and mining companies hundreds of millions. Imagine the research and development funding opportunities lost because of this!

HIGH-IMPACT STRATEGIC INFRASTRUCTURE PROJECTS CANADA COULD UNDERTAKE

- **Upgrade portions of current rail lines, where necessary, to carry heaviest weights**
- **Where required, provide access to mining/forestry operations via branch rail lines that connect back to main rail thoroughfares**
- **Reinstitute discontinued rail lines to provide business opportunities to multiple manufacturing units in rural and northern communities, which is a potential opportunity for Indigenous partnerships**
- **Target de-bottlenecking of transportation and energy networks**
- **Build a modern, smart electrical grid to support the transition to cleaner and distributed energy with greater efficiency**
- **Enable access to tidewater to reach global markets by pipelines and rail**
- **Improve efficiency and cost competitiveness of interprovincial and international trade corridors east, west and north**
- **Build infrastructure to access untapped mineral-rich areas**

"I look at our resource industry as the laboratory of the future. It takes almost 30 years to create a new industry—so think of the resources as the laboratory to create these new industries."

PROPOSAL

Innovation for competitiveness

Strengthen an innovation ecosystem that fosters public-private partnerships, accelerates deployment and adoption of advanced technologies, supports skills training, integrates innovators with the mainstream supply chain and showcases Canadian innovations

Natural resource sectors are an important, enduring strategic economic advantage for all parts of Canada. They are also early adopters of advanced Canadian clean and digital technologies, helping them grow and springboard to export markets through public–private partnerships among entrepreneurs, investors, governments, regulators, cross-sectoral experts, resource companies and academics.

WHY THIS MATTERS

Without an environment that fosters innovation and accelerates adoption of advanced technologies, the resource sectors will not be able to meet the changing expectations of the global markets.

To capture growing resource opportunities, Canada must be poised to compete in changing global markets that will reward firms that are clean, digital, innovative, agile and cost-competitive. At present, however, Canada's resource sectors are experiencing declining investment due to various macro and domestic factors. In addition, the following factors are impeding Canada's resource companies' ability to innovate:

- Many resource companies prefer to be fast-followers of new innovation.
- High costs of regulation, taxes and overall project development push potential adopters to reduce expenses in the only area they can—R&D spend—or push companies to exit Canada.
- The regulatory system is complex, inefficient and does not reward innovation. Project approval times are lengthy not only for full-scale commercial projects but also for technology pilots. In a risk-averse, cost-conscious environment, this is an additional deterrent to the deployment and adoption of potentially game-changing technologies in resource operations.
- Creating new markets or new value-add products is a challenge due to lack of scale-up capital in Canada and inadequate physical and digital infrastructure.

RESOURCE INNOVATION IN ACTION

- **Goldcorp's Borden underground mine in Ontario is the world's first all-electric mine. It will use an electricity and battery-powered underground fleet that is expected to eliminate all greenhouse gas emissions associated with moving ore and waste rock.**
- **Suncor and Teck have rolled out automated haul trucks in its oil sands mines. Running in part on electricity, these trucks will be safer, cleaner and more economical.**
- **Canada is leading the world in tall wood construction, a new frontier for wood as construction material. Wood-built structures store carbon and require less energy to heat and cool than traditional materials.**
- **Agrisoma Biosciences in Quebec is currently producing biofuels for Qantas airlines.**
- **A US$10-million Carbon XPRIZE was created by oil sands majors to challenge the world to reimagine CO_2 emissions by accelerating the development of technologies that convert CO_2 from oil sands operations into valuable products.**
- **FP Innovation and Resolute Forest Products TMP-Bio pilot project in Thunder Bay, Ontario, is focusing on developing new ways to efficiently produce and commercialize biochemicals from wood residuals.**

WHAT WE RECOMMEND

Canada needs to create major cross-sectoral, industry-led, federal government-facilitated innovation and technology "lighthouses,"[11] i.e., collaborative innovation networks built on the success of Canada's Innovation Superclusters Initiative. These lighthouses should aim to solve grand challenges such as carbon reduction, digitization and the creation of new products and markets from resources. Lighthouses will:

- Build on the success of superclusters in public–private partnership with entrepreneurs, investors, governments, regulators, cross-sectoral experts, resource companies and academics
- Provide one-stop support for innovators on skills, regulations, mentoring and access to funding (beyond fiscal tools)
- Identify global best practices on resource innovation translated to a Canadian context, with the intent of modernizing Canada's innovation ecosystem
- Showcase success stories and provide public visibility to successful Canadian innovations
- Leverage "lighthouses" to develop new products and new domestic and international markets for Canadian resources.
- Accelerate the "circular economy" by supporting and accelerating the development of higher-value products in specific resource sectors and across other sectors (e.g., forest residual products) as inputs to bioplastics, biochemical and biofuels; this should include ensuring that new products are captured by Statistics Canada
- Expand the Canadian Forest Bio-economy Framework to a National Bio-economy Strategy that includes other sectors
- Enable application of new technologies such as Smart Grid, sustainable construction including tall wood building and carbon-neutral cement, or air transporters and alternate fuels in mining

IMAGINE THIS

There is a tremendous opportunity for massive marketing of innovative Canadian role models. This was catalyzed by Governor General David Johnston and Tom Jenkins, who co-authored *Ingenious: How Canadian Innovators Made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier, and Happier*—which is about brilliant Canadian innovations whose widespread adoption has made the world a better place. "From Bovril to BlackBerrys, lightbulbs to liquid helium, peanut butter to Pablum, this is a surprising and incredibly varied collection to make Canadians proud, and to our unique entrepreneurial spirit."* This book is a clear example of the capacity for innovation Canadians have when presented with the right conditions.

* https://www.amazon.com/Ingenious-Canadian-Innovators-Healthier-Wealthier/dp/0771050917

[11] A "lighthouse" is a technology adoption hub, that may or may not be a designated physical space. The concept builds on Canadian Superclusters, and is intended to act like a beacon for entrepreneurs, investors, governments, regulators, cross-sectoral experts, resource companies and academics. The Canada Mining Innovation Council and the Clean Resource Innovation Network, while not selected as Canadian Superclusters, are operational resource innovation hubs that can be leveraged to build upon.

PRINCIPLES OF A SUCCESSFUL INNOVATION ECOSYSTEM

Innovation is defined as the development and deployment of a new or significantly improved technology, business model, product, system or service aimed at creating value

A successful, vibrant innovation ecosystem will contain the following components, designed to decrease the time to commercialize new technologies and increase adoption of successful new innovations in major projects in the natural resources sectors:

- **World-class regulatory system with outcomes-driven, stringent, flexible and predictable regulations that drive innovation and technology adoption**
- **Economic incentives to reduce the cost of investment in technology development, enable adoption of advanced and innovative technologies in the resources sectors, and de-risk being a first mover**
- **Focused co-investment by the federal government with matching private capital in demonstration and scale-up phases**
- **Sufficient infrastructure for an advanced clean and digital economy, including universal broadband access**
- **Support for clusters, and "lighthouses"—networks within and across sectors that prioritize and enable resources that will advance technology through to adoption**
- **Fast-tracking of regulatory approvals for technology pilots through regulatory sandboxes**
- **Federal and provincial governments (and the resource sector) champion the creation of the natural resources innovation ecosystem as a critical priority for Canada, and enable a public–private partnership in resources innovation**

PROPOSAL

Innovation for competitiveness

Develop a comprehensive, focused toolbox that includes financial mechanisms, coordinated across governments, to support a vibrant innovation ecosystem that accelerates development, deployment and scaled-up adoption of Canadian innovation

Recent budgetary announcements in support of scale-up and competitiveness of Canadian businesses are strong moves in the right direction. Working together, we can build on those commitments by creating a toolbox of financial and tax measures that will help innovative Canadian companies grow and succeed.

WHY THIS MATTERS

Without coordinated, focused and structured federal and provincial/territorial fiscal programs that leverage private investment and accelerate scale-up, deployment and adoption of innovation, the resource sector will not be able to scale-up innovations due to lack of capital.

FPT governments, in general, have developed policies, programs and tax measures to encourage business expansion and support invention and creativity to resolve the world's most pressing problems. However, these programs are fragmented across departments and levels of governments, are without focus and structure, and scale-up capital is still lacking.

WHAT WE RECOMMEND

The federal government should lead an initiative to revitalize fiscal tools in consultation with the natural resource sectors, **beginning by evaluating the corporate tax structure for North American competitiveness in the resource industries in light of recent changes to the U.S. tax structure, which have created an uneven playing field in favour of U.S. companies. In order to transform the resource sectors to be competitive in the future, the sectors must be competitive today**. In adjusting its fiscal measures, the Canadian government should examine best practices from other countries that provide support

throughout the various stages of innovation.

Specific examples of fiscal tools include:

- 100% first-year accelerated capital cost allowance for all new investments in advanced innovation including matching to US tax changes immediately
- Targeted incentives and support for early adopters of advanced innovations, to manage risks and costs of being a first mover
- 50% tax credits for new investments in small, growing firms targeting clean and digital innovations
- Multi-year, predictable, matching government funding to de-risk and leverage substantial direct private investment in resource innovations
- Funding programs including those announced in Budget 2017 targeted at strategic priorities such as scale-up and demonstrated best practices, and monitored closely for timely and effective technology deployment
- Scientific Research and Experimental Development (SR&ED) tax credit program modernized to expand eligibility to receive 35% credit to investments greater than $3 million, regardless of the source of the capital
- Canadian renewable and conservation expenses tax measure extended to all clean technologies—including bio-chemicals and bioproducts—to encourage investment in bioproducts from all natural resource sectors with transfer-ability measures (i.e., flow-through shares)

PROPOSAL

Innovation for competitiveness

Develop a Canadian data strategy for natural resources to drive insights for enhanced global **competitiveness**

Digitization[12] is a disruptive force that is enabling sectors to improve safety, reduce environmental impact and dramatically reduce the cost of resource development. Having a national data strategy for the natural resources sector will provide a critical foundation for Canada's global competitiveness.

WHY THIS MATTERS

Digital adoption was a significant driver behind the growth of low-er-cost U.S. oil that disrupted world oil markets in recent years, caus-ing significant adverse economic impact to Canada. Agile digital adoption is thus critical to the global competitiveness of the Canadian natural resource sectors.

WHAT WE RECOMMEND

To realize this proposal, Canada needs to:

- Incentivize donation of anonym-ized private-sector resource data, which, when coupled with publicly-derived data, will enable a significant pooled data source for application of data science
- Create a sectoral data platform supported by collaborative governance and appropriate safeguards that ensure cyberse-curity and address anti-trust concerns

CASE IN POINT

In 2017, a white paper by the World Economic Forum, written in collaboration with Accenture, said transforming to a digital oilfield could add almost $1 trillion to the world's economy by 2025. With the kind of innovation capacity Canadians inherently possess, having a high-functioning innovation ecosystem can enable Canada to claim a significant portion of that value.

EXAMPLES OF EARLY ACTION

Government could explicitly include digital investments within innova-tion programs undertaken by ISED and NRCan to encourage acceler-ated installation of advanced digital sensors, which are fundamental for accurate data collection and digitally advancing the natural resource sectors.

[12] Digitization includes data analytics, connected sensors (Internet of Things), automation, virtual and augmented reality, drones and cloud computing.

"Broadband access is a key step in reconciliation. It will empower youth to pursue careers they want without being forced to leave home. It will enable businesses to grow and thrive."

PROPOSAL

Indigenous peoples and communities

Facilitate thriving Indigenous communities by scaling up Indigenous businesses and improving access to high-quality education within communities

Indigenous communities are a cornerstone of Canada's economic growth and competitiveness. Integrating Indigenous businesses into the supply chain, with government acting as the catalyst along with continued industry support and partnerships, will be a significant step towards economic reconciliation.

Without minimizing the many challenges faced by Indigenous businesses, the last few decades have seen a renaissance in the Indigenous economy. The Indigenous private economy now includes more than 43,000 businesses.[13] Indigenous youth are the fastest-growing demographic in the country, with more than 46% of Indigenous people under the age of 25.[14] The Indigenous population in Canada also contributes more than $32 billion annually to the country's GDP—just over $12 billion of that from the Indigenous private economy.[15] There has been a 15% increase in the number of profitable Indigenous businesses,[16] an increase in the overall profitability of Indigenous businesses and continued optimism about the potential for future growth.

WHY THIS MATTERS

Without empowered, enabled and thriving Indigenous communities, Canada's attempt at reconciliation will suffer. Ensuring Canada's Indigenous peoples have a meaningful and substantial role in the economy is critical to laying the foundation for reconciliation.

Canadian resource sector partnerships with Indigenous communities are the recognized global best practice. Natural resource businesses typically operate near or around Indigenous communities and have strong partnerships with these communities. The resource sectors are also currently the largest employers of Indigenous workers.

The federal government's Indigenous Forestry Initiative is designed to support Indigenous-led economic development in Canada's forest sector. The funding program aims to increase Indigenous participation in forestry-related opportunities, businesses, careers and governance.

But this is not enough to drive large-scale advancement within Indigenous communities. Each year, the federal government spends roughly $60–$100 million procuring goods and services from Indigenous firms[17] (compared to the $2-billion annual spend among resource companies). In 2015, federal government procurement totalled about $20 billion—$63 million of which was Indigenous procurement.[18] Increasing that proportion is the most direct way the federal government can improve the country's relationship with its Indigenous communities while boosting their economic growth and sustainability.

13 National Household Survey, Statistics Canada (custom tab made for Canadian Council for Aboriginal Business and Environics Research Group)

14 National Household Survey, Statistics Canada, https://www150.statcan.gc.ca/n1/pub/89-656-x/89-656-x2015001-eng.htm

15 Estimating the size of the Aboriginal Market in Canada, https://www.ccab.com/wp-content/uploads/2016/11/TD-Economics-Estimating-the-Size-of-the-Aboriginal-Market.pdf

16 Promise and Prosperity: The 2016 Aboriginal Business Survey, https://www.ccab.com/wp-content/uploads/2016/10/CCAB-PP-Report-V2-SQ-Pages.pdf

17 https://www.canada.ca/en/treasury-board-secretariat/corporate/reports/contracting-data/2015-purchasing-activity-report.html

18 http://www.aadnc-aandc.gc.ca/eng/1407949234714/1407949278067

INDIGENOUS PARTNERSHIPS IN ACTION

CAMECO

Cameco has established a five-pillar Corporate Responsibility Strategy to support the Indigenous communities near its northern Saskatchewan operations. This strategy focuses on workforce development, business development, community engagement, community investment and environmental stewardship. Since 2004, Cameco has procured more than $3.6 billion in services from northern Saskatchewan businesses, representing more than 70% of total expenses, and has donated approximately $134 million to northern and Indigenous groups.

SUNCOR

Suncor implemented the Aboriginal Economic Collaboration Strategy in 2012 and has seen partnership increase with Indigenous businesses and improved local economic activity. They have made progress in four key areas: formalizing a supply chain management process, conducting a business review of all current and potential Indigenous partners across Canada, investing Suncor resources into community-driven Indigenous economic development, and working with the Canadian Council for Aboriginal Business to develop a national database for identifying Indigenous businesses.

In 2018, Suncor's chief operating officer partnered with the Canadian Council of Aboriginal Businesses to create Canada's largest directory of businesses that are at least 51% Indigenous owned. In 2016, Suncor spent $445 million in Indigenous business procurement, bringing the total to almost $4 billion since 1999.

FPINNOVATIONS

Since its launch in British Columbia, the FPInnovations' Indigenous Forestry Program has created or enhanced 54 forestry-based businesses, contributing to the creation and maintenance of 220 direct and indirect jobs in the province.

In addition, Indigenous economic reconciliation is a complex challenge with several factors affecting the country's ability to advance it.

- Cultural misunderstandings create a lack of trust and a perceived sense of lacking mutual respect.
- Several Indigenous communities are not enabled for self-sustainment due to unsettled land claims; lack of basic infrastructure like housing, energy and clean water; and lack of social programming governance.
- Self-sustaining communities face capacity issues that hold them back from mainstream supply chains, with business growth and partnership in large-scale projects challenged by:
  - Lack of access to business capital
  - Lack of business training and mentorship
  - Complex application and approval processes for even small amounts of funding
  - High-cost capital on reserves, compounded by the fact that there is no personal ownership of land to leverage as equity or to secure loans
- K–12 education in Indigenous schools is not equivalent to provincially-led mainstream K–12 education, posing challenges for Indigenous school graduates when they pursue post-secondary education and deterring some from considering university and STEM careers.

WHAT WE RECOMMEND

The federal government, in partnership with national Indigenous organizations and Indigenous business councils, should lead the following initiatives:

- Increase federal Indigenous business procurement through incentives and programs to support capacity-building and integration into the mainstream supply chain and ultimately be enabled to enter into equity partnerships with major projects across Canada
- Set aside a portion of Own the Podium list for Indigenous-owned companies (to give them an advantage for a specified period of time until the advantage is no longer required)

PROGRESSIVE ABORIGINAL RELATIONS (PAR): A CASE STUDY

PAR is an online management and reporting program that supports progressive improvement in Indigenous relations, and a certification program that confirms corporate performance in Indigenous relations at the committed bronze, silver or gold level. Certified companies promote their certification with a PAR logo that signals to communities that they are good business partners and great places to work and are committed to prosperity in Indigenous communities. The four PAR drivers are leadership actions, employment, business development and community relationships.

PAR – 2018

- **Currently, there are over 80 committed and certified companies in the PAR program**
- **There are over 150 companies currently going through the introductory process to join the PAR program**

GOLD-LEVEL BEST PRACTICES

- **Bruce Power is encouraging over 100 of its suppliers to join the Canadian Council for Aboriginal Business (CCAB) and the PAR program**
- **Suncor is awarding more points on their procurement scorecard to suppliers in recognition of PAR-certified companies**

PROCUREMENT SPENDING

- **Out of the recertifying companies for 2017 that reported their spend with Indigenous businesses in 2014, 2015 and 2016, there was a total reported spend of approximately $2.3 billion**

ABORIGINAL EMPLOYMENT

- **To promote employee retention, PAR gold-level companies often encourage Indigenous employee networks, cultural activities, mentorship opportunities and educational opportunities**

- Leverage the cultural strengths of Indigenous communities and partner with them in large scale, country-wide afforestation, brush clearing and improved cultural and other practices that reduce, bind and store carbon
- Integrate global best practices of oil spill management with traditional knowledge of Indigenous communities to give them ownership of oil spill management
- Identify, leverage and share best practices of resource sector relationships with Indigenous businesses
- Endorse business relationships established by natural resource companies by awarding best practices with regulatory fast-track (best practices include mechanisms for job and wealth creation, profit sharing and business sustainment)
- Increase support of Indigenous businesses through direct contracts with third-party certified Indigenous firms. (e.g., Indigenous Works, Towards Sustainable Mining, Sustainable Forestry Initiative, Canadian Council of Aboriginal Businesses, etc.)
- Establish a universal third-party certification standard based on proven best practices
- Leverage fiscal tools available to support equity partnerships with Indigenous businesses
- Provide mentorship and necessary tools to help build the needed capacity for businesses to get off the ground
- Upgrade K–12 education to be at par with Canadian public schools
- Provide universal broadband access across Canada, which will enable remote learning and upskilling opportunities in Indigenous communities so they can pursue careers in natural resource sectors without having to travel far into cities

PROPOSAL

Attracting and re-skilling talent

Attract new entrants into resource sectors, re-skill existing workers and create highly-skilled trades and science, technology, engineering and mathematics opportunities for youth

Attracting new and re-skilled workers into careers in the natural resource sectors is paramount to the resource sectors' ability to continue to grow and thrive. Talent[19] is fundamental to enabling Canada to once again become a global competitive force in natural resources, amidst the modernization of these sectors, making Canadians proud of the success we create today and in the future.

[19] Talent refers to Canadian people including Indigenous communities, women, youth and other underrepresented groups.

This proposal aims to attract new entrants into resource sectors—particularly women, youth and Indigenous workers—to re-skill existing workers at risk of being affected by job automation and to create highly skilled trades and STEM opportunities for students through K–12 curriculum enrichment.

WHY THIS MATTERS

Without a diverse, youthful and highly skilled workforce, the resource sectors will be crippled.

The natural resources sectors are digital sectors. Digital technologies are being used to improve safety and reduce the environmental impacts of resource development and use. They are helping bring down the cost of resource development, increasing profit margins, boosting the competitiveness of the natural resource sectors and enabling growth. This tremendous opportunity, however, requires a properly skilled workforce that includes a strong younger generation to be prepared for the digital transition in the next decade. Furthermore, the natural resource sectors can benefit significantly from Canada's Indigenous youth and current workers in skilled trades and STEM jobs in the northern remote areas of resource operations close to Indigenous communities. The natural resource sectors are already Canada's largest employers of Indigenous workers, but there is still a large workforce capacity to be trained/skilled and leveraged.

Unfortunately, the resources sectors are facing a dramatic talent crunch, including a talent pool mismatch:

- There are significant employment opportunities in northern and rural areas of resource operations, whereas youth unemployment is a challenge in urban centres, indicating either a lack of awareness or perceived nattractiveness of opportunities.
- There is a significant gender imbalance in resource sector employment. Women make up just 27% of the oil and gas workforce, 17% of the forestry workforce and 14% of the mining workforce.[20] The gap is especially visible within semi-skilled and trade roles in northern operations.
- Even though resource sectors are the largest employers of Indigenous workers in Canada, Indigenous workers remain underrepresented in the northern and remote areas of resource operations (i.e., areas that are closest to their communities).
- There is a brain drain.[21] In particular, there is a significant demographic imbalance in resource sector employment with a historical low of 5% of the workforce being under age 29. This may be due to uncertainty around the competitiveness—and as such the viability of jobs—in the sectors, lack of promotion of the sectors (including their environmental performance, digital modernization and strong governance), locations and/or the potential in the future of resource industries in the Canadian economy.

There is also a future skills problem that is not fully understood and, as a result, is not being managed.

- Several reports indicate that about 20% of current work activities in Canada are expected to be automated by 2030 with up to 12% of the workforce facing job loss and re-skilling challenges.[22] Yet, the 2018 Business Council Skills Survey found that 95% of Canada's largest companies do not anticipate widespread job losses with 46% expecting that AI/automation will actually result in an increase in their workforces vs 41% predicting a decrease.[23] This indicates that the majority of the workforce and employers are unprepared and largely uninformed of future-fit skills requirements of our current and future workforce.
- Canada's natural resource sectors are more vulnerable than other sectors to automation with 86% of tasks involving predictable physical work at risk of automation. While new technologies are likely to increase demand for some new job types, the adoption of autonomous vehicles, Internet of Things (smart connected sensors) and drone technologies in Canada's natural resource sectors is expected to reduce employment from 930,000 jobs in 2018 to 810,000 jobs in 2040 (equivalent to a net reduction of 13%).The largest impacts are expected to

[20] Statistics Canada

[21] http://business.financialpost.com/news/economy/investment-outflow-from-canada-already-underway-in-real-time-rbc-head

[22] McKinsey & Company provided fact-based research and analysis to support the development of the Economic Strategy Tables' recommendations presented in this report.

[23] https://thebusinesscouncil.ca/publications/2018skillssurvey/

be felt by the mining industry's adoption of autonomous vehicles (29,000 job losses) and the Internet of Things (27,000 job losses), which cumulatively account for 47% of the net natural resources digital disruption. Drones would account for a further 2,800 mining-related employment cuts.[24]

WHAT WE RECOMMEND

Create an industry-led Resources Skills Council with support from FPT governments that leverages existing skills initiatives and brings together multiple entities to focus on the resources sectors.

Recommended participants include industry senior leaders, FPT governments, industry HR councils (e.g., mining), Skills Canada (trades and technologists), Business Higher Education Roundtable (Business Council of Canada), Indigenous Nations, universities, polytechnics and labour unions.

The council's mandate should be to:

- Leverage branding proposals and appoint successful young workers as brand ambassadors to **showcase resource sector modernization** to attract youth, women and Indigenous workers (e.g., mining posters, Carbon XPRIZE, Women Building Futures, Forest Greenest Workforce).
- **Expedite future skills requirements mapping** to identify skills that may become obsolete in the next decade, and leverage the federal government's horizontal review and inventory of skills programming that is currently underway to maximize effectiveness.
- **Host information sessions** on the impact of the digital era on labour. These would be for trade associations, labour unions, company senior leaders and HR managers and be designed to create awareness.
- **Create short courses that contain experiential learning** to keep pace with changing digital technology (e.g., post-secondary digital micro-credential programs, such as those at the University of Calgary, private-sector reskilling offerings like Lighthouse Lab and EvolveU).
- **Work with provinces to enrich the K–12 curriculum** to provide students the opportunity to experience skilled trades and STEM careers through work-integrated learning and summer apprenticeship (e.g., Shad Valley). The best practices of multi-stream K–12 education systems in Germany—where high school students can self-select into highly skilled trades or STEM streams—should be leveraged. The council should also publicize the value of skilled trades so K–12 students pursue this path keenly with encouragement from parents.

PROPOSAL

Branding

Create a strong, evidence-based "Made in Canada" resource brand to be communicated to Canadians and global audiences so Canadian resources are equated with innovation, quality and environmental leadership, backed by performance

Canada is a resource-rich country with immense potential to capture a share of the growing global resources market while reducing greenhouse gas (GHG) emissions and contributing to the slowing of climate change. Canada has an incredible opportunity to share its products and knowledge widely with the world. A strong Canadian natural resources brand will enable the sectors to gain social licence and attract domestic and foreign investment.

WHY THIS MATTERS

Without effective communication of the ongoing modernization and advancements made in the nation's resources sectors, attracting youth to resource careers, regaining public

[24] Mining Industry Human Resources Council Report 2017

trust and creating pride and excitement about the natural resources sectors will be near impossible.

Canada was the first country to develop an externally verified standard for mining that has now been adopted by several other countries. Canada's forestry sector is leading the way in its sustainable management practices and by innovating in the construction of tall wood buildings. This new frontier will reduce GHG emissions, as wood-built structures store carbon and require less energy to heat and cool than other materials. Canada's oil sands sector is the first industry in the world to have collaborated with government and environmentalists to propose and support the implementation of a sectoral GHG emissions limit legislation, and was also the first to create an alliance—Canada's Oil Sands Innovation Alliance—where all of the largest oil sands producers agreed to collaborate on and share environmental technologies without competition.

But the sectors' successes and future plans are not widely known. This is why, despite the modernization and advancement, the sectors are challenged with attracting youth into the workforce and the public has lost confidence in the sectors. There is an urgent need to talk more about the resource sectors' successes and gain back public trust and confidence.

WHAT WE RECOMMEND

Develop an ambitious branding campaign for resource sectors as leaders in innovation, backed by evidence. Equip industry and government officials with consistent, evidence-based "Made in Canada" resource brand messaging so they can talk about Canadian resource sector successes and future plans whenever there is an opportunity.

Prioritize resource sectors in trade missions and export support programs, with an emphasis on innovation and performance. To do this, leverage existing solid economic, environmental, social and regulatory performance. Start by showcasing stories of resource sectors modernization—for example, Towards Sustainable Mining, Indigenous relations with the resource sectors and industry best practices, sustainable forestry initiatives, low-carbon energy initiatives such as Carbon XPRIZE, Canada's Oil Sands Innovation Alliance, etc.

BRANDING IN ACTION

Canada is recognized as a global leader in sustainable forest management. In 2016, the Forest Products Association of Canada (FPAC) introduced the "30 by 30" Climate Change Challenge to build on the industry's environmental credentials in removing CO2 from the atmosphere and world-leading sustainable forest management. Through the "30 by 30" challenge, the Canadian forest industry is aiming to contribute more than 13% of Canada's GHG emissions reduction targets by removing 30 MT of CO_2 a year by 2030 through maximizing forest carbon sinks, sequestering carbon in forest products, and reducing GHG emissions from its facilities. These targets are directly aligned with the Canada's Forest Bioeconomy Framework, endorsed by the Canadian Council of Forest Ministers in 2017. In the context of meeting the greenhouse gas mitigation targets of the Paris Agreement, bio-based products and energy present a realistic alternative to fossil-based products and chemicals now. The Framework, fully subscribed by the industry, "builds on our sector's world-leading sustainability practices and our focus on finding environmental and economic value for every part of the tree. It will help position Canada's forest sector as a solutions provider in our move to a lower-carbon economy."

Produced in Canada. Made for the World. Canadian Resources of the Future.

We are one of the most fortunate countries in the world. A small population living in a big land filled with natural beauty and natural resources. We are peaceful and inclusive, prosperous and practical. We have a global reputation for tolerance and diversity that is second to none. Yet we are not always recognized for innovation and technology.

This despite the fact we have been quietly innovating for decades. And in our understated way we are determined to make things even better, here at home and in the world. It is time now for us to share that determination. Widely. And in our own way, loudly.

Innovation is about technology, but it is about much more. It is about mindset. About ambition. About choices. In our ambition we do not choose between the environment or the economy. We choose both. And we will share with the world how we are succeeding.

For thousands of years Indigenous Peoples lived in harmony with the land, sustainably stewarding Canada's natural resources. When Europeans arrived, relationships developed around two of those resources: waterways and furs.

Since then, Canada has developed a resource sector that is recognized around the world. We are leaders in decarbonizing across all our resources, including oil and gas, forestry and mining, through nuclear and hydro and with the development of alternative energies such as wind, solar and biofuels.

Resources are Canada's family business.

For many Canadians, resources have put food on our table, sent our children to school and paid for our teachers, doctors and nurses. Resources are connected to many other sectors across Canada, including financial, manufacturing, transportation and, increasingly, digital.

We didn't always practice sustainability and Indigenous inclusion the way we do today. But as our knowledge has improved, so have we.

Today we are using both 21st century technology and timeless traditional knowledge to better care for our air, land and water. We are working increasingly together. And we are creating even more prosperity.

As a country, we now do this well. And we know we can do even better. We have a vision for what Canada can be, and what we are already becoming. We will bring not just our resources of the future to the world but also our resource knowledge and our resource technology.

Because of what we have in our country, and because of who we are and what we've done, Canada is already a world leader in responsible resources. The opportunity before us is to share our products and knowledge even more widely with the world.

In this new world of innovation, our small population size is not a hindrance. It is an advantage because collaboration and speed are required. Countries like Finland, Israel and Sweden are leading the way. In Canada we are already collaborative, and if we are determined and bold and willing to do even better, we can be nimble and can move faster than many. We have to because the race to innovate is global, and the competition is not standing still.

Here are just a few of the things the Canadian resource sector is already doing to make our resources even more responsible:

- Goldcorp's Borden underground mine in Ontario is the world's first all-electric mine. It will use an electric and battery-powered underground fleet that is expected to eliminate all GHG emissions associated with moving ore and waste rock.
- Suncor and Teck have rolled out automated haul trucks in their mines. Running in part on electricity, these trucks will be safer, cleaner and more economical.
- Canada's newest oil sands mines produce oil with the same amount of CO_2 as the average barrel used in North America.
- Canada and Alberta are partnered with an oil sands producer and Canadian Natural Resources to put carbon back in the ground and share that know-how globally.
- Energy companies came together to develop new technologies, including sponsoring a $10-million global prize to create new ways to take carbon out of the air and turn it into useful products.
- Energy and resource companies are partnering with Indigenous communities and supporting economic reconciliation by creating jobs and business opportunities and most recently by investing together as owners. (The average per capita income in the Fort McKay First Nation, which works extensively with energy companies, is almost double that of the average income in Canada.)

- The Canadian mining industry was the first to establish Towards Sustainable Mining (TSM) as a commitment to responsible mining. The externally-verified standard for performance is being adopted by several countries around the world.
- Many metals are used in renewable technologies, including steel, copper and nickel in wind turbines. And lithium, aluminum, nickel, cadmium, cobalt and zinc—products that are all mined in Canada and are key ingredients in new and emerging battery technologies.
- Canada is a leader in nuclear power and new developments are on the horizon. Nuclear small modular reactor (SMR) technology holds promise for future GHG- and carbon-free power generation, including in remote northern regions where it could replace the need to install extensive electrical transmission infrastructure across sensitive habitat.
- In a typical year, Canada's uranium mining industry produces enough fuel for carbon-free nuclear energy generation to help the world avoid 500 million tonnes of CO_2 emissions.
- Canada leads the world with more land certified to voluntary, market-based forest certification programs than any other country.
- Licella/Canfor Pulp established a joint venture to economically convert biomass, including wood residues from Canfor Pulp's kraft pulping processes, into biocrude oil to produce next generation biofuels and biochemicals, initially in Prince George, British Columbia.
- Fortress Specialty Cellulose (FSC) Mill in Quebec intends to commission the construction of a demonstration plant to produce xylitol, utilizing proprietary process technologies, know-how and expertise developed by S2G and Mondelez International, a snack company.
- FP Innovations and Kruger Biomaterials Inc. formed a strategic alliance to develop the process technology and commercial application for cellulose filaments (CF), starting with a pre-commercial plant in Trois-Rivières which will be the largest cellulosic biomaterial plant in the world.
- Canada is leading the world in tall wood construction, a new frontier for wood as construction material. Wood-built structures store carbon and require less energy to heat and cool than traditional materials.
- Canada Wood is a highly successful not-for-profit initiative developed to help the Canadian wood products industry diversify outside the U.S. market with a combination of market access and branding initiatives.
- Leadership for Environmental Advantage in Forestry (LEAF) was launched in 2008 with the goals of improving environmental acceptance of Canadian forest products in international markets, ensuring that Canadian products do not face discrimination due to environmental or sustainability issues, expanding access to markets, and helping increase market share for Canadian products by promoting their superior environmental credentials. LEAF was instrumental in positioning Canada to help withstand market share losses and create new and emerging market-share opportunities in Asia, where exports to China increased from $1.6 billion in 2008 to $4.6 billion in 2013.

This is what the Canadian resource industry is already doing today. To compete successfully in the 21st century:

- We need strong and agile regulations.
- We need predictable and time-bound regulatory approval processes.
- We need to innovate for competitiveness.
- We need to include Indigenous communities and businesses.
- We need to attract skilled talent, and we need to re-skill talent as we evolve.
- And we need to reach global markets with our responsible resources.

With our Resources of the Future Plan, the best is yet to come.

RESOURCES OF THE FUTURE KEY PERFORMANCE INDICATORS FOR 2025

In addition to the following KPIs, it is expected that Canada will continue to improve upon its top-quartile performance among OECD countries in environment, health and safety. The proposals set out in this chapter will enable a strong brand for the resource sectors, which in turn will attract youth workers to careers in the natural resources.

Key Performance Indicators	Background	Rationale
Canada ranks in the top 5 on The World Bank Ease of Doing Business Index	As of 2017, Canada is ranks 18th out of the world's 190 countries. (compared to New Zealand ranking 1st, the US ranking 6th, UK ranking 7th, Norway ranking 8th and Australia ranking 14th).	■ Globally recognized metric with consistent standards, rankings are updated annually. ■ Indicators that inform the rankings include burden of regulation, infrastructure, fiscal competitiveness and access to capital, all of which are fundamental to the growth and competitiveness of the natural resources sectors.
10 home-grown innovations that grow to >$2 billion market cap by 2025		■ An ambitious KPI that addresses the need to incent high-growth innovations to grown and be head-quartered in Canada for the long term, made possible if all of the innovation proposals made by the natural resources Table are incorporated, including lighthouses and fiscal tools recommendations. ■ Aimed at creating new industries on the backs of the resource sectors (resource companies acting as laboratories and early technology adopters) as Canada transitions to a digital and low-carbon economy of the future. ■ Innovations are not limited to resource-specific innovations; rather broadly apply to clean, digital, advanced manufacturing innovation. ■ The Table endorses the recommendations under the Own the Podium Signature Initiative.

Key Performance Indicators	Background	Rationale
Canada ranks in the top-quartile among OECD countries in The World Bank Doing Business Right Index, in average time to get project approval	As of 2016, Canada ranked 34th out of 35 countries (compared to the U.S. ranking 4th, the U.K. at ranking 6th and Norway at ranking 12th)	■ Globally recognized metric with consistent standards, rankings are updated annually and reflects having the least amount of burden due to government regulation ■ The average time to get project approval was based on construction project data from major Canadian centers. However, the metric is consistent for any type of project; in fact if resource projects were assessed, would likely put Canada at an even lower ranking.
Debottlenecked infrastructure with at least one major pipeline to the coast, and branch rail lines access for forestry/ mining		■ Physical infrastructure access is key driver for growth and competitiveness of the natural resource sectors. ■ Strategic pipeline and rail access will be a key indicator of the successful implementation of the Infrastructure proposal made in this chapter. ■ The Table endorses the recommendations and targets under the Infrastructure Signature Initiative
$1 billion public procurement of Indigenous businesses by 2025	$63 million in 2016 (typical annual federal procurement <$100 million)	■ Aligns with the target proposed by Crown-Indigenous Relations and Northern Affairs through the Public Sector Accounting Board. ■ The federal government issues the largest number of procurement contracts annually, in Canada. There is a significant opportunity to leverage a portion of those contracts to boost the integration of Indigenous businesses into supply chain and enable these businesses to self-sustain in the long-term.

RESOURCES OF THE FUTURE TABLE MEMBERS

Chair

Lorraine Mitchelmore

Members

Michelle Ash, Barrick Gold Corporation
Eric Axford, Suncor Energy Inc.
Brent Bergeron, Goldcorp Inc.
Pat Carlson, Kiwetinohk Resources Corp.
Avik Dey, CPP Investment Board
Kevin Edgson, EACOM Timber Corporation
Stewart Elgie, Smart Prosperity
Judy Fairburn
Sandy Ferguson, Conifex Timber Inc.
Anne Giardini, Simon Fraser University
Jean Paul Gladu, Canadian Council for Aboriginal Business
Karen Hutt, Nova Scotia Power Inc.
James D. “Jim” Irving, J.D. Irving Ltd.
Tom Syer, Teck Resources
Alice Wong, Cameco