How We Get There Matters: Establishing a Path to Net-zero in Canada

Canadian Chamber of Commerce

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Chambre de Commerce du Canada

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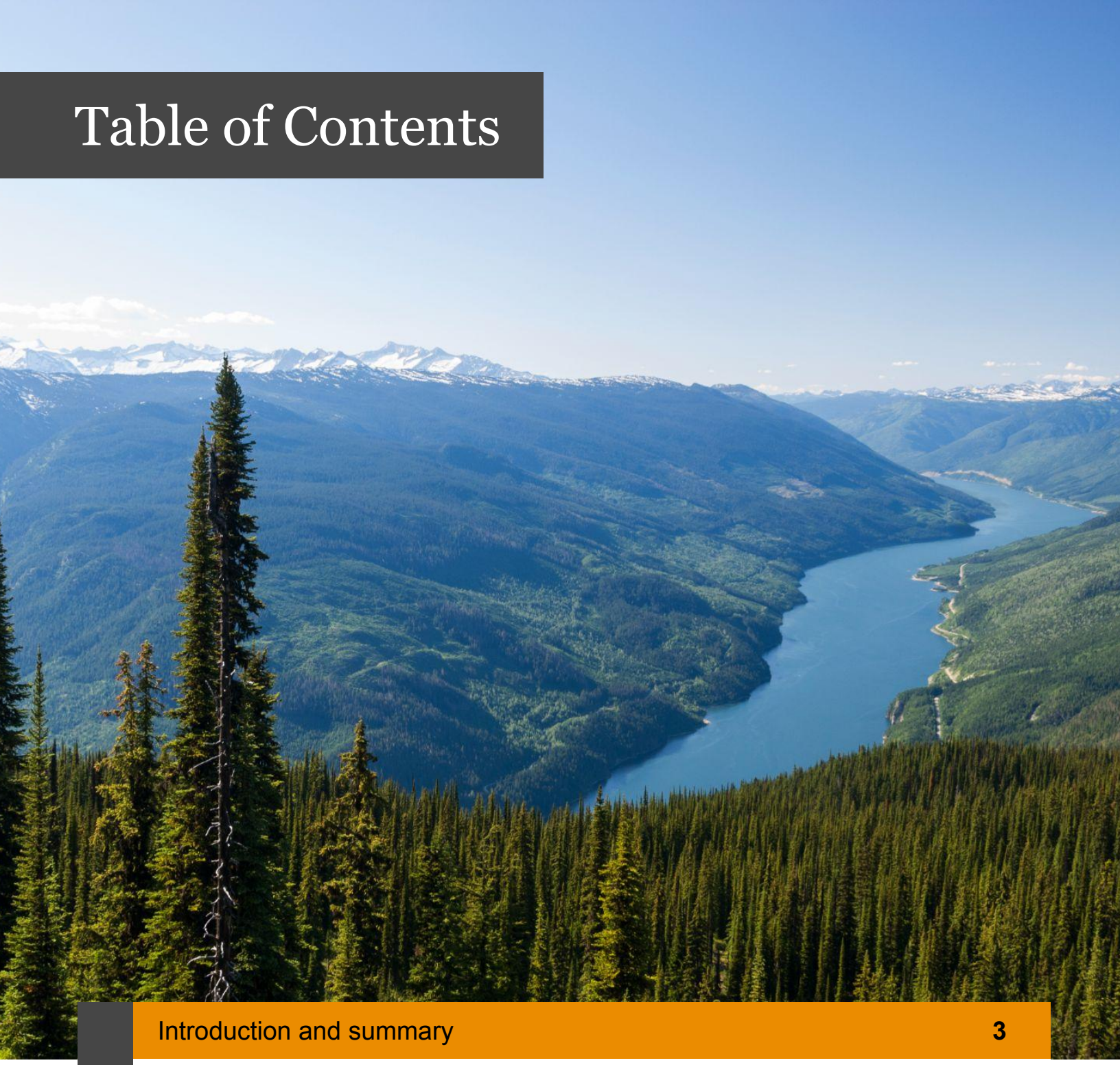


Introduction and summary

As Canada moves towards a sustainable net-zero future, the business community is leading the way. Canadian businesses have invested in low-emission energy, contributed to a greener grid and increased climate action throughout their supply chains. The Canadian Chamber of Commerce (the Chamber) and its members have taken steps to reduce their own direct emissions and believe they have a responsibility to assume a leadership role in making recommendations on climate policy. The Chamber's Net-Zero Council (NZC) is dedicated to advancing business leadership on the climate crisis and aims to inform government policy through numerous channels, including through the federal government's Net-Zero Advisory Body.

The NZC supports research and advocacy that advances Canada's pathway to net-zero while ensuring that steps are taken to optimize regulatory frameworks and manage costs to maintain Canada's competitiveness. Membership on the NZC is available to corporations that have made public declarations on their commitment to achieve net-zero by 2050.

Environment and Climate Change Canada (ECCC) recently published the 2030 Emissions Reduction Plan (the Plan or the ERP). In addition, recent federal and provincial budgets included measures to facilitate the path to net-zero greenhouse gas (GHG) emissions. Together these efforts set out a number of major initiatives to support delivery of net-zero. The Government of Canada recognizes that the ERP is the first step of many in this journey and it will continue to update its plans in the next Biennial Report in December 2022 and the first 2030 Emissions Reduction Plan progress report expected in late 2023.

Purpose and structure of this report

This document has been developed by the Chamber of Commerce in partnership with PwC Canada. We intend it to be a constructive addition to the discourse on Canada's pathway to net-zero, to share viewpoints and ideas on future priorities and to identify current gaps as well as aspects that would benefit from additional focus and research. While the main focus of this document is the ERP, it also considers the measures presented in recent federal and provincial budgets and economic statements.

This report does not contain an exhaustive review of the measures in the ERP but rather focuses on recommendations that advance four core principles:

1 The 2030 roadmap must firmly position Canada to achieve its net-zero target for 2050

This means that a key goal of actions taken between now and 2030 should be to enable delivery of the 2050 target, rather than short-term measures that may help deliver on 2030 targets but cannot be leveraged thereafter. These actions may consist of pilot programs, feasibility studies and consultations to position initiatives for major emissions reduction in the coming decades. In the absence of this, we risk our ability to reach our net-zero goal and/or risk needing to resort to extreme measures in later years.

2 Canada's net-zero plan must be tightly coupled with its economic goals

This will ensure that fulfilling Canada's commitment to contribute to the global fight against climate change and maintaining/improving our standard of living will not be seen as either/or.

3 Canada's economic plan and the net-zero transition plan must consider the global context

This consideration is necessary to protect competitiveness of Canadian businesses and avoid carbon leakages to other countries.

4 Canada's net-zero plan should deliver an orderly and inclusive transition

This is critical to avoid economic crises and energy crises and to ensure the ongoing support of Canadians for Canada's commitment to net-zero.

Key recommendations

Canada should increase overall net-zero funding and do more to de-risk and address barriers to private sector investment. From the indicative gap analysis undertaken in this report, it appears that overall expenditure needs to substantially increase in order to reach net-zero GHG emissions by 2050. As well as funding programs directly, this should also include co-investment through public-private partnerships, support for R&D projects and de-risking private sector investments in new technologies (e.g. Carbon Capture Utilization and Storage (CCUS), hydrogen infrastructure, battery storage). The private sector needs new and innovative blended finance structures (such as loan guarantees, subordinated debt, first loss equity) to make investments in emerging technologies commercially viable. Public-private partnerships in sustainable infrastructure should use long-term debt structure to unlock Canada's capacity for long-term financing. In this context, we note that the recent US Inflation Reduction Act includes major incentives for qualifying US-based facilities in sectors like hydrogen production, biogas and CCUS. Finally, Canada should look to match or exceed these incentives to avoid being perceived as less attractive to internationally mobile capital.

Canada should adopt a common definition for what constitutes investment that supports net-zero. Greater transparency on what governments are investing in and plan to invest in net-zero would help track progress, facilitate accountability and help the private sector plan its investment strategies. The Sustainable Finance Action Council set out recommendations on establishing a Canadian Sustainable Finance Taxonomy, which should be adopted by stakeholders across Canada.

Canada should consider a holistic picture of emissions in its planning by measuring not just territorial emissions (as defined in the Paris Agreement Carbon Budgets) but also non-territorial emissions resulting from economic activity required to meet a nation's demand for goods and services (together termed consumption based emissions). To this end, the federal government should promote and strengthen incentives to reduce global supply chain-related emissions of products, materials and businesses.

Canada should design policy options to incentivize emission reductions in Canada's international supply chains. Measuring consumption-based emissions will shine a light on the emissions linked to the $631 billion in goods and services Canada imports each year. The ERP notes that "border carbon adjustments" are being explored; we recommend that Canada develop options to lower non-territorial emissions and protect the competitiveness of Canadian businesses. This could either be through border adjustments developed in consultation with key trading partners or support for Canadian businesses to mitigate negative competitiveness effects due to clean investment. More broadly, all net-zero policies adopted need to consider potential negative impacts on Canadian companies relative to international competitors and how they impact Canada's current energy independence.

Canada should develop a detailed net-zero skills plan to unlock the opportunities that net-zero will bring. By moving decisively on net-zero, Canada will create many economic opportunities. Canada can be a reliable low-emission energy powerhouse and a leading producer of the critical minerals that underpin many low-emission technologies. Workers will be foundational to net-zero efforts. Delivering net-zero while capitalizing on its economic opportunities will require a skills plan that includes a comprehensive set of employment and skill projections to identify gaps across different sectors of the economy and different geographies. Without this, it will be difficult to appropriately plan training and retraining needs and put supports in place for displaced workers. Such a plan would provide guidance that all orders of government and other key stakeholders, such as education and training institutions as well as employers in the private sector, can align behind and develop their plans and strategies accordingly.

Canada should develop a plan for funding decarbonization equitably, by reviewing the distribution of costs for businesses, households and the government to ensure that vulnerable households are not disproportionately affected. There needs to be a discourse on how other competing government spending priorities will be affected by the need for significant investment in achieving net-zero targets.

Canada should develop a public engagement and information strategy. Canadians need access to public information on how the transition to net-zero emissions could impact them in key ways such as additional costs, savings they are likely to benefit from and the distributional impact of net-zero policies (across sectors, geographical locations and different stakeholders/communities). The current ERP provides transparency on government spending but not on potential changes in consumer prices, business costs or taxes. Greater transparency will help involve Canadians in decision-making, inform their consumption choices and aid consultation on public policy. We encourage the federal government to coordinate an engagement strategy that relies on the expertise of a broad array of stakeholders that can speak to specific aspects of climate change, building on the work of agencies such as the Canadian Climate Institute.

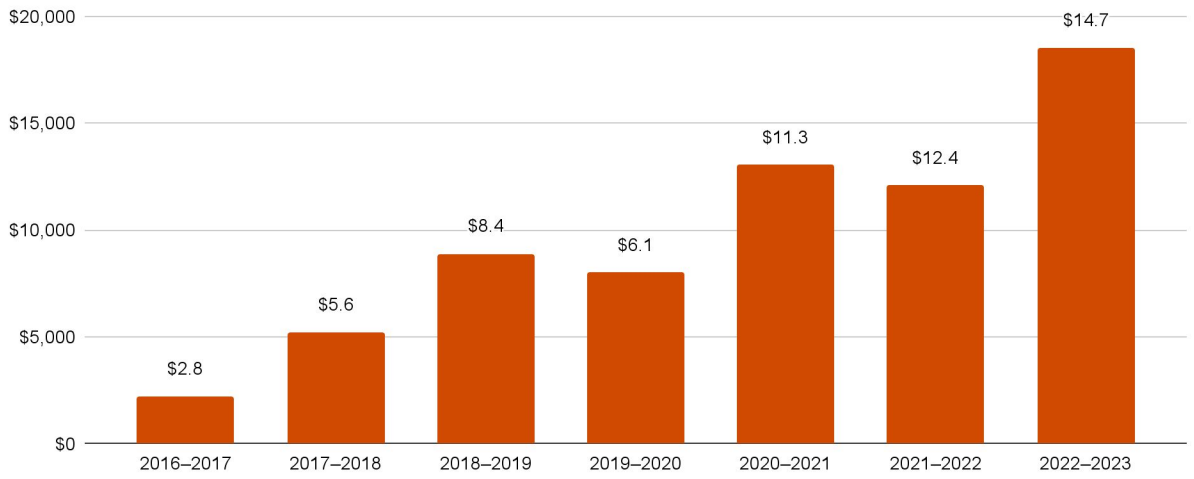
1 Canada's investment levels are currently below what is needed

The ERP sets out $9.1 billion in new climate funding from the federal government and was followed by Budget 2022, which announced a series of new, renewed and extended policies. Reviewing initiatives from the ERP, the last six federal budgets and the 2020 Fall Economic Statement, we have attempted to estimate the growth trajectory of federal government net-zero spending over time, which is illustrated in the chart below.[1]

While spending on net-zero is growing, the federal government recognizes that current investment levels are still below what is needed. Budget 2022 put the investment needed at up to $125 billion to $140 billion annually through to 2050.[2] Additional research by the Royal Bank of Canada (RBC)[3] placed the investment needed at $72 billion per annum over the same period, but the RBC analysis only quantified the cost of selected policies and so it is likely to have excluded certain costs.

Based on these estimates, federal net-zero spending currently amounts to around 10–20% of what is needed. The investment targets are for all of Canada, including businesses, households and other orders of government. There is limited data on the contribution of these other segments but our judgment is that other stakeholders are only filling a fraction of the shortfall. As this is the spend requirement each year until 2050, every time the spend is below target the future investment need rises.

Estimated new announced federal government net-zero budgeted spending ($m), 2016–17 to 2022–23



Source: PwC analysis of 2030 Emissions Reduction Plan, Budgets between 2016 and 2022, FES 2020.

We estimate that the majority (68%) of federal net-zero budgeted spending has been allocated towards transportation, electrification and buildings, with a strong focus on public transit, supporting electric vehicles and renovating buildings for improved energy efficiency. Major commitments have included:

- $35 billion to capitalize the **Canadian Infrastructure Bank (CIB),** $15 billion of which comes from existing funds committed in the government's Investing in Canada infrastructure plan. The CIB invests in sustainable infrastructure over ten years in areas like transportation, green infrastructure, clean power and agriculture.[4]
- $3.2 billion for the **Low Carbon Economy Fund** and its recapitalization. The Fund helps to support projects from provinces and territories, municipalities, Indigenous governments, businesses and other organizations aimed at reducing GHG emissions and generating clean growth.
- $2.6 billion for the **Canada Greener Homes Grant,** which aims to make up to 700,000 homes more energy efficient by 2028.
- $2.2 billion annually for the **Canada Community-Building Fund**, which supports 3,600 communities across the country. It focuses on 19 different project categories including public transit, energy systems and waste management. Note that not all project categories are targeting net-zero.
- $1.7 billion recapitalization of the **Incentives for Zero-Emission Vehicles** (iZEV) program and $400 million for ZEV charging stations. Prior to Budget 2022, the federal government had already spent over $1 billion to support increased ZEV adoption.
- $1 billion of new funding for sustainable agriculture in Budget 2022, distributed between the **On-Farm Climate Action Fund**, **Agricultural Clean Technology program**, R&D for net-zero emissions agriculture and resiliency and adaptation.

[1] We reviewed the federal government's detailed spending plans and classified them according to (1) the sector (electricity, oil and gas, buildings, transportation, heavy industry, agriculture, other) and (2) whether spending is likely to contribute to net-zero. This included investments in areas such as adaptation planning, regulatory innovation and nature-based solutions. We note that the lack of clear definition on what constitutes net-zero investment means that allocation required judgement. Annual totals were calculated based on the year that funding is planned to be spent, rather than the year funding is announced

[2] Government of Canada. (2022). *Budget 2022: Chapter 2: A Strong, Growing, and Resilient Economy.*

[3] RBC Economics estimated that it will cost Canada $2 trillion, $72 billion annually, to reach transition to net-zero by 2050. https://thoughtleadership.rbc.com/the-2-trillion-transition/

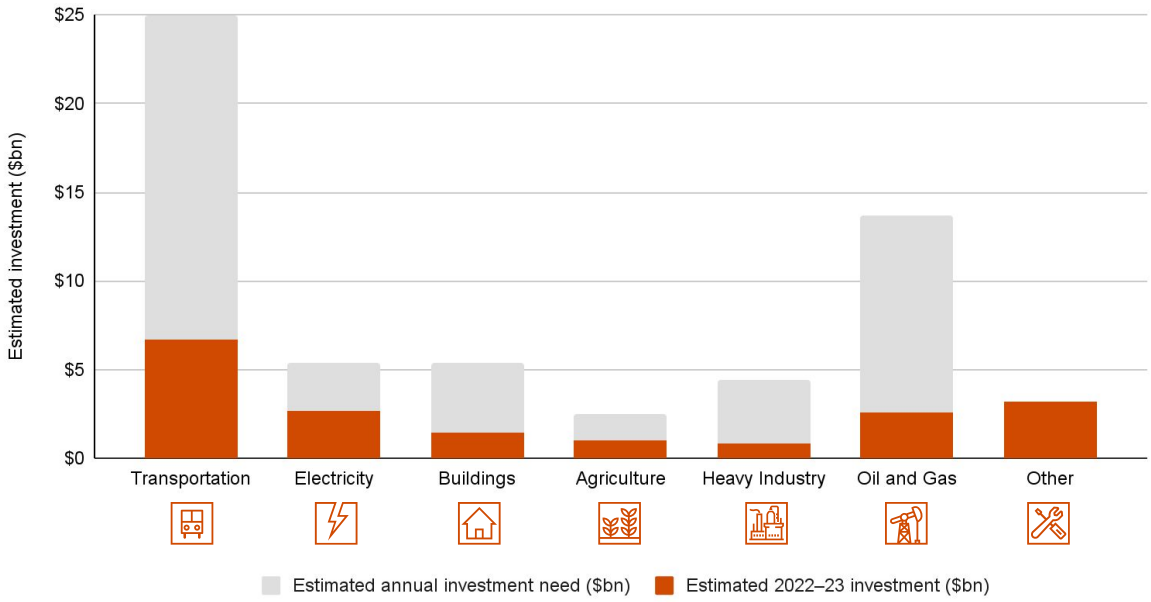
[4] Note: This is only captured in federal spending estimates above when the funds are allocated. For the CIB's three-year, $10-billion, Growth Plan announced in 2020, we assumed that the funding was dispersed equally over the fiscal years 2021-22 to 2023-24, at $3.3 billion per annum.

Provincial government net-zero spending data, for the most part, is not currently presented on a consistent basis that would easily enable measurement or comparison. While some provinces, territories and municipalities (PTMs) have published costed net-zero plans (such as BC and Quebec[5]), many only present budget data at the departmental level, which prevents an accurate accounting of net-zero investment since these departments undertake a wide range of activities. Based on the partial data available, we assess that aggregate PTM net-zero spending may be over $10 billion a year currently (with a strong concentration on public transit) but even so, this would not meet the shortfall.

To better understand where the current spending gaps are, we classified over 300 federal climate and sustainability related announcements by sector and compared these to estimates of sectoral investment needs developed by RBC. The results, shown in the chart below, suggest that gaps exist in all sectors. Some of the gaps shown below may be filled in part by PTMs, businesses and households. The lack of data means that we do not have a clear picture of their contribution. The main investment needs according to the RBC analysis are:

Transport	To subsidize EV adoption, biofuel investments and public transit
Electrification	To increase low-emission energy generation and total generation to allow for greater use of electricity for transport and heating, increased grid capacity and storage (e.g. high-capacity batteries for grid storage) and decarbonizing fossil fuel use in the electricity grid
Buildings	To fund retrofits to improve energy efficiency, electric heat pumps and furnaces to power commercial and residential buildings
Agriculture	To decarbonize the upstream food production value chain including electric tractors, electrifying indoor growing facilities, as well as rethinking livestock production and manure management
Heavy industry	For CCUS, electrification of facilities and biomass in energy intensive sectors such as chemicals, fertilizer, mining, manufacturing, cement and steel
Oil and gas	For CCUS, electrification and growth of the hydrogen industry

Estimated annual investment needs by sector, compared to current federal investment, based on 2022–23 spending plans



Source: 2030 Emissions Reduction Plan, Budget 2016–2022, FES 2020.

Note: Canada's net-zero spending compared to the investment needed (as determined by RBC) was calculated based on 2022–23 figures. We note that a sectoral view does not account for the systemic investments needed to support energy transition activities for all sectors.

[5] For example, the BC Government's CleanBC climate plan in 2017 and CleanBC Roadmap to 2030 in 2021 included total funding of $3.5 billion between both plans over ten years. Quebec's climate plan is called the 2030 Plan for a Green Economy and its first 2021–2026 implementation plan had a budget envelope of $6.7 billion over five years.

What Canada should do next

Federal government funding cannot deliver the transition to net-zero alone. Other orders of government, businesses, households, non-profits and the financial sector have major roles to play. The role of the federal government and its partners encompasses not just funding, as the ERP recognizes, it also includes:

- supporting private sector investment through incentives and de-risking;
- setting the legal and regulatory framework;
- setting investment targets and common reporting processes;
- encouraging the development of net-zero technology; and
- setting performance standards for net-zero.

There is a clear need to increase federal investment, but the federal government should also continue to focus on facilitating investment by PTMs, businesses and households. As the ERP is further developed we believe that:

Canada should increase overall net-zero funding and do more to de-risk and address barriers to private sector investment

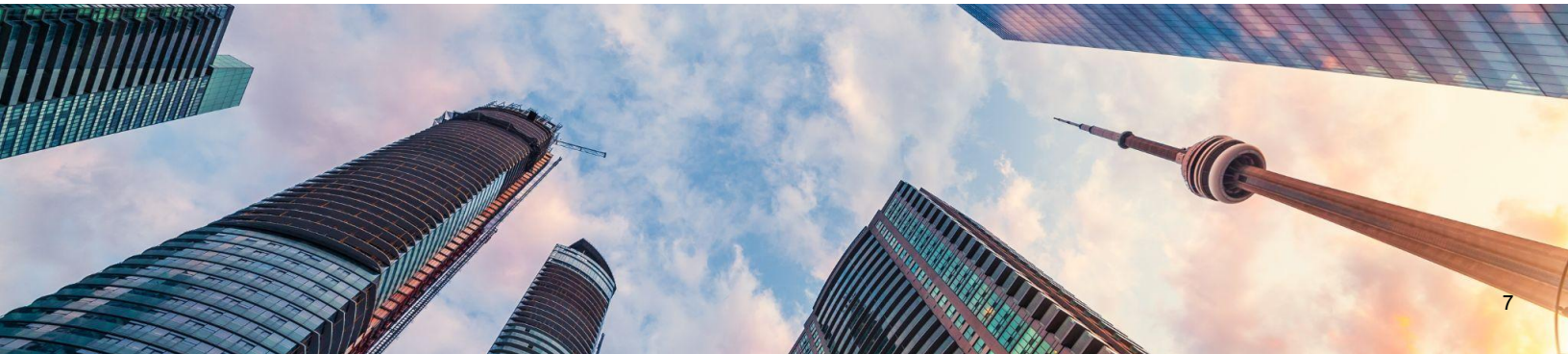
From the indicative gap analysis undertaken in this report, it appears that overall expenditure needs to substantially increase in order to reach net-zero GHG emissions by 2050. As well as funding programs directly, this should also include:

- co-investment through public-private partnerships and support for R&D projects;
- additional measures to de-risk private sector investments in new and growth technologies (e.g. biogas, hydrogen infrastructure, next generation nuclear, battery storage, etc.) through new and innovative blended finance structures (such as loan guarantees, subordinated debt, first loss equity);
- broadening tax incentives to be inclusive of more carbon free technologies to encourage private sector investment, for example, the 30% investment tax credit for net-zero technologies, energy storage and hydrogen could be broadened to include a wider list of emissions reduction investments; and
- public procurement of infrastructure by Canada's governments should utilize long-term financing that will unlock Canada's vast pool of capital and greater work should be done to incentivize financial institutions to invest in sustainable infrastructure.

In this context, we note that the recent US Inflation Reduction Act includes major incentives for qualifying US-based facilities in sectors like hydrogen production, biogas and CCUS. Finally, Canada should look to match or exceed these incentives to avoid being perceived as less attractive to internationally mobile capital.

Canada should adopt a common definition for what constitutes investment that supports net-zero

Greater transparency on what governments are investing in and plan to invest in net-zero would help track progress, facilitate accountability and help the private sector plan its investment strategies. The Sustainable Finance Action Council set out recommendations on establishing a Canadian Sustainable Finance Taxonomy, which should be adopted by stakeholders across Canada.



2 Canada needs to evaluate the global impact of its plans

Mitigating the climate crisis requires reduced global production and consumption of high-carbon products and services.[6] In this context, Canada's contribution to the fight against climate change should focus on:

1. Decarbonizing high-carbon products manufactured in Canada
2. Reducing demand among Canadians for high-carbon footprint products and services, irrespective of where they were manufactured
3. Encouraging the use of decarbonized Canadian products abroad
4. Encouraging trading partners to decarbonize their supply chains

The ERP and recent federal budgets contain a number of measures designed to incentivize emissions reduction investment in the private sector. These incentives signal that Canada is open for low-carbon investment and is seeking to lead in clean technology. Major measures include:

- $4.6 billion announced in Budget 2021 to support **innovation and industrial transformation**. These investments are focused on helping large emitters decarbonize and accelerate the adoption of clean technology.
- $2.6 billion announced in Budget 2022 for the **CCUS Tax Credit** to incentivize the expansion of CCUS technologies to reduce emissions in high-emitting sectors. This includes credits for exporting industries to support global energy security.
- $700 million announced in Budget 2018 for the **Industrial Research Assistance Program.** This program offers flexible funding along with consulting services to help Canadian entrepreneurs and small business owners develop innovative technologies and successfully commercialize them in a global marketplace.

While these are positive developments, these policies focus on decarbonizing Canadian-produced goods but do little to address the carbon footprint of imported goods and the activities of Canada's trading partners more broadly. Moreover, while tax credits and grants mitigate some of the costs businesses face for decarbonization, they rarely mitigate the full cost. These costs can be significant, for example, adopting CCUS technology entails significant capital and operating spend. According to the International Energy Agency (IEA), the estimated cost of CCUS-equipped ammonia and methanol production is around 20–40% higher than their unabated counterparts.[7]

Policies that support Canada's net-zero goals can affect business competitiveness if they lead to additional costs for Canadian businesses that are not borne by international competitors. The federal government has produced research that discusses the potential negative competitiveness impacts of carbon pricing regimes where Canadian businesses compete with foreign businesses that do not face equivalent carbon costs.[8] This demonstrated awareness of competitiveness-related issues should be maintained and the government should continue to consider ways to level the playing field for Canadian businesses every time it implements policies that result in a cost increase for Canadian business.

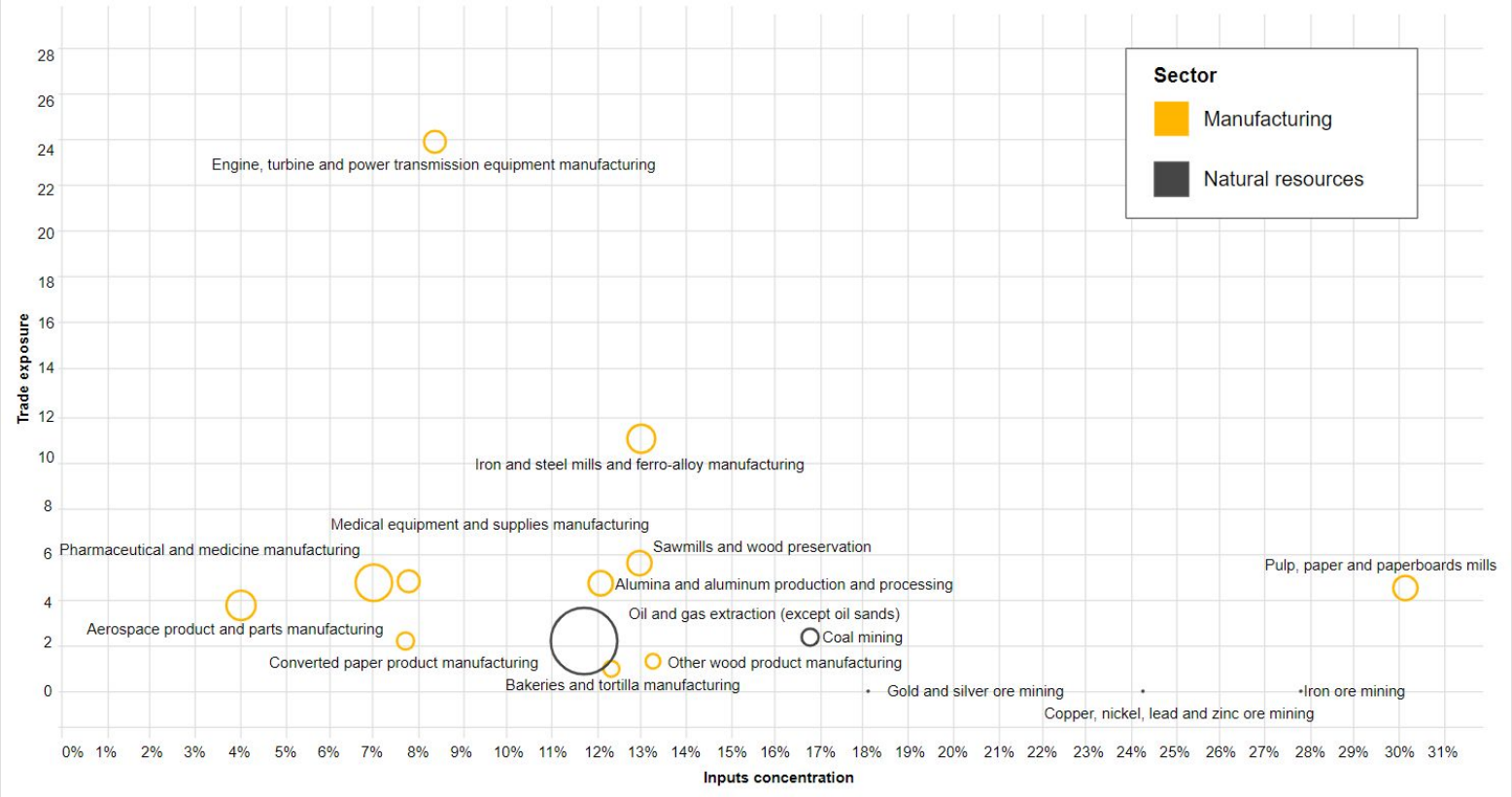
Measures that increase the cost of doing business will have to be absorbed through lower revenue margins or passed to consumers in the form of higher prices. This is important both for jobs and the economy and for the reduction of global emissions. Canada's net-zero policies may not reduce global emissions if they result in a shift of high-emission economic activity to other jurisdictions (often referred to as "carbon leakage"). Therefore, policies should be designed to incentivize emitters to remain in Canada and invest in emissions reduction.

[6] In this report, reference to "carbon footprint" means the greenhouse gases generated by a product, service or activity over its lifecycle and through the supply chain.
[7] IEA. (2021). *Is carbon capture too expensive?*
[8] Government of Canada. (2021). *Exploring Border Carbon Adjustments for Canada.*

As illustrated in the chart below, the sectors that may be most affected by carbon leakage are those that are highly dependent on foreign trade (vertical axis), defined as total imports and exports relative to gross domestic product (GDP) and sectors that are heavy users of input resources such as electricity, utilities and transportation (horizontal axis).[9] Sectors toward the top right of the chart may see their competitiveness more acutely impacted by any net-zero policies that increase costs for them but not for foreign competition. The sectors highlighted in the chart include:

- engine, turbine and transmission equipment;
- iron and steel manufacturing;
- sawmills and wood preservation;
- pulp, paper and paperboard mills.

Illustrative assessment of tradable sectors and input costs[10] [11]



Note: Inputs concentration measures the concentration of sector input spending on the following products: utilities, electricity, transportation and oil and gas. Trade exposure is calculated by adding sector exports and imports, and dividing by sector GDP. Bubble size represents sector GDP.

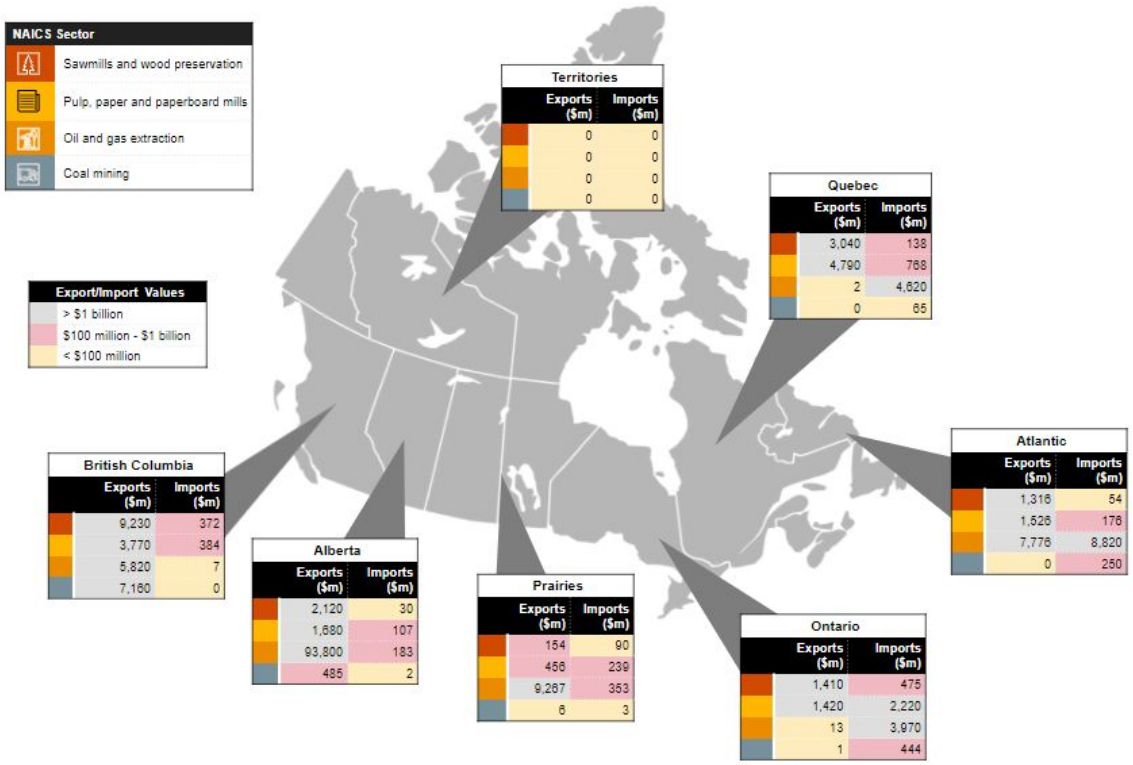
The economic footprint of these "tradable" sectors varies across Canada. The map on the following page shows imports and exports of the five highlighted sectors. For example:

- In aggregate, Canada is a significant net exporter of products in the pulp and paper and sawmill and wood preservation sectors. Ontario, Quebec, BC and the Atlantic provinces all export over $1 billion per annum between both sectors, with BC alone exporting around $13 billion.
- While Canada is a net importer of iron and steel products, Ontario in particular has a significant export market, at $7.6 billion in 2021.
- Supported by strong aerospace clusters, Quebec and Prince Edward Island are the only provinces that are net exporters in engine, turbine and transmission equipment; all other regions are significant importers of these products.

In addition to the impact on the cost of doing business, the federal government and provincial governments need to consider supply chain resiliency impacts as the country moves to net-zero. For example, Canada is currently energy independent; however, the shift to net-zero will require Canada to rely more on low-emission sources of energy. Canada is, for the most part, an importer of wind turbines and solar panels with limited domestic manufacturing capacity. Canada needs to assess the risk of reliance on other countries for critical products, especially those countries that are considered higher risk. Switching the focus to Canadian-made products such as nuclear energy, where Canada is a tier one nation with a robust supply chain, would also strengthen Canada's resilience in the energy sector.

[9] These inputs may be affected by net-zero policies that directly or indirectly impact costs.
[10] Data sourced from the Government of Canada's Trade Data Online and Supply and Use tables.
[11] No data available for oil sands.

Value of exports and imports, selected sectors, 2021



Source: Statistics Canada, PwC analysis.

What Canada should do next

The ERP discusses the issue of international competitiveness in the context of the oil and gas emissions cap and the issue of carbon leakage, but contains few concrete steps in this area. As the ERP is further developed, we believe that:

Canada should consider a holistic picture of emissions in its planning

Canada's planning should not just measure territorial emissions (as defined in the Paris Agreement Carbon Budgets) but also non-territorial emissions resulting from economic activity required to meet a nation's demand for goods and services (together termed consumption based emissions). To this end, the federal government should promote and strengthen incentives to reduce global supply chain-related emissions of products, materials and businesses.

Canada should design policy options to incentivize emission reductions in Canada's international supply chains

Measuring consumption-based emissions will shine a light on the emissions linked to the $631 billion in goods and services Canada imports each year.[12] The ERP notes that "border carbon adjustments" are being explored; we recommend that Canada develop options to lower non-territorial emissions and protect the competitiveness of Canadian businesses. This could either be through border adjustments developed in consultation with key trading partners or support for Canadian businesses to mitigate negative competitiveness effects due to clean investment. More broadly, all net-zero policies adopted need to consider potential negative impacts on Canadian companies relative to international competitors and how they impact Canada's current energy independence.

[12] Statistics Canada, (2022). *Canadian international merchandise trade, December 2021*.

3 Canada needs a net-zero skills plan to deliver net-zero opportunities

The net-zero transition provides an impetus to innovate and create new economic sectors related to clean technology. With the right policies, it may catalyze new technologies in the same way other national missions have done, such as the effort by the US to land on the moon in the 1960s. Clean energy jobs are growing in Canada; it is estimated that 1 in 26 professional jobs are part of the environmental workforce[13] with sectors such as professional, scientific and technical services, construction and manufacturing leading the growth.[14] The opportunities for Canada include:

- **Developing low-carbon Canadian oil, gas, hydrogen, biogas and liquified natural gas to displace higher carbon energy overseas:** Supported by the incentives for investment in CCUS included in the ERP, Canada should seek to be a global clean energy powerhouse and a greater source of clean energy to its allies and trading partners.
- **Delivering a carbon-free electricity system:** Canada has an opportunity to use its existing clean energy assets along with new clean generation to deliver reliable, cost competitive electricity in a manner that reflects regional differences across the country.
- **Carbon sequestration:** Canada's geology and existing oil and gas infrastructure provide an advantage in sequestration of atmospheric carbon. This should include CCUS from existing activity as noted above and aggressively pursuing direct air capture research and implementation.
- **Growing the circular economy:** There is a need to be more efficient in the use of resources through recycling and reuse to make the most of what is extracted. Canada needs to support workforce development and investment that will allow the circular economy to thrive.
- **Strengthening environmental, social and governance (ESG) standards:** Canada's regulatory environment in ESG disclosure lags global peers. Canada needs to implement an ESG standards and disclosure framework that positions Canadian companies competitively in a global marketplace.
- **Leveraging the opportunities created by the US Inflation Reduction Act:** This Act includes a range of measures to increase demand for energy efficient products such as electric vehicles, heat pumps, solar panels and high efficiency air conditioning. The increased demand for low-emission energy products from the US provides substantial opportunities for Canadian exporters and for research and development collaboration.
- **Using CCUS-enabled Canadian oil and gas as a feedstock for other industries:** With a rise in the use of renewable electricity for transportation and heating, there will also be more opportunities to use CCUS-enabled oil and gas as a feedstock for other industries such as blue hydrogen and petrochemicals.This could displace the use of non-CCUS enabled production from elsewhere.

The ERP, Budget 2022 and previous budgets contain several major measures to incentivize the transition, for example:

- $2.2 billion renewal of the **Low Carbon Economy Fund**, which includes a new Indigenous Leadership Fund ($180 million), focused on supporting Indigenous organization led low-emission energy projects, and $25 million for Regional Strategic Initiatives, in part focused on creating sustainable jobs.
- **Canada's Net-Zero Accelerator program** provides $8 billion for projects that help large emitters to invest in clean technology. It also will help to fund the development of a Canadian batteries ecosystem.
- **Sustainable Development Technology Canada** has invested over $1.4 billion in 460 companies, creating nearly 17,000 jobs in Canada since 2001. In 2020, the federal government further invested $750 million over five years to support startups and to scale up companies develop clean technologies.

The incentives and measures in the ERP will accelerate the net-zero transition and incentivize the creation of new green jobs. The ERP highlights the potential for the clean economy of tomorrow to create between 235,000 to 400,000 jobs (representing both reskilling of existing jobs as well as net new jobs).

As with any major change, the shift to net-zero will have economic winners and losers. However, this is not explicitly recognized in the ERP, which focuses on the upside of the transition. Understanding and planning for sectoral shifts is important. The transfer of thousands of jobs between sectors and potentially across geographies requires detailed planning, as does the reskilling of millions of Canadians to have the skills needed for the future. The sectoral shift could be significant. At a global level, it is expected that the shift to net-zero could reduce employment in energy-intensive manufacturing sectors and certain natural resource sectors, while increasing employment in sectors like electricity generation and transport.

[13] Environmental Careers Organization Canada. (2022). *Canada's Environmental Workforce*.
[14] Environmental Careers Organization Canada. (2021). *Alberta's Mid-2021 Environmental Recruitment Trends.*

Skills planning is extremely important as Canada is already facing a skills shortage. Net-zero will require additional training and skills development to provide the workers needed for the transition. Job vacancies in the first quarter of 2022 were up 75% from pre-pandemic levels in 2019, with almost 900,000 vacancies,[15] while the unemployment rate was at the historic low of 4.9% in July 2022.[16] A recent survey reported that over a quarter of Canadian companies are currently suffering from labour shortages and high turnover.[17]

With the acceleration of the green economy, the need for workers with new and enhanced skills to fill positions in green jobs is expected to grow. Occupations expected to be most sensitive to disruption include those in business and finance, management, agriculture and resources, trades and transportation.[18] A large proportion of these occupations are expected to require reskilling to adapt to green sectors. For example, new roles in business and finance could include sustainable finance consultants or environmental specialists. These roles are instrumental in understanding optimal pathways in a green transition for private and public entities. Similarly, given the shift toward renewable energy and low-emissions technologies, some occupations may face greater demand in 2030. This requires an examination of potential shortages of skilled workers capable of filling these positions.

What Canada should do next

The ERP sets out the planned emissions trajectory but focuses on the upside of labour market impacts through new jobs created. Canada needs to develop a net-zero skills plan that includes comprehensive employment projections and projections for skills needs and gaps across different sectors and geographies. Without this, it will be difficult to appropriately plan for training and retraining needs and put supports in place for displaced workers. As the ERP is further developed, we believe that:

Canada should develop a detailed net-zero skills plan to unlock the opportunities that net-zero will bring

By moving decisively on net-zero, Canada will create many economic opportunities. Canada can be a reliable low-emission energy powerhouse and a leading producer of the critical minerals that underpin many low-emission technologies. Workers will be foundational to net-zero efforts. Delivering net-zero while capitalizing on its economic opportunities will require a skills plan that includes a comprehensive set of employment and skill projections to identify gaps across different sectors of the economy and different geographies.

Without this, it will be difficult to appropriately plan training and retraining needs and put supports in place for displaced workers. Such a plan would provide guidance that all orders of government and other key stakeholders, such as education and training institutions as well as employers in the private sector, can align behind and develop their plans and strategies accordingly.

These plans should, at minimum, detail:

- the sectors that are likely to grow or shrink as a result of net-zero policies;
- the likely province-level impacts of the transition;
- how this sectoral shift will impact the skills needs in the economy, including transferable skills and interrelation with existing skills shortages;
- what existing jobs will need to be re-skilled;
- the distributional effects on different communities, highlighting impacts that should be mitigated through policy. This will also enable government to provide support for diverse groups of Canadians to participate in the transition to net-zero and could also support companies with diversity, equity and inclusion ambitions; and
- retraining needs by sector.

[15] Statistics Canada. (2022). *Job vacancies, payroll employees, job vacancy rate, and average offered hourly wage by provinces and territories, quarterly, unadjusted for seasonality*.
[16] Since collection for labour statistics in unemployment began in January 1976.
[17] Statistics Canada. (2022). *Labour force characteristics, monthly, seasonally adjusted and trend-cycle, last 5 months*.
[18] Express Employment Professionals. (2022). *Labour Shortages Forcing Canadian Companies to Scrap Job Requirements*.

4 Canada needs greater transparency to achieve an orderly and inclusive transition

The Paris Agreement formalized the concept of a just transition, stating that climate policies should "take into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities…"[19]

There is a need to protect the most vulnerable households from negative impacts of the transition and to support all communities to benefit from the positive impacts. Part of this includes informing and educating Canadians on the impacts and requirements behind a net-zero transition on a household and Canada-wide level. The ERP includes a number of inclusivity-related measures. For example:

- the **Canada Greener Homes Grant Initiative**, will help households, including those on low incomes, with grants from $125 to $5,000 to support home retrofits that improve energy efficiency (additional funding of $458.5 million);
- an additional $1.5 billion investment for the **Green and Inclusive Community Buildings program**, for projects that improve energy efficiency in community buildings through retrofits, repairs or upgrades, and new builds; 10% is reserved for projects benefiting Indigenous communities;
- $5,000 rebates for purchasing **Zero Emission Vehicles**, will help Canadians afford new, greener vehicles. Funding of $1.7 billion was announced to extend the existing program, which also includes 100% tax writeoffs for businesses purchasing ZEVs.;
- investment in the **First Nation Infrastructure Fund (FNIF)** to support energy efficiency on reserve, and the **Northern Responsible Energy Approach for Community Heat and Electricity** program for Inuit and northern Indigenous communities to develop low-emission energy and energy efficient projects; and
- $300 million will be invested over five years to ensure that **rural, remote and Indigenous communities that currently rely on diesel** have the opportunity to be powered by clean, reliable energy.

While implicitly recognizing the challenges for vulnerable communities through these programs, the ERP does not explicitly document what it expects these challenges to be. As we discuss in the section on investment needs, delivering net-zero will require substantial investments (estimated in Budget 2022 at around $125 billion to $140 billion per year),[20] which will have differing impacts on different communities and stakeholders depending on who bears the cost. For example:

- government: may require additional taxation or cuts to other services to fund net-zero investment;
- businesses: some may experience lower margins, loss of global market share and/or higher prices for Canadian consumers due to higher costs; other businesses may benefit from the growth of new markets; and
- households: may experience changes to everyday expenses (e.g. purchasing a ZEV rather than a gasoline car may have a higher upfront cost but lower running costs and it will also be eligible for tax credits) and changes to prices reflecting cost impacts on businesses.

The first step in helping vulnerable communities is to assess and be transparent about what the likely impacts of the transition might be, including one-off costs (e.g. a new heat pump), changes to everyday bills and the support from government programs in funding these costs.

[19] United Nations Framework Convention on Climate Change. (2015). *Paris Agreement*.
[20] Government of Canada. (2022). *2030 Emissions Reduction Plan: Clean Air, Strong Economy.*

The labour market changes are also important to understand. According to the Canadian Climate Institute, there is a relative overrepresentation of Indigenous people and visible minorities working in transition-vulnerable sectors such as emissions-intensive manufacturing.[21] This gap is larger in some provinces and territories; for example, in Nunavut, Indigenous workers make up 71% of the overall workforce, but represent 93% of transition-vulnerable workers. Avoiding a disruptive transition requires policy intervention to support reskilling these workers and understanding the barriers that they could face.

To illustrate this issue we summarize the employment characteristics of several sectors that may experience major changes through high retraining needs, major investment needs and potential growth impacts. As shown below, many of these sectors have a disproportionately high share of Indigenous workers and offer relatively high wage jobs, especially for those without post-secondary education.

Characteristics of key sectors impacted by the net-zero transition

	Actual wage rate per hour	% of women working in sector	% of Indigenous People working in sector	% visible minorities working in sector	% without post-secondary education
Agriculture, forestry, fishing and hunting	$25.34	31.9%	4.8%	7.2%	58.9%
Utilities	$54.12	27.4%	5.3%	13.0%	18.2%
Construction	$38.76	13.2%	4.4%	11.3%	43.3%
Transportation and warehousing	$34.03	22.3%	3.7%	24.6%	50.1%
Mining and quarrying	$53.48	14.1%	11.6%	4.1%	38.1%
Oil and gas extraction	$73.67	25.8%	5.2%	15.7%	23.7%
Manufacturing	$35.48	28.5%	3.2%	23.4%	45.2%
Canadian average	$36.47	47.3%	3.6%	20.8%	36.6%

Source: Statistics Canada. All data is for the year 2021, with the exception of the proportion of workers with a post-secondary education, Indigenous workers for Agriculture, forestry, fishing and hunting and Utilities, and the proportion of visible minorities in a sector, which are sourced from the 2016 Census.

[21] Canadian Climate Institute, *Sink or Swim?: Transforming Canada's economy for a global low-carbon future*

What Canada should do next

As the ERP is further developed we believe that:

Canada should develop a plan for funding decarbonization equitably

This can be done, in part, by reviewing the distribution of costs for businesses, households and the government to ensure that vulnerable households are not disproportionately affected. There needs to be a discourse on how other competing government spending priorities will be affected by the need for significant investment in achieving net-zero targets.

Canada should develop a public engagement and information strategy

Canadians need access to public information on how the transition to net-zero emissions could impact them in key ways such as additional costs, savings they are likely to benefit from and the distributional impact of net-zero policies (across sectors, geographical locations and different stakeholders/communities). The current ERP provides transparency on government spending but not on potential changes in consumer prices, business costs or taxes. Greater transparency will help involve Canadians in decision-making, inform their consumption choices and aid consultation on public policy. We encourage the federal government to coordinate an engagement strategy that relies on the expertise of a broad array of stakeholders that can speak to specific aspects of climate change, building on the work of agencies such as the Canadian Climate Institute.