Summary report

Transforming Canada's economy for a global low-carbon future

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CANADIAN INSTITUTE FOR CLIMATE CHOICES
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ABOUT THE INSTITUTE

The Canadian Institute for Climate Choices brings together experts from diverse disciplines to undertake rigorous research, conduct insightful analysis, and engage a range of stakeholders and rightsholders to bring clarity to the climate challenges and transformative policy choices ahead for Canada. We are publicly funded, non-partisan, and independently governed. Learn more at climatechoices.ca

Transforming Canada's economy for a global low-carbon future

The green wave—the global economic transformation necessary to avoid the worst impacts of a warming and increasingly volatile climate—has already begun sweeping across economies and industries around the world, and it is building strength. In response, Canada faces a critical choice that will define our economic prospects for generations: will we fight against the tide, simply tread water, or catch the wave and ride it to a prosperous, low-carbon future?

To date, Canadian governments have not done enough to transform Canada's economy to thrive in the years and decades ahead. There are enormous economic opportunities, but governments have tended to focus on minimizing near-term competitive risks rather than developing future competitive advantages.

Canada needs a new approach. Governments at all levels should develop forward-looking, globally targeted economic strategies and transition plans to secure long-term prosperity. There is a lot at stake—for workers, for communities, for Indigenous Peoples, and for youth and future generations.

If governments take targeted actions to mobilize and direct private investment, they can drive cleaner, stronger, and more inclusive growth that positions Canada to thrive amid global market change. As our analysis shows, there are significant advantages to being bold and proactive, rather than slow and reactive.

A successful transition depends upon ensuring that vulnerable people and communities are not left worse off. This includes those people and communities that have historically been disadvantaged, as well as those that have prospered but are now vulnerable to the disruption of carbon-intensive sectors. Governments need to make concerted efforts to empower and equip those facing risks, as well as those seeking new opportunities. And Indigenous Peoples must have greater influence on, and oversight of, both climate and economic plans.

This report assesses the implications of the green wave for Canada, and the strategies that can be used to manage risks, seize opportunities, and drive clean, strong, and inclusive growth.

Global momentum is accelerating

As the effects of climate change become increasingly severe through heatwaves, wildfires, floods, droughts, and other impacts, governments and citizens are acknowledging the need to rapidly reduce greenhouse gas emissions to avoid the worst outcomes. The global human, environmental, and economic costs of not reducing greenhouse gas emissions far outweigh the costs of transitioning to a low-carbon economy. In fact, overall global costs are lowest in scenarios where the world takes significant action right away to achieve net zero emissions by 2050 (Figure A).

While progress to date has been slow, trends indicate that climate policies will ramp up dramatically in the coming decades. Pressure to act on climate change has now permeated economic, trade, geopolitical, and social agendas and even the courts. Unions that used to fight climate action are now calling for greater progress as they see markets changing.

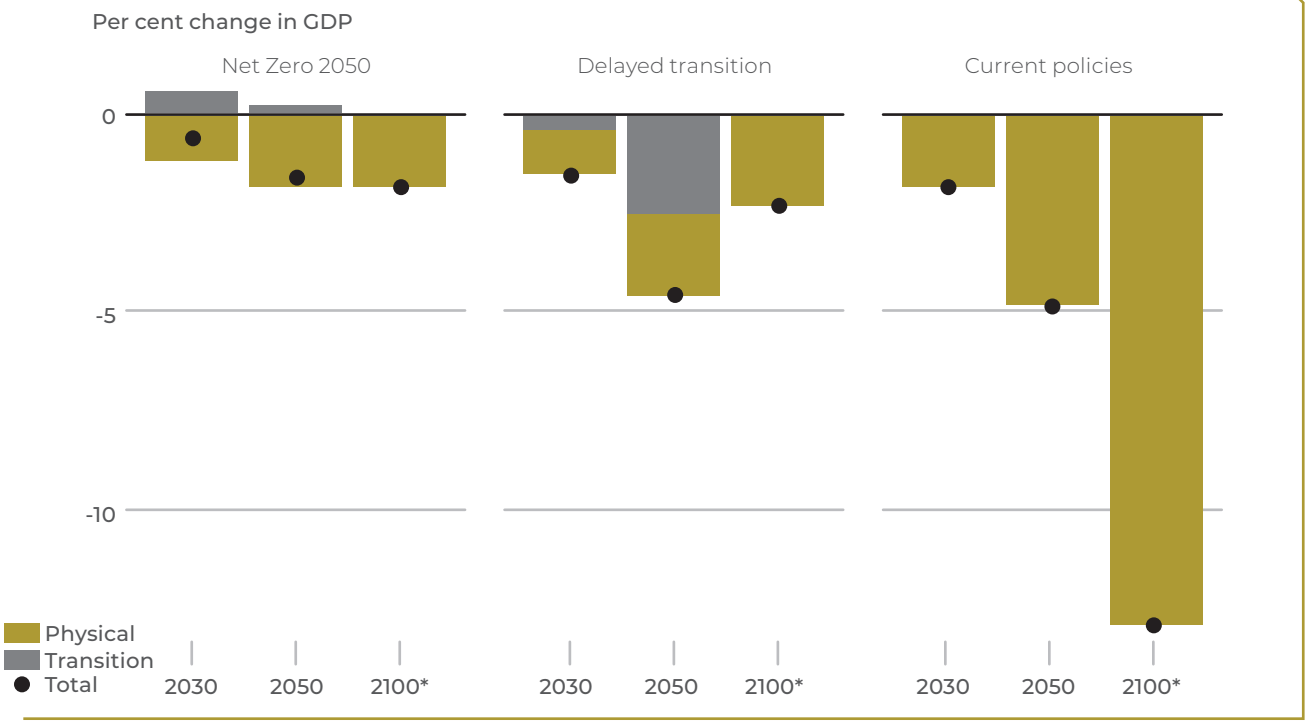
The world's largest economies and emitters—including the United States and China—have committed to dramatic emission cuts and are making large investments in clean energy and infrastructure. Countries representing over half of the world's emissions, and over 60 per cent of global gross domestic product, have committed to net zero emissions targets by mid-century (IEA, 2020a; IMF, 2020).

Capital markets have awakened, and climate change is increasingly a factor in investment decisions. International investors with over US$43 trillion in assets under management have committed to supporting net zero emissions goals (NZAMI, 2021).

Technology is also moving rapidly, making action more feasible and cheaper than ever before. Wind, solar, and electric vehicle battery technology costs have fallen by 60 to 90 per cent over the past decade, and new technology solutions are emerging across multiple sectors (IRENA, 2020; Colthorpe, 2020). Transition costs are now a smaller barrier to action—and will keep shrinking.

Figure A

Ambitious global low-carbon transition costs less than inaction



*Economic impacts are modelled out to 2050. To obtain an estimate of impacts in 2100, the NGFS took the estimate of physical risk impacts based on the damage function and assumed no transition risk impacts at this point (i.e., the GDP loss is solely due to physical risk).

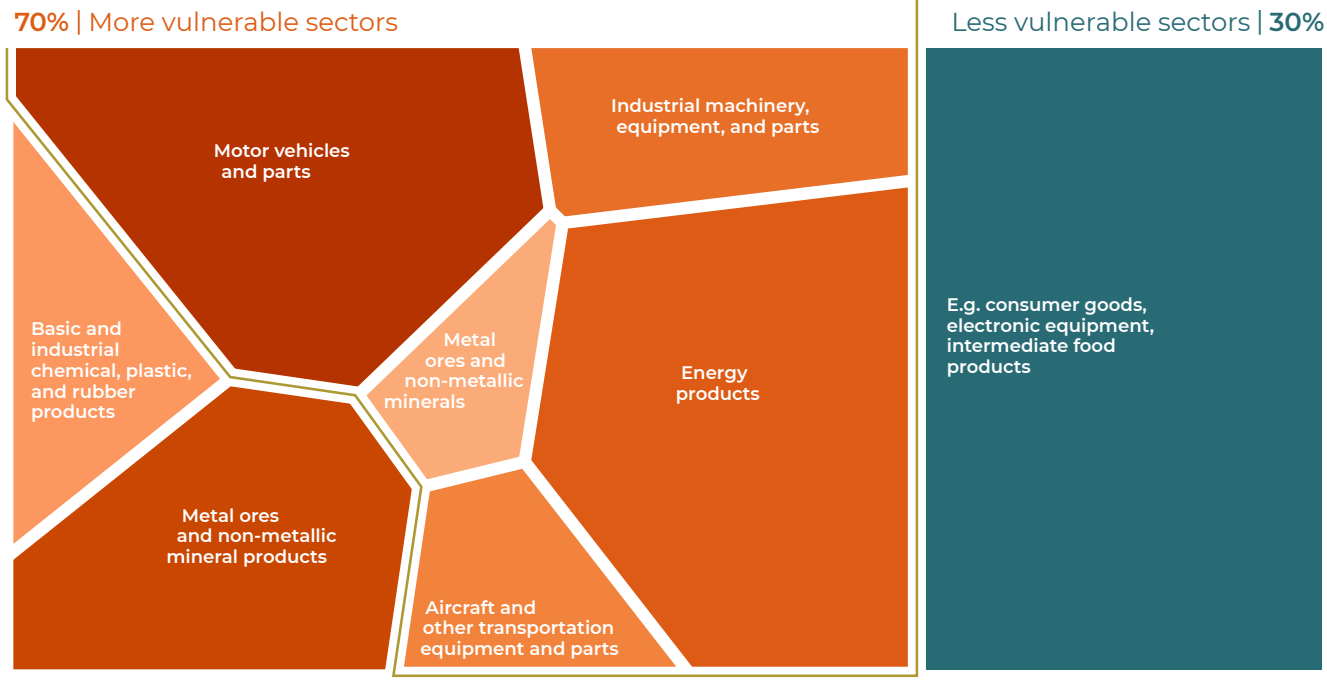
Source: NGFS (2021a). Note: The figure above shows the per cent change in gross domestic product associated with the physical impacts of a changing climate in yellow, and the per cent change associated with the low-carbon transition in grey relative to a prior trend under three different scenarios developed by the Network of Central Banks and Governors for Greening the Financial System.

The transition stakes are high for Canada

Canada is a trade-dependent country, with over one third of gross domestic product generated from exports. We also rely on foreign direct investment to finance activities that generate economic growth. Around 70 per cent of our goods exports, and 60 per cent of our foreign direct investment, come from transition-vulnerable sectors that will experience market disruption through the global low-carbon transition (Figure B). These sectors generated almost $300 billion in export and investment value in 2019.

Figure B

Canada's goods exports are sensitive to transition-related market disruption



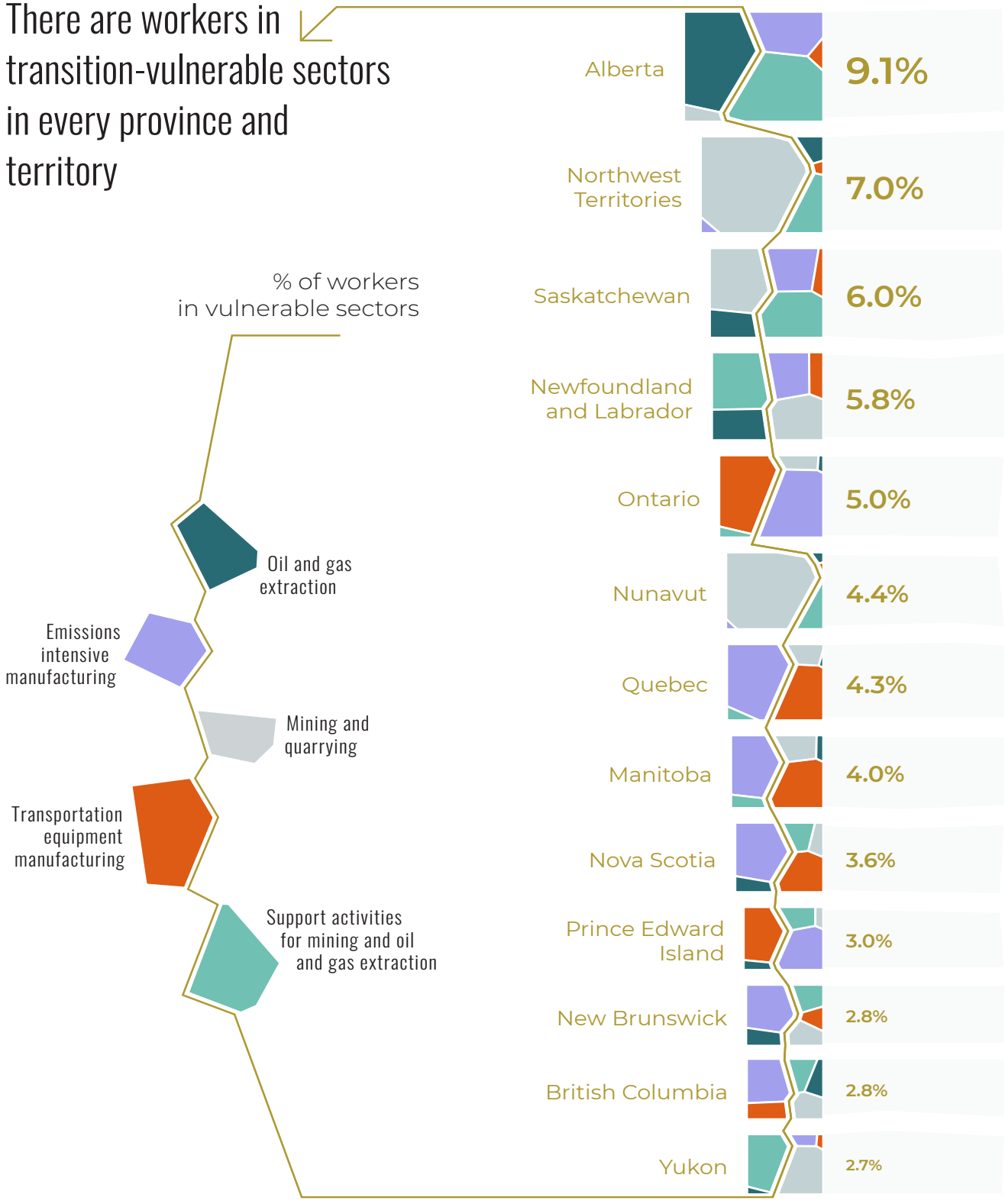
Source: GAC (2020). Notes: This figure shows the per cent share of the value of Canada's goods exports in 2019, by product. Nearly 70% of Canada's goods exports—including energy products, motor vehicles and parts, metal ores and non-metallic minerals, and basic and industrial chemicals—are in global markets expected to face disruption.

Around 70 per cent of our goods exports, and 60 per cent of our foreign direct investment, come from transition-vulnerable sectors that will experience market disruption through the global low-carbon transition.

Canada's financial sector—including banks, pension funds, hedge funds, and insurers—is deeply connected to these transition-vulnerable sectors, raising the possibility of systemic financial risk. If the global transition occurs faster than anticipated, it could cause abrupt market corrections, and lead to losses for investors and businesses.

Hundreds of thousands of people across Canada work in these transition-vulnerable sectors (see Figure C). While these workers represent a higher proportion of the workforce in regions with oil, gas, and mining activity, such as Alberta, the Northwest Territories, and Saskatchewan, in absolute terms there are more workers in transition-vulnerable sectors in Ontario, including auto manufacturing, chemical production, iron and steel, cement, and more.

Figure C



Source: Analysis by the Canadian Institute for Climate Choices (2021) based on data from Statistics Canada (2016a). Notes: This figure shows the share of the workforce directly employed in transition-vulnerable sectors by province and territory. The size of each square represents the share of workers in transition-vulnerable sectors relative to each province and territory's total workforce. The size of polygons within each square illustrates the share of workers within individual sectors. Emissions-intensive manufacturing includes NAICS codes 324, 325, 326, 327 and 331.

Economic success requires investment in large-scale, transformative change

Regardless of Canadian climate policy, Canada's exporters and multinationals will face significant changes in demand, commodity prices, and carbon costs in response to the global green wave.

To assess transition readiness, we stress-tested Canadian and global publicly traded companies under different green wave scenarios. The analysis shows that, in many sectors, Canadian companies are not ready. Based on their assets, sales, and emissions in December 2020, companies in transition-vulnerable sectors would see significant profit loss over the next 20 to 30 years (see Figure D).

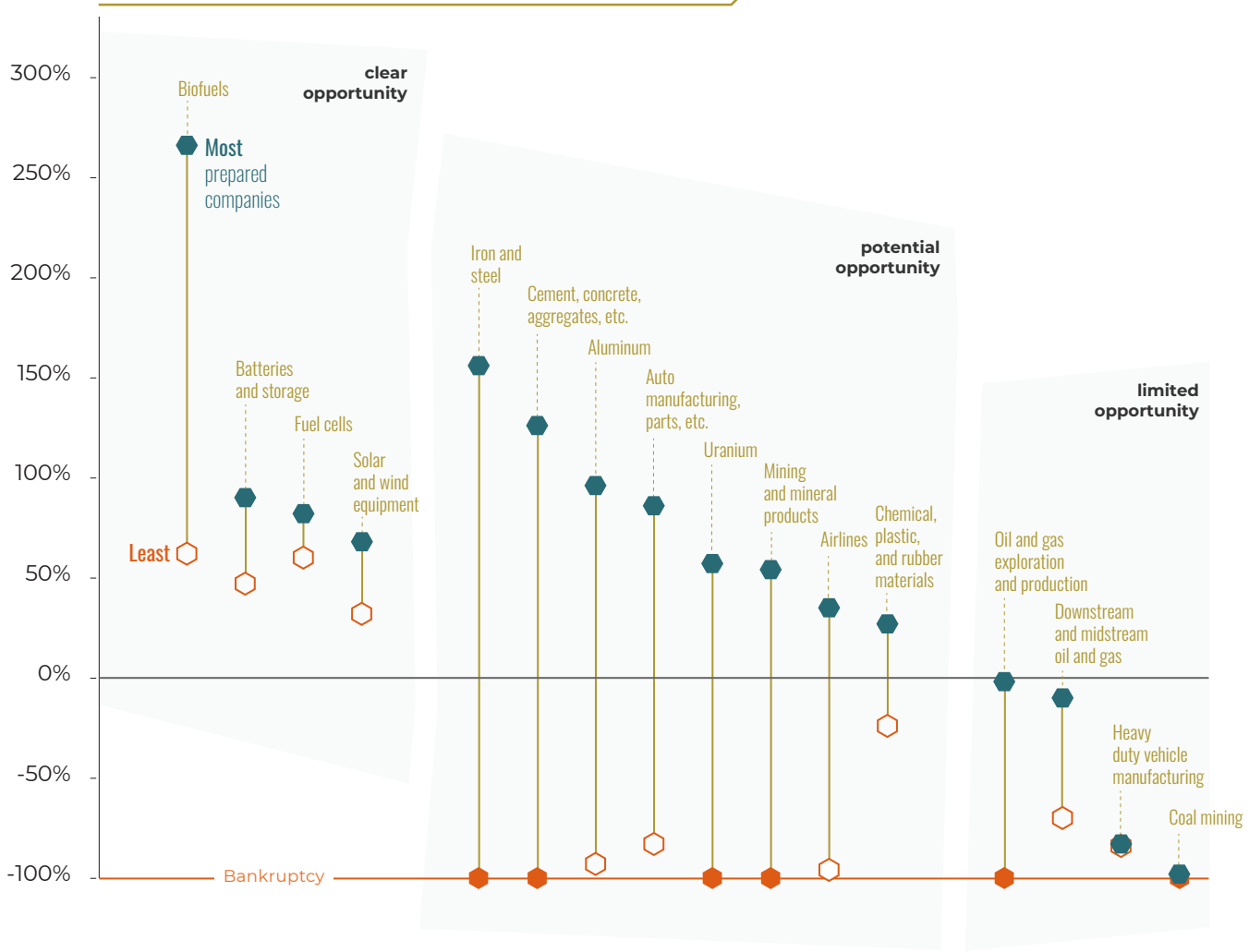
Yet these results do not suggest that the future is already written. Companies can turn risk into opportunity. The stress testing analysis shows that, in many sectors, the best global performers can increase profits through the transition. There will be strong demand for low-carbon products in sectors such as aluminum, iron and steel, and cement. Companies that make the multi-billion-dollar investments to decarbonize production could see substantial future competitive benefits.

There is also potential for the growth of smaller, privately listed *transition-opportunity* companies not captured in the stress-testing analysis of publicly traded companies. There are hundreds of Canadian companies active in a range of sectors that will see increased demand. These transition-opportunity sectors include low-carbon electricity, batteries and storage, low-carbon transport, building technology, carbon capture, clean hydrogen and technology, mining technology, alternative proteins and agriculture technology.

Canada has the potential to capture sizable export and investment opportunities through the global low-carbon transition, but success requires large-scale investment. While there are some investments taking place, too many projects are not moving forward. Investors are holding back because of both real and perceived policy, market, and technological risks.

Figure D

Preparation for global low-carbon transition will determine whether companies sink or swim



Source: Canadian Institute for Climate Choices (2021c), based on modelling and analysis commissioned from Planetrics. Notes: This figure shows the difference in profitability between the baseline scenario and the immediate 1.5-degree scenario in 2050. It compares the performance of the bottom 10 per cent of global equities in a sector (bottom node) with the performance of the top 10 per cent of global equities in a sector (top node). It illustrates that sector average results do not necessarily represent the performance of individual companies through transition.

Transition strategies need to be about more than emission reductions

The best transition strategies will differ by sector but will generally respond to three different impact drivers: demand creation, demand decline, and carbon costs. The stress-testing analysis in this report allows us to see the ways global transition affects company profitability in response to these three impact drivers (see Figure E). In some sectors, higher carbon costs are the most significant driver. In others, it is more about changes in global demand.

For example, even the lowest-emitting coal mine in the world would still face significant profit loss through the global low-carbon transition. This is because demand for coal will decline as electricity and steel producers switch away from coal due to pressure from climate policies, investors, and cheaper alternatives. Making large investments to reduce emissions at a coal mine is therefore a risky transition strategy. Instead, companies can shift into mineral and metal commodities that will see strong demand growth through transition. For example, Canada is well positioned to capture new mining opportunities from global demand growth for minerals and metals needed for renewable energy and electric vehicle batteries. In fact, Canada ranks in the top 10 globally for reserves in transition-opportunity minerals, which include nickel, molybdenum, cobalt, zinc, and rare earths, and which are expected to see a four-to-six-fold increase in demand by 2050 (IEA, 2021f).

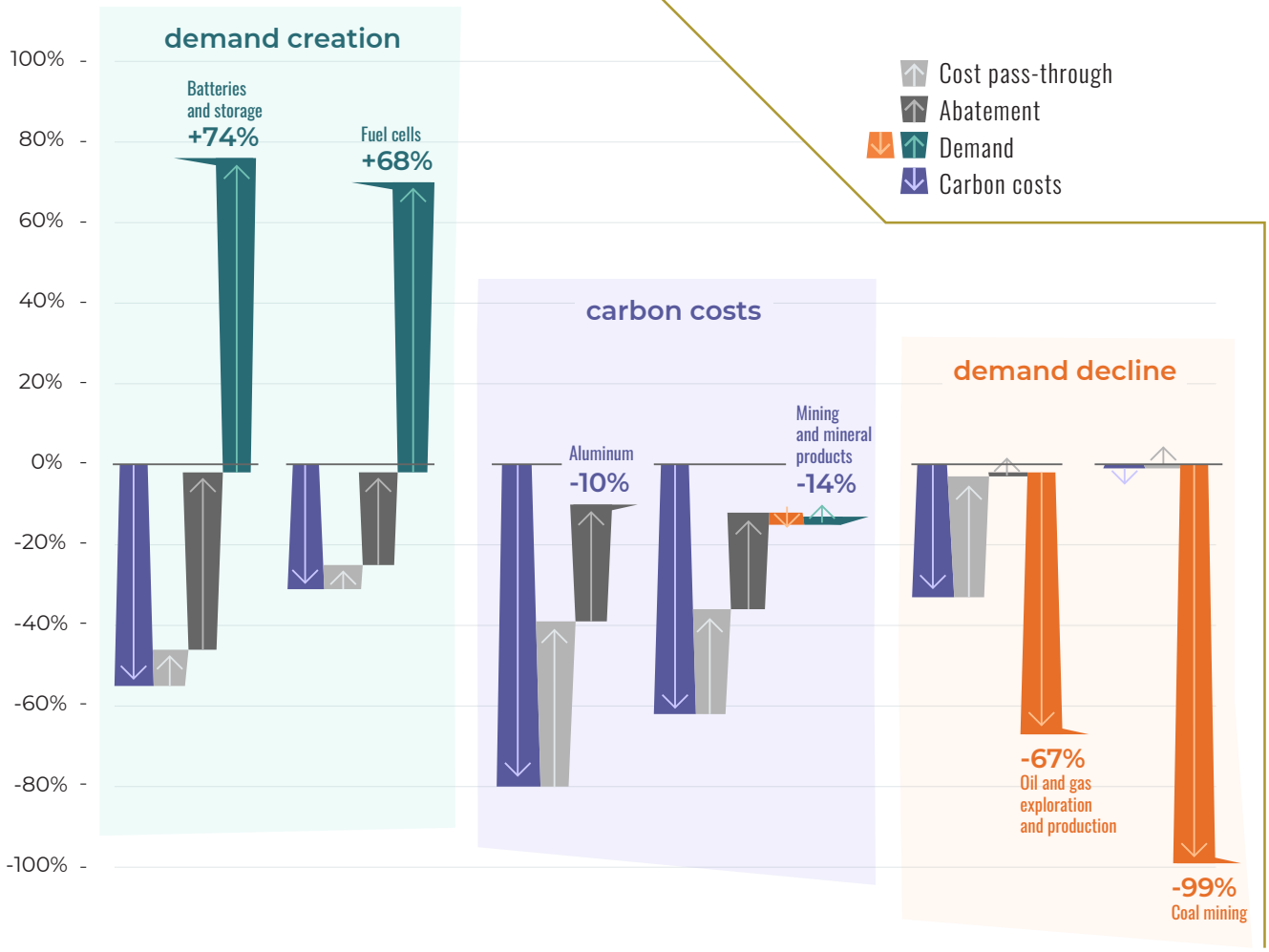
The situation is similar for oil and gas production, where declining global demand is the biggest impact driver. While the timing of demand decline differs across scenarios, most global outlooks show both oil and gas demand peaking and beginning to decline well before 2050. Transition scenarios show global oil prices declining to US$25–45 per barrel by 2050, below the break-even point for many Canadian oil producers (Planetrics, 2021; IEA, 2021e; Rystad Energy, 2020). Companies can cut emissions to reduce the portion of profit losses from carbon costs, but that won't reduce the larger portion of losses from demand decline. In a world with shrinking demand, competition for a smaller market will intensify, leaving only the lowest-cost, highest-value producers. Some Canadian companies may be able to meet this challenge, but their best transition strategy may be to move into new business lines such as hydrogen or biofuels.

In transition-opportunity sectors like fuel cells, electric batteries, and grid-scale energy storage, the biggest transition driver is demand creation. For these sectors, transition strategies are about

Figure E

Three dominant drivers of profit change across sectors

Impacts of transition on profitability in 2050



Source: Canadian Institute for Climate Choices (2021c), based on modelling and analysis commissioned from Planetrics. Notes: This figure breaks down the major drivers that determine the future profitability of companies through low-carbon transition. It shows the decomposition of the difference in profitability between the baseline scenario and the 1.5-degree scenario for a selection of sectors in 2050, based on all equities operating in the Canadian market. Results are similar for Canadian equities operating in the international market, though fewer companies and sectors are captured.

reaching scale and expanding into new international markets.

For companies active in mining, minerals, and aluminum, the biggest driver of profit loss is higher carbon costs. This means that their best strategy is to substantially reduce emissions, with large investments in technologies that have not yet been widely tested at commercial scale (Canadian Institute for Climate Choices. 2021b). These investments carry both technological and market risks.

Mobilizing private capital is critical

Companies in both transition-vulnerable and transition-opportunity sectors face barriers to making the kind of investments that are needed. Status quo bias, combined with weak policy and market signals, technology uncertainty, and large upfront capital costs make it difficult to secure investment.

The timing aspect is most challenging. If global markets shift faster than expected, traditional revenues could dry up before new investments to improve transition readiness have been made. At the same time, markets currently in their infancy—such as green hydrogen or lab-grown meat—are also a risky bet. It is the risky bets that could lead to big payoffs, but when and where is hard to predict.

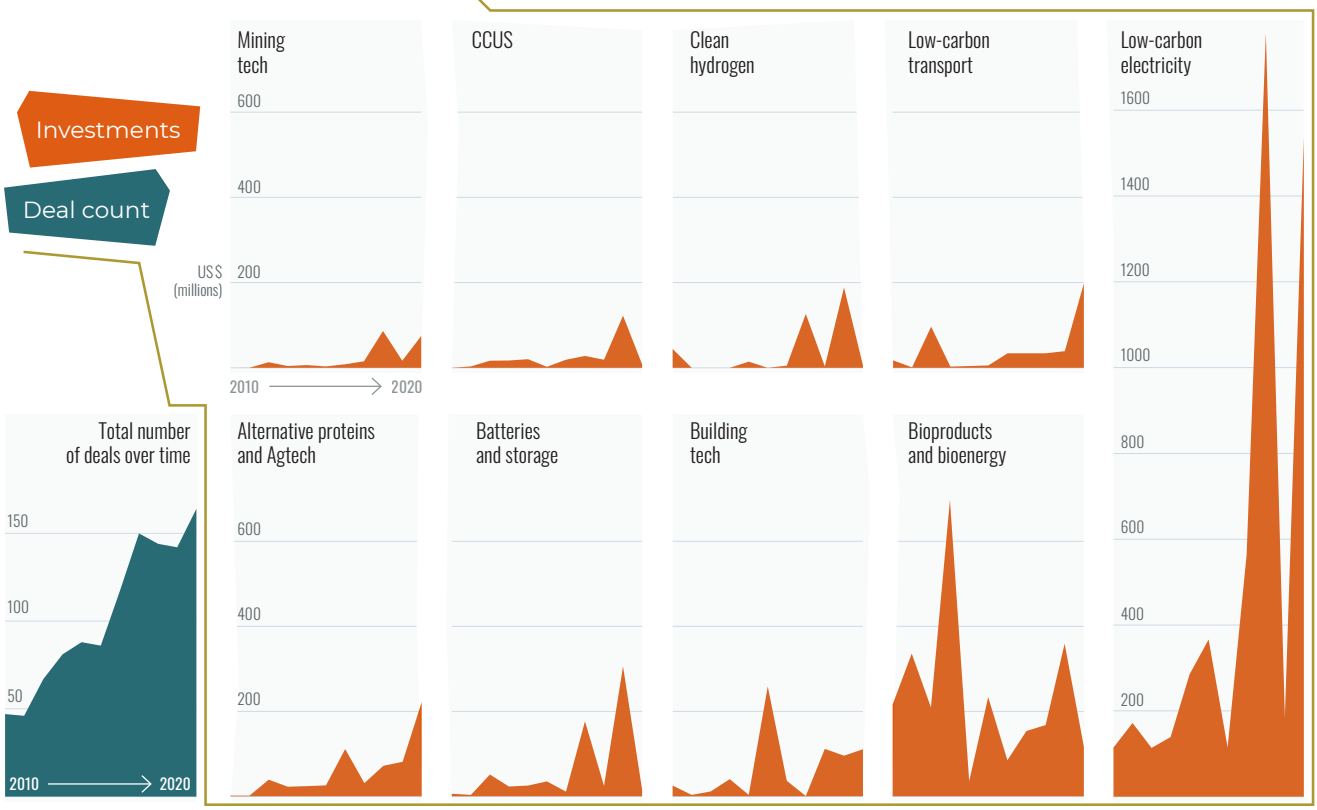
Overall investment is growing in Canada's transition-opportunity sectors, but not at the pace needed to get ahead of global market change and establish early leadership (see Figure F). Canada's capital markets are currently heavily weighted towards traditional sectors, and investors that are moving into new areas are generally playing it safe. Canadian investors have tended to stick to renewable energy generation and low-carbon buildings. Many promising Canadian companies that have great potential to generate future economic and export growth in other sectors still struggle to obtain the financing they need. Canada continues to lose high-value companies and intellectual property to foreign buyers.

Market information is inconsistent due to poor company-level disclosures and reporting, increasing the challenges investors and consumers face in making informed decisions. It is difficult to compare the transition readiness of one company or product to another if companies do not disclose clear, consistent, and comparable quantitative metrics. As a result, markets are unable to effectively and efficiently price in the risks and opportunities associated with the global low-carbon transition.

Government intervention can address the barriers to private investment and accelerate progress. This is not about supporting any one company, but about creating the conditions needed for Canada to drive the economic growth that supports quality of life and public services such as healthcare and education. There are also substantial public benefits from investments in early-stage technology adoption or first-of-their-kind projects, as these can kick-start a cycle of technology development, investment, learning, and cost reduction that leads to growth—and often environmental and social benefits—beyond the original investment.

Figure F

Investment in Canada's transition-opportunity sectors is trending upwards, but some companies and sectors still struggle to attract financing



Source: Analysis by the Canadian Institute for Climate Choices using data from PitchBook (2021). Notes: This figure shows the total capital invested across nine transition-opportunity sectors in US dollars and the number of completed business deals (i.e., investment transactions). Values include private equity, venture capital, corporate and strategic mergers and acquisitions, initial public offerings (IPOs) and liquidity, and debt. The analysis captures businesses that are primarily focused on the relevant technologies, products, and services in each sector. More detailed analysis on each opportunity is available at https://climatechoices.ca/reports/sink-or-swim. Data is drawn from a custom search and has not been reviewed by PitchBook Analysts.

People and communities should be front and centre

While economic disruption and change driven by the global low-carbon transition will bring new opportunities, some people and communities will need more help capturing them than others. If Canada's growth trajectory is to be inclusive and benefit all regions, there needs to be greater attention to the equity and distributional implications of this transition.

Dozens of communities across Canada are dependent on sectors that face global market disruption. We analyzed census data for communities with more than 10,000 people and found 55 communities where more than three per cent of workers are employed in transition-vulnerable sectors (see Figure G). Some communities have high levels of employment in more than one sector and therefore show up multiple times in the figure (e.g., Wood Buffalo, Fort St. John, and Val-D'or). In total, there are 69 community-sector pairs.

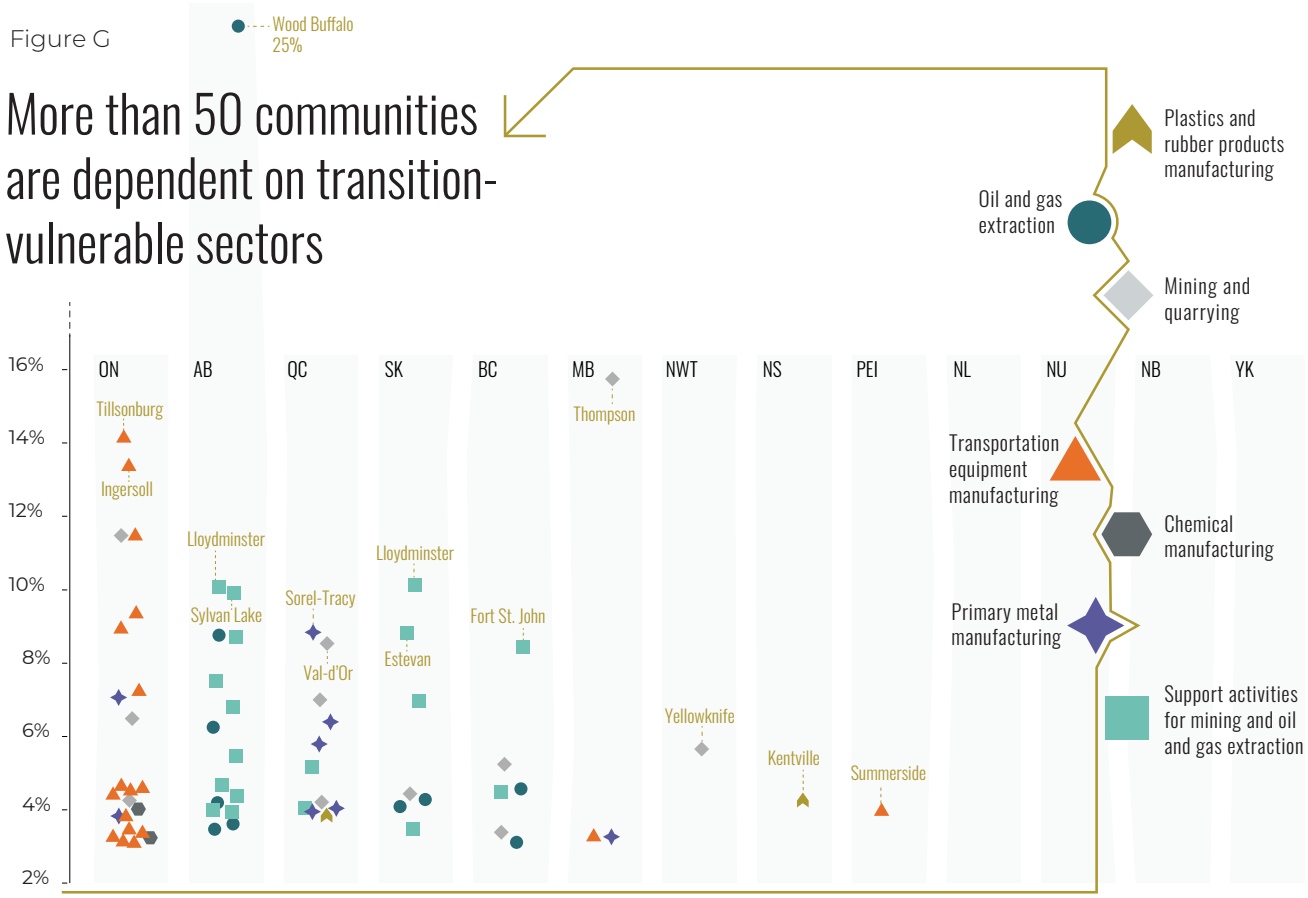
Of those 69 community-sector pairs, nine are highly dependent on a single transition-vulnerable sector, with more than 10 per cent of the workforce employed in that sector. Another 22 community-sector pairs are moderately dependent, with more than 5 per cent of the workforce in a transition-vulnerable sector. A further 38 are somewhat dependent, with more than 3 per cent of the workforce in a transition-vulnerable sector.

Workers who have lower education or limited skills and those who face discrimination in hiring (such as Indigenous Peoples and visible minorities) could have a greater challenge in replacing a lost job. Low-income and Indigenous youth continue to face barriers to completing high school and entering post-secondary programs, which means they could be more likely to experience unemployment and poverty in an economy demanding skilled workers.

An inclusive growth pathway should not just consider those who stand to lose from transition, however. It should also consider communities across Canada that currently have high levels

Figure G

More than 50 communities are dependent on transition-vulnerable sectors



Source: Analysis by the Canadian Institute for Climate Choices based on data from Statistics Canada (2016d). Notes: This figure shows census metropolitan areas (CMA) and census agglomerations (CA) that have more than three per cent employment in transition-vulnerable sectors. Communities within each province and territory are plotted according to the total share of their workforce within a single transition-vulnerable sector. Some communities appear twice, illustrating that they have a concentrated workforce in multiple transition-vulnerable sectors. For example, Wood Buffalo in Alberta has 25 per cent of its workforce employed in oil and gas extraction, and four per cent of its workforce in related support activities for mining and oil and gas extraction.

of unemployment and where people have not benefited from historical sources of growth.

Indigenous Peoples and communities are central to transition success. They are overrepresented in transition-vulnerable sectors in many provinces and territories, and some communities depend on these sectors for jobs and income. Transition also, however, offers opportunities for Indigenous-led clean energy, mining, and guardian programs that could provide new sources of employment and income, though some of these activities carry risks in terms of their impact on Indigenous rights and lands. Economic reconciliation is a chance to enable Indigenous economic participation in ways that respect Indigenous rights and support reconciliation.

Governments can drive success through bold and forward-looking actions

Discussions on climate policy in Canada have previously been dominated by concerns of moving too quickly ahead of trading partners. The landscape, however, has changed. Our analysis shows that moving too slowly is a greater competitive risk than moving too quickly.

Governments will need to adjust to the rapid pace of change. Current approaches to decision making were designed for small, incremental change, not large, transformative restructuring.

Policies and programs remain too heavily weighted towards sectors that will face demand decline through the global transition, and not enough towards sectors that will see significant demand growth. These measures could also be more efficient and targeted, focusing on high growth potential rather than specific technologies.

Transition plans are often too top-down, focusing on single policy tools or technology strategies. Ultimately, transition success matters most to the people and communities that could see job losses or are most in need of new opportunities. People-focused skills and education strategies, and community and Indigenous-led plans to manage local risks and capture opportunities, will be critical to long-term transition success.

Capital markets have also been left to their own devices for too long, with inconsistent climate-related risk disclosures and misleading financial products. International approaches are emerging, but there are still gaps that Canadian governments and regulators need to fill on their own. Improving market transparency goes beyond market efficiency or climate-related financial stability risks. It is also about ensuring that financial flows support the economic, climate, environmental, and social outcomes that people across Canada want.

Fixing these issues requires rethinking approaches to government decision making, programming, transition plans, and sustainable finance. We propose four broad recommendations to help focus this process. To implement these recommendations, governments may need new governance structures that cut across traditional mandates and bring together different sources of expertise and knowledge.

As we face the growing momentum of the green wave, Canada has vital choices to make that will define our economic prospects for generations to come. Governments at all levels need to work collaboratively to build a shared vision to transform Canada's economy for a low-carbon future.

Recommendations

Our recommendations focus on four priorities for government action: forward-looking decision making; future-fit innovation and economic development programming; local and people-focused transition plans; and actionable disclosure and metrics. These are the areas where government involvement is most needed to overcome market and non-market barriers to successfully navigate the low-carbon transition.

1. PRIORITIZE FORWARD-LOOKING DECISION MAKING

Federal, provincial, territorial, municipal, and Indigenous government decision making on carbon pricing, regulations, procurement, and infrastructure investments should explicitly account for the future competitive benefits of near-term climate action, including improved transition readiness and increased demand for clean energy and technologies. Canadian governments can and should wield a range of existing policy tools to smooth the transition, improve policy and market certainty, and ensure long-term competitiveness. They can only do so, however, with a fundamental change to how policy decisions are made.

Implementation example: Zero-emission vehicle mandate

Province X is considering a Zero-Emission Vehicle (ZEV) mandate to require a certain percentage of vehicles sold to be non-emitting by 2035. Traditional cost-benefit analyses would lead the province to consider the additional costs to manufacturers and consumers, as well as fuel savings and climate and health benefits from emission reductions. However, such an analysis would not generally include the long-term competitiveness benefits to manufacturers associated with greater certainty around the shift to electric vehicle production. It would also not consider the demand creation benefits to companies selling charging technology, batteries, battery recycling, battery minerals and metals, and more. Including these benefits would help to align decision making with effective long-term transition strategies.

2. EMPHASIZE FUTURE-FIT INNOVATION AND ECONOMIC DEVELOPMENT

Federal, provincial, and territorial governments should rebalance public investments and tax incentives towards activities with export and growth potential that face barriers to private investment. Improving the resilience of the Canadian economy means directing less public support to current economic activities that will see declining global demand—such as coal mining and oil production—and increasing support for "future-fit" areas expected to see strong demand growth, such as hydrogen, renewables, biofuels, clean technology, and carbon capture, utilization, and storage technology.

Implementation example: Future-fit fund

Province Y is setting up a new fund to support economic development consistent with its net zero target. Metallurgical coal mining has been an important source of provincial economic growth historically, while some small companies active in areas such as grid-scale energy storage and bioplastics have struggled to scale up to the point where they can be globally competitive. There have been calls to focus the fund on reducing emissions from coal mining to protect jobs. A future-fit fund would, however, instead emphasize the growth and expansion of energy storage and bioplastic companies where analysis shows global demand will grow through low-carbon transition. The approach could include addressing some of the barriers facing those companies, such as collaborating with electric utilities to accelerate adoption of energy storage technology. Focusing investments on coal would see a lower long-term economic growth return since a low-emission coal mine would still be vulnerable to demand decline as global steel makers shift away from using coal. Private companies and investors may, of course, still choose to bet on continued future demand and make those investments on their own.

3. DEVELOP **LOCAL AND PEOPLE-FOCUSED TRANSITION PLANS**

Federal, provincial, territorial, municipal, and Indigenous governments should work together to develop detailed transition plans to support workers and communities and improve overall well-being. Transition plans should aim to attract new sources of growth and jobs, support worker transition and skill development, improve youth education outcomes and readiness, ensure alignment with Sustainable Development Goals, and empower Indigenous economic leadership.

Implementation example: Community transition plan

Community Z relies heavily on a single sector that will experience declining global demand in the coming decade. To prepare for what could potentially be a very disruptive shock to the community, it is developing a transition plan to support economic diversification and address unemployment. With support from a provincial transition fund, the community starts a five-stage process to develop a transition plan: (1) consultation; (2) analysis; (3) options evaluation; (4) engagement; and (5) plan development. The entire process follows a bottom-up approach, integrating the concerns and ideas of industry representatives, unions, workers, youth, local Indigenous communities, NGOs, and experts from a diversity of disciplines. After commissioning a series of studies based on what they heard and conducting additional engagement with the community and implicated levels of government, the community finalizes and implements the proposal. One of the outcomes from the transition plan is to establish an employment hub for affected workers, which provides targeted retraining programs, a space to work on their resumes, and regional job postings.

4. MANDATE THE DISCLOSURE OF CLIMATE-RELATED METRICS THAT ARE DECISION-USEFUL

The federal government—with leadership from the Privy Council Office—should work with the Sustainable Finance Action Council, securities and financial regulators, provincial and territorial governments, standards associations, and Indigenous organizations to accelerate the development and require the use of quantitative and comparable company- and product-level metrics, standards, and certifications that measure climate, environmental, social, and Indigenous performance. Building on international approaches, the federal government should address priority gaps where Canadian-led work is needed, including better disclosure metrics, coverage of large private companies, leadership from Crown corporations and public entities, product certification, financial product oversight, and Indigenous metrics.

Implementation example: ESG standards and certification

Mining company A has committed to adopt a suite of new technologies to minimize their Scope 1 and 2 greenhouse gas emissions at a proposed northern cobalt mine. In addition, it has committed to world-leading tailings management and reclamation, with negligible impact to natural ecosystems. The company has also reached an agreement with three local First Nations communities that includes equity stakes in the project, a formal role in any decisions that would alter land-use or reclamation plans, and commitments to hire and procure goods and services from the communities.

Company A has, however, struggled to obtain financing for the project, even with a growing number of electric battery manufacturers interested in moving away from cobalt imports associated with human rights abuses and poor environmental performance. The company included some of its environmental and social performance in its annual sustainability report, but investors were unable to differentiate between company A and others that make similar sustainability claims.

A new standard developed in Canada offers a clear methodology, with transparent, comparable, and quantifiable metrics, combined with third-party certification for low emissions and exemplary environmental, social, and Indigenous performance. Once company A was certified, it was able to attract investors right away and move forward with the project.