

BUILDING BACK BETTER WITH A BOLD GREEN RECOVERY

Synthesis Report

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Forward

Business Leaders Call for Bold Green Recovery in Open Letter

Dear Minister Morneau,

As leaders of major corporations in Canada, we are focused on our country's safe road to recovery. Canadians are experiencing significant economic hardship because of the COVID-19 pandemic – challenges that will continue for months and possibly years.

Around the world, countries have adopted unprecedented policies during this crisis. Canada's federal and provincial governments have acted boldly and creatively with their emergency relief measures, with positive results. However, for a full-scale recovery, even bolder action will be needed.

We have the opportunity to emerge from this moment with a resilient economy that creates prosperity for more Canadians. We will get there by working together with all the industries that have led us to where we are as a nation today - from natural resources to telecommunications, manufacturing and financial services. We must build on and reinforce that foundation to set us up to thrive in the future. To get there, we must leverage our strengths and invest in our most promising assets that align with growing global markets. Canada already has a competitive advantage in four of them: low-carbon natural resource commodities, zero-emissions vehicles, smart buildings, and sustainably produced food. All are poised for explosive growth going forward.

*On the **natural resources front**, Canada is a treasure trove for the low-carbon commodities that the world needs to decarbonize, and we are among the most carbon-efficient producers of those commodities. It's well-known that we are the fourth largest oil producer in the world. It's less well known that our vast supplies of bitumen are uniquely suited for producing carbon fibre for strong, lightweight materials that would be the top choice for manufacturing electric vehicles, and a host of other applications if we can crack the cost nut. Canada also generates more renewable electricity than any country except China, which creates a path for us to be a supplier of choice for the growing clean hydrogen market. In addition, Canada has an abundance of bio-based natural resources, the waste residues of which are ideal feedstock for renewable jet fuels, a market which is taking off.*

*On the **vehicle** front, we are a top-five exporter by value globally and a top-five producer of the minerals that are essential for battery production. We have the resources and industrial ecosystem to be a North American hub for battery production and zero emissions vehicles, including freight trucks and buses.*

*Looking at **buildings**, Canada is one of the world's largest commercial landlords. Twelve of the top 50 real estate investors in the world are based in Canada, and we are recognized as global leaders in green building. With green renovations taking centre stage in recovery packages across the globe, Canadian real estate investors possess the know-how and property tech required to surf this long-term wave.*

*In **food**, Canada is the world's fifth-largest agricultural exporter and is number one in pulses. By restoring soil carbon, we can feed a growing global appetite for sustainably sourced food, including plant protein.*

If we invest in these tangible markets, it would also be a shot in the arm for Canada's financial services and technology sectors. Toronto Finance International estimates there's potential to grow annual revenues in low-carbon banking, insurance and investment by \$110 billion in the next five years.

All of these markets are fast-growing but in a state of flux. Whether Canada becomes a supplier or a buyer in the coming decades depends on our decisions today.

Doing this will not be easy. It will require a significant burst of investment in the first couple of years buttressed with complimentary policies over the next five. Some will raise concerns about the costs, but if we learned anything from the last economic crisis, it's that austerity is not a growth strategy, rather it leads to lost opportunities for people and businesses alike. Other countries have learned this lesson, and Canada's industrial competitors will be investing boldly: South Korea is structuring its economic recovery plan as a "Green New Deal," and the European Union is allocating 25% of its proposed €750 billion recovery package to green projects and strengthening connectivity networks.

We also recognize that building back better is an opportunity for all Canadians to work together. We need to engage broadly. This means forming meaningful partnerships with Indigenous communities in terms of equity ownership, employment, and procurement, and it also means breaking down systemic barriers that for too long have disproportionately held back women and people of colour.

Now is the time to be courageous and bold. We encourage governments to lead a collaborative and bold economic recovery building on the strengths of our existing economy and talent to capture the growth markets of the future.

As corporate leaders, we are committed to doing our part to build back better towards a more resilient – and inclusive – economy.

Sincerely,

Mike Andrade, CEO, Morgan Solar

Brian Bentz, CEO, Alectra Inc

Guy Bourbonnière, Vice President Trane Commercial HVAC – Eastern Canada, Trane Technologies

Toby Heaps, CEO, Corporate Knights Inc.

Gord Hicks, CEO, BGIS

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Don Lindsay, CEO, Teck Resources Ltd
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Nathalie Palladitcheff, CEO, Ivanhoé Cambridge
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Mary Ann Yule, CEO, HP Canada

Executive Summary

“One of the things we have seen over the last few months is we do have the capability to come together and do really challenging things. We never would have imagined the federal government could have turned on a dime to deliver cheques to eight million people at the pace that we did. It shows that when faced with a challenge we can get to solutions, even complex solutions. That should give us insights into how we can move forward on other complex challenges, and there is probably not a more complex challenge than the climate crisis we are facing as a planet.”

- Hon. Bill Morneau, Minister of Finance, Canada

Source: <https://www.youtube.com/watch?v=5vULfiWzKE>

Over the last few months, policy-makers around the world have taken unprecedented action to protect their people from the COVID-19 pandemic. As we move beyond the acute phase of the health crisis phase, countries are now designing recovery plans to deal with the economic fallout.

Many of the world’s leading economic and political authorities, including the International Monetary Fund,¹ the International Energy Agency² and our G-20 peers,³ are leading calls for governments to make a jobs-rich green recovery. In Canada, more than 40 major business leaders⁴ are advocating for a bold green recovery to help get people back to work and bolster Canada’s chances of playing to win in large and growing low-carbon markets where we have competitive advantages.

As policy-makers design economic recovery plans, they are making decisions that will cast the die of our economy for decades to come. For this once-in-a-generation investment, it’s vital that we look ahead and invest in building an economy that’s ready for tomorrow, instead of spending large amounts of public money on infrastructure and technologies that will soon be outdated.

The Building Back Better plan set out in this report is a synthesis of seven white papers published between April 22 and June 3. Our plan makes it clear that governments have a unique

¹<https://www.imf.org/~/media/Files/Publications/covid19-special-notes/en-special-series-on-covid-19-greening-the-recovery.ashx>

²<https://www.iea.org/news/iea-offers-world-governments-a-sustainable-recovery-plan-to-boost-economic-growth-create-millions-of-jobs-and-put-emissions-into-structural-decline>

³<https://www.corporateknights.com/voices/shawn-mccarthy/green-recovery-fever-spreads-around-globe-15916950/>

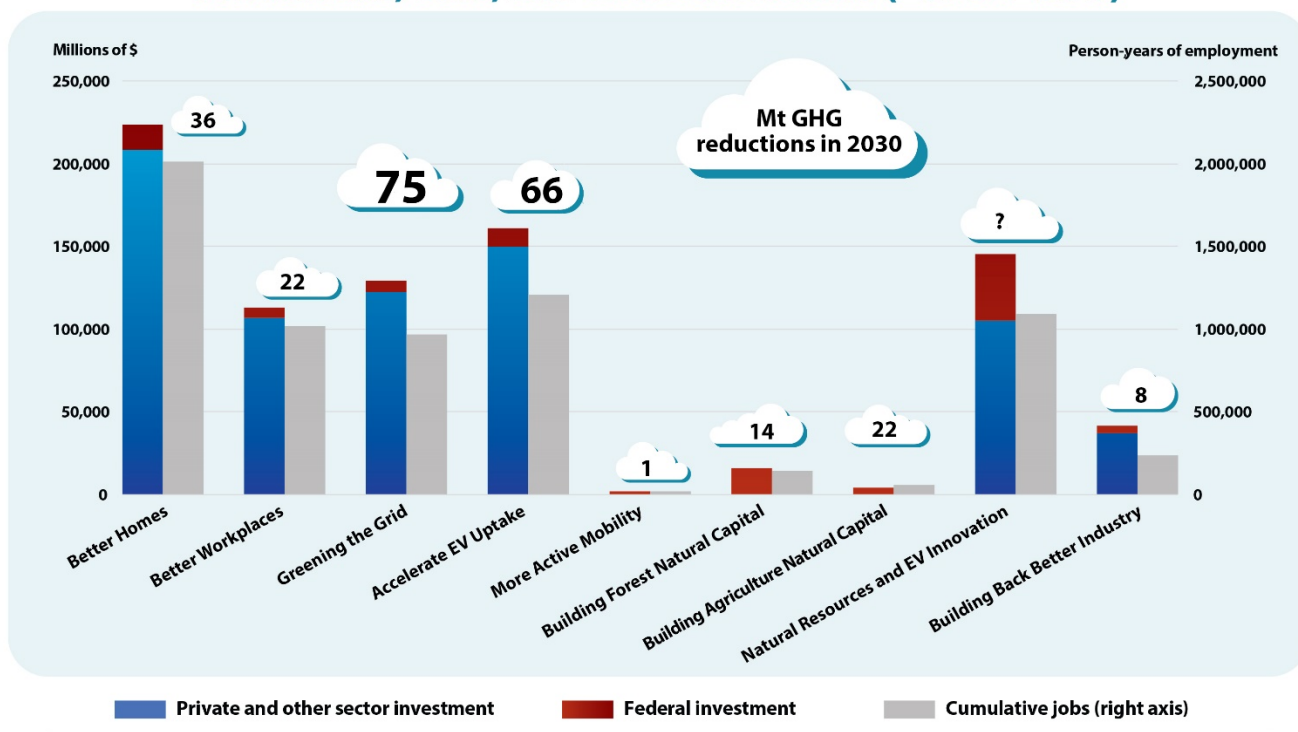
⁴ <https://www.macleans.ca/news/industry-leaders-call-for-bold-green-recovery-in-open-letter/>

opportunity today to boost economic growth, create millions of new jobs and position Canadian businesses as suppliers rather than buyers in tomorrow's economy.


This document, put together with input from more than 100 of Canada's most inspired minds, outlines a series of investments that the federal government could make to set Canada on a path to a resilient, net-zero economic recovery. The areas for investment for the Building Back Better Canada Plan include the following programs:

- deep retrofits of homes and workplaces
- accelerated electric vehicle (EV) uptake
- support for active mobility (e.g. walking and biking)
- greening of the electricity grid
- decarbonizing of heavy industry
- nature-based climate solutions for our forests and farmland, and
- making Canada a leading supplier of EV components and zero-carbon natural resources.

BUILDING BACK BETTER: INVESTMENTS, JOBS, AND GHG REDUCTIONS (2021-2030)



Combined, the proposals create or maintain more than 6.3 million years of employment and crowd in \$681 billion of private and other sector investment in the next decade. They would also deliver \$44 billion annually in energy savings to Canadians while reducing greenhouse gas (GHG) emissions by 242 megatonnes (Mt) of CO₂e⁵ per year by 2030 and setting a course for a zero-carbon Canada within a generation. The proposals are **different from what the federal government currently has in place in two important respects: they go further on emissions reductions and they go to the heart of our industrial policy, targeting investments in high-growth areas where Canada has strong competitive advantages** to compete and win in global markets.



In an Ipsos global poll, **61% of Canadians** said they **agree or tend to agree** that “in the economic recovery after COVID-19, it’s important that government actions prioritize climate change” – and that was without being given information about the job-rich nature of a green recovery.

The federal investment of \$11 billion per year (0.5% of GDP) for 10 years would trigger a total of \$790 billion investment, including both public and private, over the 2021 to 2030 period.

The federal investment could be paid for by issuing sovereign green bonds or closing federal tax loopholes and eliminating current Canadian corporate tax breaks, or some combination thereof.

Stronger use of regulations or higher carbon pricing could potentially reduce the cost of the plan for the federal government, but this would likely result in delays – an important consideration for stimulus spending, as well as for ensuring Canadian businesses don’t miss the low-carbon economy train that is speeding out of the station.

The federal contribution would be front-loaded, with almost 40% of it booked in the first two years and half of those early funds earmarked for deep building retrofits, which deliver broad and immediate job benefits (including for the more gender-diverse design and architecture industry) with strong economic multipliers. A study⁶ by the International Monetary Fund on climate policy and recovery found that “environmental measures have been a valuable part of fiscal stimulus packages,” emphasizing that “**energy efficiency investments are particularly well-suited to stimulus spending,**” because they can be executed quickly.

⁵ Carbon dioxide equivalent, or CO₂e, means the number of metric tons of CO₂ emissions with the same global warming potential as one metric ton of another greenhouse gas. EPA. (n.d.) < <https://www3.epa.gov/carbon-footprint-calculator/tool/definitions/co2e.html> >

⁶https://www.elibrary.imf.org/view/IMF004/10522-9781455220946/10522-9781455220946/10522-9781455220946_A001.xml?language=en&redirect=true

Aside from jobs, this burst of investment would help to create economies of scale and bring costs down, especially for building energy retrofits.

Fully \$40 billion of the \$109 billion federal portion of the recovery package is earmarked to catalyze commercial-scale investments to ensure Canada is a supplier rather than buyer in the booming global markets for zero-emissions vehicles, clean fuels, property technologies and essential materials for the low-carbon economy.

The capital expenditures projected for these proposals are well within the bounds of routine levels of investment in Canada, which exceed \$400 billion per year. For example, in the residential sector, Canadians spend \$60 billion⁷ annually to renovate their homes.

Building Back Better Homes and Workplaces would redirect 10% of existing renovation spending in the first year, rising to 60% in the fifth year and declining to 15% of current investments in the 10th year. During the transition to a fossil-free electric power system throughout Canada, the **Greening the Grid** proposal for investments in solar, wind and storage capacity averages \$12.9 billion per year in a sector that routinely absorbs \$22 to \$23 billion per year in capital expenditures. Combined with other expected investments in this sector, including those needed to finish hydro megaprojects already underway, total investment in the electric power sector is

Global green recovery efforts already underway

- On May 27, the European Commission proposed a €750 billion (\$1.14 trillion) recovery fund to steer the continent toward carbon neutrality by 2050, with a quarter of the plan earmarked for the EU Green Deal (with energy efficiency retrofits¹ being the top budget item).

- On May 26, France announced an €8 billion (\$12 billion) plan to accelerate the transition to electric cars, which will include increasing the monetary amount buyers can receive as a state incentive toward the purchase of an electric car.

- German Chancellor Angela Merkel has indicated that her government aims to implement a stimulus package that “helps the economy’s move toward climate neutrality,” saying “it will be all the more important that if we set up economic stimulus programs, we must always keep a close eye on climate protection.” Germany’s €130 billion stimulus package includes massive investment in EV charging stations, doubling the incentive for EV purchases from €3,000 to €6,000 and the establishment of a €50 billion futures fund for R&D investment. These are in addition to demand-side policies, including €300 for every child in Germany and a time-limited reduction in the VAT from 19 to 16%.

- Denmark has allocated 30 billion kroner (\$6 billion) for green building renovations, with a short-term priority to upgrade 72,000 public housing units in 2020/21.

¹<https://about.bnef.com/blog/liebreich-energy-efficiency-key-to-covid-recovery/>

⁷ <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410001001>

expected to grow by about 20% during the transition to a carbon-free grid.

Our proposal is that the Building Back Better Canada Plan would ensure that, starting now, integrated and mutually supportive zero-carbon investment programs support Canada's move to net-zero emissions while delivering strong risk-adjusted returns to Canadians through their savings and pensions.

In addition to direct federal investment, **it is essential that the federal government set the right policy framework to drive the transition to net-zero** and use its spending power to encourage provinces and municipalities to follow suit by attaching **green strings** as a condition for accessing federal stimulus funds. The need for supportive policy spans across all the proposals included here, from model building codes and zoning for zero-carbon affordable housing, to zero-emissions vehicles mandates, fast and fair power-grid access for storage and renewables, recalibration of agricultural subsidies, circular economy targets, and large-scale green government procurement, including embodied carbon of building materials. Providing a clear policy direction to drive toward a zero-carbon economy is essential to sustaining the momentum and securing investor confidence.

This Building Back Better Plan is a different kind of plan from what happened **following the global financial crisis of 2008-9, when just 8% of Canada's stimulus contributed to sustainability and resiliency, compared to 12% in the U.S., 38% in China and 59% in the European Union**, according to HSBC Global Research.⁸

This time we have a government that was elected with a strong mandate for climate action⁹ and a clearly stated commitment to transitioning Canada to a low-carbon economy. The government is rightly focused on getting the economy growing and people back to work as quickly as possible, especially women (who lost more than twice as many jobs as men). The best way to do that is with investments that profit from the immediate returns from energy efficiency and significant savings from steeply declining renewable energy costs.

Some of the world's leading economists recently completed an analysis¹⁰ of possible COVID-19 economic recovery packages. They concluded that **compared to traditional fiscal stimuli, green projects create more jobs, deliver higher short-term economic returns per dollar spent and deliver higher long-term cost savings**. This finding is also supported by McKinsey's

⁸ https://www.globaldashboard.org/wp-content/uploads/2009/HSBC_Green_New_Deal.pdf

⁹ <https://cleanenergycanada.org/poll-two-thirds-of-canadians-want-to-continue-or-increase-climate-efforts-under-minority-government/>

¹⁰ <http://www.ox.ac.uk/news/2020-05-05-building-back-better-green-covid-19-recovery-packages-will-boost-economic-growth-and>

research,¹¹ which found that a low-carbon recovery could not only initiate the significant emissions reductions needed to tackle climate change but also create more jobs and economic growth than a high-carbon recovery would.

Applying a climate lens to economic recovery can help us identify some of the best opportunities to get people back to work immediately while building a more resilient Canada for the long-term, ready to capitalize on new global growth trends in six key areas.

BUILDING BACK BETTER SUMMARY								
Estimated capital mobilized and impact of low-carbon recovery measures for Canada								
	Cumulative Investment 2021-30 Billion \$		Jobs created 2021-30 ⁽²⁾	Jobs per Million \$ ⁽²⁾	Gross Value Added (GVA) Billion \$ ⁽³⁾	GVA Multiplier ⁽³⁾	Annual Mt GHG reduction by 2030 ⁽⁴⁾	Annual Energy Savings by 2030 Billion \$ ⁽⁴⁾
	Federal ⁽¹⁾	Other Capital Mobilized ⁽¹⁾						
Building Back Better Homes	\$14.7	\$208.8	2,010,761	9.0	\$491.5	2.2	35.6	\$12.5
Building Back Better Workplaces	\$6.0	\$107.1	1,018,260	9.0	\$215.0	1.9	21.8	\$7.4
Greening the Grid	\$6.7	\$122.6	905,100	7.0	\$284.5	2.2	75.0	
Building Back Better EV Uptake	\$11.9	\$100.8	834,059	7.5	\$236.8	2.1	65.7	\$23.9
Building Back Better Active Mobility	\$2.0		18,000	9.0	\$4.4	2.2	0.7	
Building Forest Natural Capital	\$16.0		143,760	9.4	\$33.6	2.1	13.5	
Building Agriculture Natural Capital	\$6.0		84,000	14.0	\$12.6	2.1	22.0	
Natural Resources and EV Innovation	\$40.5	\$105.0	1,091,250	7.5	\$305.6	2.1	TBD ⁽⁵⁾	
Building Back Better Industry	\$4.8	\$37.0	234,080	5.6	\$87.8	2.1	8.0	
Sum for all Programs (2021-30)	\$108.6	\$681.3	6,339,270		\$1,671.6		242.3	\$43.7

Chart notes: (1) Federal contribution is front-loaded in the first two years to maximize stimulus impact, bring costs down and incentivize complementary policies essential to crowd in private capital and sustain the momentum. (2) Includes direct and indirect jobs as per Statistics Canada and Torrie Smith Associates analysis. Job years correspond to 1 job for 1 year; job multipliers measure only employment created during spend. In practice, economic stimulus/recovery could create jobs that become self-sustaining, resulting in more job years than shown here. (3) Based on gross-value-added (GVA) multiplier at a sector level as per McKinsey & Co. (4) Based on analysis by Torrie Smith Associates available here: <https://www.corporateknights.com/wp-content/uploads/2020/04/CK-Residential-Retrofit-Calculator-200602.xlsx>, <https://www.corporateknights.com/wp-content/uploads/2020/04/CK-Commercial-Building-Retrofit-Calculator-200422-1.xlsx>, <https://www.corporateknights.com/wp-content/uploads/2020/04/Carbon-Free-Grid-Calculator-200527.xlsx>, <https://www.corporateknights.com/wp-content/uploads/2020/05/CK-Transport-Calculator-200611-V9.xlsx> (5) Most of the greenhouse gas reductions from these investments would be concentrated downstream in what is known as scope 3 emissions, resulting from displaced emissions by light-weight carbon fibres as one example.

¹¹<https://www.mckinsey.com/business-functions/sustainability/our-insights/how-a-post-pandemic-stimulus-can-both-create-jobs-and-help-the-climate>

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1. Better Homes and Workplaces

Opportunity

A federal program to support the deep retrofit¹² of homes, buildings and workplaces can provide more climate-change-resilient homes and workplaces, boost local manufacturing, and help homeowners and businesses save money on energy and reduce GHG emissions.¹³ More than three million jobs¹⁴ could be created, cumulatively, between now and 2030 by the deep retrofits of 60%, or 8.9 million homes, and 60% of Canada's 750 million square metres of commercial and institutional workplaces. These jobs could be scaled up quickly across the country to kickstart the retrofit market and boost the construction sector. By 2030, annual GHG emissions could be reduced by 58 Mt as a result of the program.

Proposal

How would it work? The federal government creates a time-limited funding program to make deep retrofits free or nearly free for households and businesses. This could jolt the market for retrofits to quickly put those in the construction sector, and other supporting sectors, to work at a time when the housing market is slow and consumers have less money to spend and are less able to borrow. It would also help develop and organize the market for deep retrofits, reduce retrofit costs through economies of scale and provide data and metrics to support ongoing financing options once federal grants wind down (i.e. via property assessed clean energy (PACE) programs and other models). After the initial stimulus injection, the program would shift to interest-free loans. At that point, the building code updates, credit market, supply chains and workforce would be in place to deliver economic deep retrofits to Canadian homes and workplaces.

How it could work

1. Establish deep retrofit criteria: The federal government has already committed to developing a “best in class” model building code for the retrofit of existing buildings. This can form the criteria to define what constitutes a deep retrofit for existing houses, multi-unit residential buildings and commercial and public buildings. The criteria need to comprise the measures to be

¹² This involves basement flood protections, upgrading windows, insulation and the installation of heat pumps to displace natural gas.

¹³ The numbers cited here are drawn from the following models: CK Residential Retrofit Calculator; CK Commercial Building Retrofit Calculator

¹⁴ Unless otherwise qualified, “jobs” refer to full time equivalent direct and indirect job years, based on multipliers contained in the summary table above

adopted – including targets for leakage from the building envelope and lighting efficiency, conversion to electric heat pumps, safeguards against basement flooding – that together would achieve deep GHG reductions, energy cost savings and ensure climate resilience.

2. Public platform and data warehouse: A public portal is created, likely hosted by Canada Mortgage and Housing Corporation (CMHC), that includes:

- a clear, accessible articulation of the criteria for the programs and the process for participating;
- a searchable portal for parties to register their interest, including municipalities, retrofit contractors, equipment manufacturers, utilities, energy audit firms, as well as home and property owners. This creates a picture of the supply and demand marketplace for deep retrofits and allows interested parties to locate participants in their region; and
- a public platform that shows the average cost of Build Back Better Homes and Workplaces equipment and labour, based on postal codes, and in time, the impact of deep retrofits on the resale and rental value of homes. This platform, which is continuously updated, publishes regional reports on equipment costs and labour shortages. It enables all levels of government to identify and troubleshoot supply chain challenges.

3. Participants apply for Building Back Better loans: Participants in the program would start by applying to a bank for a Build Back Better forgivable loan. Participants could include homeowners, residential property owners, commercial property owners, utilities, municipalities and other delivery agents. We recommend a meaningful portion of the forgivable loans be assigned for affordable housing (including development of new MURBs or retrofitting existing buildings), which should be exclusively targeted to the community housing sector to boost capacity so it can become the delivery agent of choice for all public investment into affordable housing.

The application could be for an individual or a bundle of buildings or houses within a neighbourhood. Bundling would allow delivery agents to achieve economies of scale and reduce the burden on individual homeowners or businesses to manage their own retrofit projects.

Loans qualifying for rebates would be covered through the CMHC Building Back Better Credit Insurance for Homes and Property Owners. The program would have two phases:

Phase 1 (first 18 months): Loans would be 100% forgivable upon providing proof of the retrofit through an energy audit.

Phase 2: Zero-interest loans would be provided upon proof of the retrofit through an energy audit.

The amounts of the loans could range from \$40,000 per house, \$45,000 to \$2,000,000 for residential buildings and \$250 per square metre for workplaces (\$6,000,000 to \$60,000,000).

4. Financing: Banks would underwrite Building Back Better loans and mortgages and sell the insurance, which requires registration with CMHC. When retrofits are complete and an energy audit is presented showing the project has met the program criteria, banks would apply to CMHC for the Build Back Better loan benefit.

- Phase 1 loans are repaid by the Building Back Better Homes and Workplaces federal fund administered by CMHC. Banks receive reimbursement and use it to repay the loan or mortgage.¹⁵
- Phase 2 loans could be interest-free, backed by a federal capitalization to support programs like PACE and other models to finance retrofits.

By administering the capital investment and underwriting the loans, CMHC could develop the market information and capacity needed to support additional financing models for deep retrofits as recommended by the Expert Panel on Sustainable Finance.¹⁶ By enabling the banks to make loans to participants during the first, stimulus-focused phase of the program, those entities ready to scale up deep retrofits could access capital quickly without relying on funding negotiations between multiple levels of government.

Cost: A commitment from the federal government of \$21 billion for grants and low-cost financing over 10 years, with the majority spent in the first two years.

Complementary policies

- The commitment to develop a “net-zero energy ready” model building code (with the goal that provinces and territories will adopt it by 2030) will ensure that new buildings also support Canada’s net-zero goal. As well, provinces and municipalities that receive federal funding for retrofits should commit to a model building code for existing buildings by 2022, including open-data policies on energy usage.
- The Canada Green Building Council has recommended that the government invest \$500 million in workforce development and training to grow Canada’s low-carbon workforce to ensure that we have the skilled workers and professional expertise to meet the demands of scaling up and delivering new zero-carbon construction and deep energy retrofits. Training programs that can be scaled up immediately already exist, and with this

¹⁵ Participating financial institutions who receive the loan buy-out from the federal government in this stimulus program could be required to commit to revolving that capital exclusively for green building and deep retrofit work for some specified time period.

¹⁶ Government of Canada. (2019). Final Report of the Expert Panel on Sustainable Finance - Mobilizing Finance for Sustainable Growth < http://publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf >

investment, new ones could be brought online faster and specifically target women and men who have lost their jobs because of COVID-19.

- Following the advice of the Expert Panel on Sustainable Finance, the introduction of mandatory labelling and public disclosure would enhance the transparency of building energy performance. This proposal is also aligned with existing federal building-upgrade plans under the Greening Government Strategy, including plans for a centralized deep retrofit project pipeline for public-private co-investment.¹⁷
- The creation of a loan program for local manufacturers and logistics companies that want to grow and support this market could provide additional economic benefit by generating more local supply options.

Alignment with government priorities

- This program would align with the government's commitment to meet a strengthened 2030 GHG reduction target and achieve net-zero by 2050. Buildings currently account for 13% of Canada's GHG emissions. Deep retrofits of 60% of Canada's residential and commercial buildings over the next 10 years could reduce emissions by 45%, saving 58 Mt CO₂e per year by 2030.
- This program would support the government's aim to make life more affordable for the middle class and those struggling with energy poverty by saving \$12.5 billion annually in residential energy costs by 2030.
- The deep retrofit would also free up existing electricity capacity for the conversion of our private cars to EVs. The absolute drop in electricity consumption from the combined residential and commercial building retrofit would be more than enough to power an EV fleet of 13 million, more than one EV for each of the 8.9 million households included in the retrofit scenario. The displaced gasoline consumption would cut GHG emissions by another 48 million tonnes of CO₂e annually in addition to the 58 million tonnes of direct emission reductions from the building retrofits.

Examples from other jurisdictions

- The Credit Institute for Reconstruction (Kreditanstalt für Wiederaufbau, or KfW) of Germany has financed the retrofit of nine million housing units and created 849,000 jobs.¹⁸

¹⁷ Government of Canada. (2019). *Final Report of the Expert Panel on Sustainable Finance - Mobilizing Finance for Sustainable Growth* < http://publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf >

¹⁸ Tower Renewal Partnership. (2017). *German Retrofit Financing*. < http://towerrenewal.com/wp-content/uploads/2017/04/20170331_Case-Study_KFW.pdf >

- Denmark, with a population of 5.8 million, is allocating \$6 billion toward retrofitting social housing as part of its early economic stimulus plan.
- Efficiency Nova Scotia has helped businesses and families save \$166 million annually on energy costs.¹⁹

Additional benefits

- The employment and economic benefits of a retrofit investment would be spread across regions, rather than isolated to one province – like, for example, big infrastructure projects often are. Market-capacity building investments could be targeted at neighbourhoods and regions with higher-than-average unemployment, lower-than-average income and the greatest impact from COVID-19.
- A study by Efficiency Canada and Clean Energy Canada found that every \$1 spent on energy efficiency generates \$7 in GDP and that investment in retrofits could create an average of 118,000 jobs annually between now and 2030.²⁰
- Energy efficient homes and workplaces are more comfortable and have better air quality, thereby contributing to health and well-being.
- Local and regional supply chains that provide the products for deep retrofits would be supported and built.
- The program would create competition in the retrofit market, helping to drive down costs.
- The involvement of CMHC would allow tracking and accumulation of data of the impact of deep retrofits on the resale value of homes and buildings, enabling the monetization benefit to be transparent and understood. Similarly, the CMHC would also capture information on labour and other market participants to inform the impact of this program on employment.

¹⁹ Clean Energy Canada, Efficiency Canada. (2018). Less Is More - A win for the economy, jobs, consumers, and our climate: Energy efficiency is Canada's unsung hero. < https://www.energycanada.org/wp-content/uploads/2018/05/Report_LessIsMore_EconomicImpactStudy-2018-05-01.pdf >

²⁰ Clean Energy Canada, Efficiency Canada. (2018). Less Is More - A win for the economy, jobs, consumers, and our climate: Energy efficiency is Canada's unsung hero. < https://www.energycanada.org/wp-content/uploads/2018/05/Report_LessIsMore_EconomicImpactStudy-2018-05-01.pdf >

2. Accelerating EV Uptake and Supporting Active Mobility

Opportunity

An investment in decarbonizing our transportation sector can help create construction and manufacturing jobs, bridge the gap that exists to meet Canada's 2030 target for GHG reduction, improve air quality and benefit people's health. Transportation currently accounts for 25% of Canada's emissions, and affordable technologies exist today to transition to carbon-free mobility.²¹ An ambitious schedule of passenger vehicle electrification tracking to 100% of new car and SUV sales by 2030 would reduce GHG emissions by 33 Mt per year, create a cumulative 474,000 jobs and save drivers \$11.7 billion annually at the pump.

The electrification of commercial trucking lags that of personal vehicles but is also progressing rapidly. As an increasing number of electric trucks come on the market that offer total-cost-of-ownership advantages as well as acceptable range and performance, the rate of adaptation will depend on the availability of the necessary charging infrastructure. An ambitious schedule of truck electrification in which the electric share of new truck sales grows rapidly after 2025, reaching 75 to 80% by 2030, would reduce GHG emissions by 30 Mt per year, create a cumulative total of 167,900 jobs and save truck drivers \$11.1 billion per year in fuel costs by 2030.

Taken together, these scenarios for the electrification of personal vehicles and commercial trucks over the 2021 to 2030 period would reduce annual GHG emissions by 63 Mt CO₂e, create 642,067 person-years of employment and, after accounting for the cost of the electricity to power the vehicles, yield a net savings at the pump of \$22.8 billion per year.

There is also an opportunity to put people to work over the next 18 months by building active mobility options in our cities and towns. Federal support for new cycling lanes and pedestrian infrastructure could make people's commutes healthier and more enjoyable, reduce air pollution and create 18,000 jobs over two years.

The Proposal

1. **Installation of charging infrastructure (long haul transportation):** The current Zero Emission Vehicle Infrastructure Program (ZEVIP) and Electric Vehicle and Alternative Fuel

Infrastructure Deployment Initiative cover 50% of the cost of charging installation. To kickstart installation jobs in the short-term, the government could launch new fast-track requests for proposals to provide advance financing for any proponents able to complete projects over the next 12 months, and ensure the program is sufficiently funded to support eligible projects. A loan guarantee should be provided for the additional cost for proponents that need it. Financing for charging and power infrastructure for freight could align nicely with the mandate of the Canadian Infrastructure Bank.

Priority should be placed on projects that help fill gaps in the current Trans-Canada Highway network, that are in locations convenient for drivers (i.e. rest stops, truck scales) and that improve interoperability.

2. **Installation of charging infrastructure (urban):** To kickstart installation jobs in urban areas, federal support for the cost of installation and electricity upgrades could be provided to building owners, homeowners, municipalities and other businesses. This should include DC and Level 2 chargers and be in the form of 50% grant and 50% loan guarantee for projects that can be completed over the next 12 months. An additional 4,500 ultra-fast charging stations along the Trans-Canada Highway and other major road networks and in Canada's urban and rural areas is included to provide the infrastructure needed to support the electrification of trucks and to ensure adequate infrastructure for the burgeoning electric vehicle fleet.
3. **Incentives for ZEV purchase:** The current iZEV program provides a point-of-sale rebate for the purchase of a zero-emission vehicle (ZEV) up to \$5,000 per vehicle. Over the next 12 months, owners of fleets could be further incentivized to purchase ZEVs by:
 - removing the cap on the number of vehicles per business for private "transportation as a service" (TaaS) companies that serve the public's mobility needs, such as car-sharing, taxi and ride-hailing companies, in instances where the driver does not own the vehicle;
 - doubling the current iZEV incentive specifically for TaaS fleets to support uptake among those operators who are not in a position to benefit from the accelerated depreciation tax-incentive option;
 - adding a \$1,000 scrappage incentive for purchasers turning in an internal combustion engine vehicle to replace it with a ZEV; and
 - providing a scrappage incentive for medium trucks (\$2,500) and heavy trucks (\$15,000).
4. **Active Mobility Fund:** Cycling and other modes of active transportation are important for reducing congestion and GHG emissions in cities and can provide economic opportunities for tourism in smaller communities. Many municipalities have a roster of cycling infrastructure projects awaiting funding. A \$2 billion Active Mobility Fund for projects that

can begin construction in the next 12 months could create construction jobs, enhance cycling infrastructure and improve the health and safety of residents.

5. **Electric Buses:** The conversion of transit and schools bus fleets to electric buses can provide a catalyst to Canadian industry while improving urban air quality and eliminating children's exposure to bus tailpipe emissions. Subsidies to cover the incremental cost of electric buses for municipalities and school boards would support the purchase of 7,500 zero-emission school buses and 7,500 zero-emission transit buses over the next five years and lead to a longer-term transition of the bus fleets to electricity.

Cost: A \$12 billion federal fund over five years for ZEV uptake and charging infrastructure, plus a \$2 billion federal Active Mobility Fund.

Complementary policies

- Canada can send a strong signal to ZEV suppliers by adopting a federal ZEV mandate that ratchets up so that 100% of new passenger vehicle sales are ZEV by 2030, leveraging the purchasing power of Canada's annual \$85 billion market for new vehicles. A mandate for suppliers would ensure that Canadians have timely access to ZEVs and create additional incentive for the establishment of an EV manufacturing hub.
- Require dealerships to display Total Cost of Ownership for all new models, using a standard methodology from NRCAN.
- Electrifying transportation needs to be done in conjunction with the transition to a 100% carbon-free electricity grid. The federal and provincial governments, along with utilities and renewable energy companies, all have a role in creating a stable, flexible, carbon-free smart grid that can support electrification of transportation, as well as heating homes and workplaces.
- Commercial and residential building developers need to install charging units in new buildings. It is far cheaper to do this during construction than to add them later. The federal model building code should provide a template for provinces to ensure all new buildings are EV-ready.

Alignment with government priorities

- These investments would meet and exceed Canada's target for 10% of light-duty vehicle sales to be zero emissions by 2025, 30% by 2030 and 100% by 2040.

Examples from other jurisdictions

- Norway set a goal that all new cars sold by 2025 would be zero emission and has put in place tax incentives, built charging infrastructure and adopted policies that favour ZEVs.²² The market share of battery electric vehicles in new car sales was 42% in 2019.²³
- California has had a ZEV mandate in place since 2005, Quebec adopted one in 2016, and B.C. followed in 2019.²⁴ In 2019, B.C. and Quebec had the highest growth of EV sales in Canada.²⁵
- The U.K. government has proposed banning sales of new diesel and petrol cars by 2035²⁶ and recently announced a \$3.4 billion investment in active mobility in recognition that more people will be cycling and walking as the economy reopens after the pandemic.²⁷
- Investment in cycling infrastructure in Vancouver resulted in a doubling of the share of trips made by bike and made it the second-best city in North America for cycling.²⁸

Additional benefits

- These programs would support a transition to an electrified transportation system.
- According to BNP Paribas, “the economics of oil for gasoline and diesel vehicles versus wind- and solar-powered EVs are now in relentless and irreversible decline.”²⁹ Investing now in electrified transportation will help Canadian families and businesses save money.
- Charging infrastructure needs to be installed across the country, meaning the benefits are not isolated to one province or region. It supports electrician and construction jobs, both of which may be at risk if housing construction slumps post-COVID.

²² Norsk Elbilforening. (n.d.) *Norwegian EV policy*. < <https://elbil.no/english/norwegian-ev-policy/> >

²³ Richardson, J. (2020, January 28). *The Incentives Stimulating Norway's Electric Vehicle Success*. Cleantechnica. < <https://cleantechnica.com/2020/01/28/the-incentives-stimulating-norways-electric-vehicle-success/> > >

²⁴ Navius Research. (2019). *California and Québec's ZEV mandates description*. < <https://www.naviusresearch.com/wp-content/uploads/2019/05/2019-05-01-CA-QC-ZEV-mandate-brief.pdf> >

²⁵ Electric Mobility Canada. (2019). *Electric Vehicle Sales in Canada – Q1 2019*. < <https://www.emc-mec.ca/wp-content/uploads/Sales-Report-Q1-2019.pdf> >

²⁶ <https://www.cnn.com/2020/02/04/uk-government-plans-to-ban-sale-of-diesel-and-gasoline-cars-by-2035.html>

²⁷ Gov.uk. (2020, May 9). *£2 billion package to create new era for cycling and walking*. < <https://www.gov.uk/government/news/2-billion-package-to-create-new-era-for-cycling-and-walking> >

²⁸ Chan, K. (2019, May 14). Vancouver ranked the 2nd best city in North America for cycling. *The Daily Hive*. < <https://dailyhive.com/vancouver/vancouver-cycling-ranking-2019> >

²⁹ Mark Lewis, BNP Asset Management. Wells, Wires and Wheels. August 2019.

3. Greening the Grid

Opportunity

Building a carbon-free, resilient electricity system is essential as our homes, buildings, vehicles and factories shift from using fossil fuels to using electricity. Canada has already reduced the GHG emissions and air pollutants from electricity generation by phasing out coal and investing in efficiency, energy storage and solar and wind power. Still, the power sector remains a major source of GHGs and pollution in many parts of Canada, at the same time that electric vehicles and heat pumps are opening up vast new markets and increasing demand for electricity. The post-COVID recovery is a historic opportunity to make a push for a carbon-free, renewable electricity system for all Canadians.

Currently, 82% of electricity generation in Canada is carbon-free. Canada could create jobs and resilience by investing in building a carbon-free electricity grid to serve all parts of the country. Over 10 years, this would create almost one million cumulative jobs, virtually eliminate the 75 million tonnes of GHG emissions from the power sector and improve public health by reducing air pollution.

The Proposal

A carbon-free grid across Canada would be facilitated by federal investment through:

- the transmission infrastructure needed for increased interprovincial electricity trade between B.C. and Alberta, between Manitoba and Saskatchewan, and between Quebec and both Ontario and the Maritime provinces. This will expand markets for low-carbon power surpluses while providing flexibility for Alberta or other importing provinces to become renewable power exporters in the future;
- building up intraprovincial transmission capacity to ensure access to wholesale markets, thereby building investor confidence and attracting investments to renewable energy, especially in the rich solar and wind regimes of southern Alberta and Saskatchewan; and
- supporting the rapid deployment of energy storage, particularly in provinces that do not have access to sufficient hydro reservoir storage to balance the growing share of intermittent renewable energy on their grids.

This public investment would help build the backbone needed to increase the flow of renewable power.

How it could work

- 1. Transmission:** The Canada Infrastructure Bank (CIB), with support from the federal government,³⁰ could establish a 20% incentive for inter- and intraprovincial transmission upgrades that are commissioned before 2025. These grants totaling \$1.7 billion would attract \$6.6 billion in private investment and would bring provinces and the private sector together with the necessary speed and efficiency.

The priority for federal grants should be given to building new transmission links that have the highest potential to both expand Canadian markets for existing clean energy and spur growth in new renewable power investments. The following indicative projects have been included in the scenario for a carbon-free Canadian grid:

- Add a 500-kilovolt connection between B.C. and Alberta to facilitate clean power flow to and from Alberta.
 - Strengthen intraprovincial grids in Alberta and Saskatchewan to facilitate the growth of wind- and solar-energy supply.
 - Add a new high-voltage connection between Manitoba and Saskatchewan.
 - Build an additional Nova Scotia/New Brunswick tie line to facilitate the flow of Quebec hydropower to the Maritimes.
 - Upgrade the current interconnection and build a new 2,000-megawatt (MW) high-voltage, direct-current (HVDC) connection between Ontario and Quebec to facilitate the supply of hydropower to Ontario and to provide Ontario with access to seasonal reservoir storage in Quebec.
- 2. Financing** could be structured on a fee-for-service basis, with provinces paying only when they make use of the interties and with the Canada Infrastructure Bank assuming the long-term risk, which would be low, with expected rising demand for zero-carbon electricity in North America. This would address the split-incentive barrier that prevents provinces from taking the initiative on new interprovincial capacity.

Storage: We envisage a 10-year, \$25-billion program of strategic investment in the storage capacity needed to support renewable electricity grids, particularly in Alberta and Saskatchewan, where access to hydro reservoir storage is limited, even with the proposed additional transmission capacity. A federal subsidy of 20% is envisaged, front-loaded over the 2021 to 2025 period at a rate of \$1 billion per year.

³⁰ This could be part of the mandate for CIB to develop a \$5 billion Clean Power Fund.

In our carbon-free-grid scenario, the transmission upgrades and storage investments help to direct \$95 billion of private investment to 22 gigawatt (GW) of wind capacity and 25 GW of solar capacity. When fully built out, an annual carbon-free electricity supply of 68 terawatt hours (TWh) of wind and 31 TWh of solar would be added. When combined with the current and committed carbon-free electricity supply, it would bring Canada's total annual supply of carbon-free electricity to 642 TWh (566 TWh renewables and 76 TWh nuclear), 67 TWh above current domestic consumption levels, including transmission losses, of 575 TWh.

Complementary policies

Achieving a carbon-free electricity supply will be facilitated by the moderation of electricity consumption caused by the efficiency and heat pump investments that form other components of the overall strategy presented here. It is the strategic combination of efficiency gains, strengthened transmission and renewable generation that creates the possibility for Canada to virtually eliminate GHG emissions from its electricity supply while maintaining or increasing electricity export sales to the U.S.

In addition, while investments in the bulk transmission system will help connect end users to centralized supplies of hydropower, the heart of the transition in the electric power sector is in seasonal storage, wind and solar farms and local distribution systems. Electrification of buildings and vehicles, the growth of rooftop solar and other embedded generation (electricity production that is “behind the meter” in the traditional power sector), vehicle-to-grid storage, microgrids, 5G infrastructure, end-use efficiency gains and informatics, the changing out of inefficient electric resistance systems – all these things happen locally, wherever people live and work. In the post-COVID recovery period, the investments we make in local infrastructure and the built environment will determine how successfully we make the transition to a renewable and carbon-free electricity system. Opportunities for federal stimulus initiatives in this area include:

- green power procurement for federal facilities; and
- investments in the acceleration of distributed power and smart grid systems.

Alignment with government priorities

- This proposal supports the mandate to the Minister of Infrastructure and Communities to develop a “Clean Power Fund, sourced through the Canada Infrastructure Bank, to help

finance the development and linking of clean energy to transmission systems . . . [that] will contribute to the achievement of Canada’s climate goals, helping move more electricity between provinces and regions and supporting the electrification of Canadian industries.”

- This proposal supports the electrification of transportation.
- This proposal supports the mandate to the Minister of Natural Resources to “advance the electrification of Canadian industries through new, zero-carbon clean electricity generation and transmission systems and grid modernization, making Canada home to the cleanest mills, mines and factories in the world.”

Additional benefits

- The complete decarbonization of Canada’s electricity supply will require expanding renewable electricity production. Since 2009, the cost of wind and solar energy has declined by 70% and 89%, respectively, making renewables a cost-competitive energy source for Canadians compared to fossil fuels.³¹
- The proposed transmission projects would create jobs in the regions that urgently need new employment opportunities, such as the Maritime provinces, which had high unemployment levels prior to COVID-19, and Alberta and Saskatchewan, which have been severely affected by the oil market crash. By enabling private capital investment in renewable energy in these regions, as well as Ontario and Quebec, the projects would also create resilient, low-carbon jobs across the country.
- The phasing out of coal-fired electricity generation creates significant health benefits by improving local air quality. However, simply shifting from coal to natural gas for electricity means that communities are still affected by hazardous air pollution, such as nitrous oxides. Decarbonizing Canada’s grid can protect people’s health in addition to helping to meet our climate goals.

³¹ Lazard. (2019, November 7). *Levelized Cost of Energy and Levelized Cost of Storage 2019* <<https://www.lazard.com/perspective/lcoe2019>>

4. Building Back Better Industry

Opportunity

Canada's manufacturing sector accounts for more than 10% of the total GDP, exports goods worth more than \$354 billion each year and employs 1.7 million Canadians.³² The sector is also a significant source of GHG emissions – heavy industry alone accounts for 10% of Canada's emissions.³³

When it comes to GHG emissions, there are two distinct groups: general manufacturing and what we call heavy industry. The heavy industries are the energy-intensive, primary processors – steel, metal smelting, pulp and paper, lime and cement, and industrial chemicals. They consume 80% of the sector's energy and emit more than 85% of total manufacturing GHG emissions. Their energy and emissions intensities are tied to the production technologies and processes, often in high-temperature furnaces and kilns.

Setting Canada's heavy industry on a pathway to decarbonization can reduce GHG emissions by 8 Mt per year by 2030, support 23,000 good jobs and simultaneously make Canadian companies leaders in exportable low-carbon technology.

Proposals

1. Drive investment and innovation toward a circular, zero-waste economy: Shifting our manufacturing and retailers to support the transition to a circular, zero-waste economy can reduce the need for raw materials, support local economic development and domestic manufacturing (including upcycling of materials), and reduce vulnerability to global market disruptions. It can also reduce GHG emissions and waste that goes to landfill and support new jobs in technologies to reduce, reuse and recycle products in the waste management sector, a sector that has grown three times faster than the rest of the economy over the past two decades.

While waste management is largely under provincial and municipal jurisdiction, the federal government has an important role to play in setting the policy and public procurement framework to help drive investment in the circular economy. This includes:

- setting rising standards and integrating requirements for the recycled content of plastic produced to drive demand for recycled plastic in Canada and send a clear signal to

³²Government of Canada. (2020). *Canadian manufacturing sector gateway*. < (<https://www.ic.gc.ca/eic/site/mfg-fab.nsf/eng/home>) >

³³ Greenhouse gas sources and sinks: executive summary 2020(<https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2020.html>)

recycling firms that they will have a domestic market. This would reduce uncertainty in the emerging supply and value chains while boosting domestic recycling capacity;

- delivering on the government's commitment to ban harmful single-use plastic products while providing financial carrots for provinces to adopt a more harmonized approach to landfill bans, modelled on the approach taken in the EU; and
- making producers fully responsible for their products, including packaging, at end-of-life by working with provinces and territories to ensure, through extended producer responsibility (EPR) programs, that companies that manufacture plastic products or sell items with plastic packaging are fully responsible for the cost of collecting and recycling, and to set increasingly aggressive targets for recycling.

2. Leverage public procurement: The steel, wood and cement sectors produce critical materials needed to build our infrastructure, and they employ tens of thousands of Canadians. All levels of government are significant purchasers of steel and cement for the construction of public works projects like hospitals, transportation infrastructure and bridges. To support the decarbonization of these sectors, Canada should follow the lead of California and parts of Europe (with the EU as a whole soon following) by adopting green public procurement policies for construction materials.

The federal government and some provinces have already taken steps to lay out guidelines for greener procurement. The federal government can send a clear signal to the steel and cement sectors that there will be a strong market in Canada for low-carbon materials by:

- paying a prorated intensity premium for lower-carbon cement and steel in public projects (maximum \$100 per tonne of carbon avoided for zero-emissions cement and \$200 per tonne for steel) – based on an industry benchmark – that declines as the cost of adopting the technology decreases;
- paying a pro-rated premium of \$30/cubic metre (works out to about \$50/tonne of GHGs avoided) for top-tier sustainably-certified wood used in construction for structural purposes.³⁴
- adopting a policy to reward lower-carbon suppliers in public procurement that sets a maximum threshold for GHG intensity that declines over time; and
- requiring that comparable thresholds are phased in by provincial and municipal governments for projects that receive federal government funding.

³⁴ Only projects in provinces or municipalities which have committed to upgrading their building codes by 2022 to reflect the 2020 federal code that allow construction of tall wood buildings up to 12 story high would be eligible

When Canada's carbon pricing scheme for energy intensive, highly traded emitters was initially designed, steel and cement were given partial exemptions based on physically unavoidable "process emissions" to protect their competitiveness from regions without carbon pricing. This is common practise globally. There are technical means to eliminate these emissions, but they are risky investments for these industries, and the above temporary subsidies, which must be offered to domestic and foreign firms equally to be WTO compliant, are a means to reduce that risk and monetize these emissions. As these new production methods become commercially viable, and Canada can pool its efforts with other willing jurisdictions to incentivize these, the carbon pricing exemptions and subsidies can be removed through time.

With these measures, energy economist Chris Bataille estimates that by 2030, the carbon intensity of steel and cement could be reduced by 30% and the technology will have developed such that new facilities could be net-zero carbon by 2035.

Cost: Depending on the scale of infrastructure building, a maximum \$4.8 billion federal investment over 10 years, that could be made more effective and cheaper in cooperation with California, the EU, the UK, and other willing jurisdictions.

Alignment with government priorities

- The decarbonization of heavy industry is a critical part of achieving Canada's goal of net-zero by 2050.
- These measures support the mandate to the Minister of Innovation, Science and Industry to position Canada as a global leader in clean technology.³⁵
- These measures support the mandate to the Minister of Public Services and Procurement to adopt procurement practices that support green and social procurement.³⁶

Examples from other jurisdictions

- California's Buy Clean Act will set standards for the maximum amount of GHGs produced by steel and other building materials used in public works projects.

³⁵ Justin Trudeau, Prime Minister of Canada. (2019). *Minister of Innovation, Science and Industry Mandate Letter*. <<https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-innovation-science-and-industry-mandate-letter> >

³⁶ Justin Trudeau, Prime Minister of Canada. (2019). *Minister of Innovation, Science and Industry Mandate Letter*. <<https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-public-services-and-procurement-mandate-letter> >

- The European Green Deal is building on existing green public-procurement policies to drive forward the EU's net-zero goal.
- The EU has adopted a new Circular Economy Action Plan, which outlines initiatives along the entire life cycle of products, targeting their design, promoting circular economy processes, fostering sustainable consumption and aiming to ensure that natural resources are reused and kept in the EU economy for as long as possible.³⁷

Additional benefits

- By supporting Canadian heavy industry in decarbonization, Canadian companies can also become leaders in exporting the technology to other jurisdictions.
- A circular economy can reduce pressure on natural resources and prevent the need for new landfills, which have environmental and human health concerns. For energy-intensive materials like aluminum, steel, plastics and paper products, there are large GHG reductions that result from increased use of recycled inputs in the manufacturing stage.

³⁷ European Commission. (2020). *EU Circular Economy Action Plan*. < <https://ec.europa.eu/environment/circular-economy/> >

5. Building Natural Capital (Forests and Agriculture)

Opportunity

The “pandemic pause” provides an opportunity to assess the health and sustainability of Canada’s natural ecosystems and the economic activity that depends on them. The pandemic has revealed the vulnerability and the importance of our food production and supply chains and has heightened awareness of the importance of green spaces. Forestry and agriculture are both susceptible to the ravages of extreme weather and a destabilized climate, but both sectors have great potential to contribute to a rebalancing of the climate system and the establishment of a resilient, low-carbon economic recovery.

Conservation, restoration and land management can help store carbon and avoid GHG emissions. Approximately 84% of land in Canada is forested (about 2,420 million acres) and an additional 158 million acres are dedicated to agriculture.³⁸ Due to the sheer scale of Canada’s landmass and the carbon sequestration capacity of forests and land, nature-based climate solutions can have a material impact on both the climate and biodiversity crises.

The federal government could support farmers to convert marginal agricultural lands to deliver ecological goods and services (EGS) and use less nitrogen. This could create nearly 60,000 cumulative jobs and sequester and reduce emissions by 22 Mt annually by 2030. An ambitious program to restore degraded lands and urban forests could create 144,000 cumulative jobs and reduce emissions by 13.5 Mt per year by 2030.

Proposals

- 1. Incentivize farmers to adopt practices that sequester carbon on marginal agricultural land:**
Of Canada’s 158 million acres of farmland, 93 million are dedicated to crops. A quarter of Canada’s farmland is considered to be marginal land. The potential for sequestering carbon on marginal agricultural land depends on the willingness of farmers across the country to commit to, and invest in, afforestation, restoration and conservation efforts. Such incentive-based programs for farmers and rural-land managers do double duty by both sequestering

³⁸ Natural Resources Canada. (2020). *Statistical data*. < <https://cfs.nrcan.gc.ca/statsprofile> >

carbon and delivering valuable natural infrastructure services like flood and watershed protection for nearby cities and rural towns.

Support for farmers to convert 10 million acres of marginal agricultural land over 10 years through afforestation (e.g. planting trees where none had previously grown), restoration (e.g. planting trees where trees had grown previously) and conservation (e.g. not disturbing or tilling the land) to sequester 22 Mt of GHG emissions annually by 2025 and create 5,600 jobs per year.

2. **Incentivize farmers to use less nitrogen fertilizer, save money and reduce emissions:** Nitrogen fertilizer is the largest source of on-farm emissions. Nitrogen use in Canada has doubled since 1993, driving emissions higher; more than a quarter of all GHG emissions in agriculture stem from fertilizer derived from natural gas. Farmers need help to reduce fertilizer use while maintaining yield by implementing alternatives such as enhanced crop rotations that include more nitrogen-fixing legumes.

An additional investment to optimize and reduce nitrogen use on Canadian farms would create 2,800 jobs for qualified agrologists in hard-hit agricultural communities and reduce GHG emissions by 3.75 million tonnes annually. Because lowering fertilizer use reduces costs, this investment would in time return \$850 million per year to farmers through a 15% reduction in fertilizer use, with commensurate reductions in emissions. Paired with efficiency measures, this 15% reduction in tonnage would have little or no effect on yields. The immediate need is to hire hundreds of independent agrologists who can work in the countryside to help farmers reduce nitrogen use and attendant emissions.

3. **Restoration of degraded land and urban forests:** Canada has committed to planting two billion trees by 2030. Conservatively estimated, this will reduce GHG emissions by three million tonnes by 2030 and six million tonnes by 2050, with an estimated average cost of \$20 per tonne of CO₂e.³⁹

The restoration of forests and wetlands can lead to near-term job creation, increase carbon storage in natural areas and restore biodiversity. While there are economies of scale involved in tree planting, it's generally assumed that the cost per tonne of carbon emissions avoided rises with the ambition of a tree-planting program, due to varying absorption capacities of land across Canada.

³⁹ Smart Prosperity Institute. (2019). *There's promise in planting billions and billions of trees.* < <https://institute.smartprosperity.ca/content/there-s-promise-planting-billions-and-billions-trees> >

As part of a resilient recovery, the commitment to plant two billion trees by 2030 could be scaled up to 10 billion trees. This could generate 15,000 full-time jobs per year, including 8,000 seasonal jobs for young tree-planters.

The effectiveness of an expanded tree-planting program will depend on carefully identifying where to plant. The impact of tree planting on the albedo effect in northern areas, and the impact of increased forest fires as a result of climate change, need to be factored in. Also, biodiversity considerations need to be paired with climate considerations; reforesting a degraded area that was previously forested can have a positive impact on both biodiversity and the climate, whereas foresting a native grassland can have both a positive climate impact and a significantly negative biodiversity impact.

Cost: A federal investment of \$4.2 billion in agriculture and \$16 billion to restore degraded land over 10 years.

Complementary policies

- Delivering on the commitment to protect 25% of Canada's land and 25% of our oceans by 2025 – with a goal of 30% of each by 2030 – is critical. This will protect important ecosystems and biodiversity and contribute to Canada's efforts to fight climate change. Protecting more of our land and oceans can also support nature-based tourism, for which there may be a growing market among Canadians following the pandemic's impact on air travel.
- Indigenous Protected and Conservation Areas – lands and waters where Indigenous governments have the primary role in protecting and conserving ecosystems through Indigenous laws, governance and knowledge systems – will be an important part of achieving the commitment. They represent a modern application of traditional values, Indigenous laws and Indigenous knowledge systems; [are](#) an exercise in cultural continuity on the land and waters; and are a foundation for local Indigenous economies.
- The existing federal Natural Climate Solutions [fund](#) supports projects brought forward by communities, provinces, private landowners and businesses to reduce emissions from forests, wetlands and farmland. This is an opportunity for the federal government to support innovative projects that can be good for the climate, biodiversity and local communities. It could build from the example of the Great Bear Initiative, led by the Coastal First Nations in B.C., where conservation, local economic development and carbon management have been achieved all at once. It has resulted in a first-of-its-kind carbon offset project, where the First Nations have the ownership and right to sell carbon offsets from their territories.

- Reforming forest practices on the managed forest is critical to preserving biodiversity and storing carbon. Strategies to increase the value obtained from forest products while cutting fewer trees for wood production need to be deployed, and the federal government needs to work with the provinces to protect species at risk and make climate and biodiversity priorities in forest management.

Alignment with government priorities

- The federal government has already committed to planting two billion trees and protecting 25% of Canada's lands and ocean waters.

Examples from other jurisdictions

- ALUS Canada already works with farmers and ranchers on 27,000 acres of Canadian farmland to produce valuable ecological services such as clean air, clean water, flood mitigation, climate adaptation, carbon sequestration, habitats for species at risk and support for native bees and pollinators.
- The European Green Deal has a strong focus on sustainable agriculture and sustainable food systems.⁴⁰

Additional benefits

- Investing in natural infrastructure creates more livable communities and improves active mobility, including for walking and cycling.
- Investing in sustainable agriculture can help retain and attract highly educated young professionals to jobs in rural communities and engage rural volunteers.
- Introducing urban Canadians to rural communities and farming through media coverage of the important services that farmers and rural communities are providing.
- Restoration can create habitat for species at risk and other wildlife, provide relief from floods, and prevent soil erosion, all in addition to sequestering and storing carbon.
- Urban forests can reduce temperatures in the summer (thus helping cities adapt to climate change), clean the air, improve water filtration, reduce stormwater runoff, promote physical activity and mental well-being, and reduce buildings' heating costs.

⁴⁰ European Commission. (n.d.). *A European Green Deal*. < https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en#policy-areas >

6. Natural Resources and EV Innovation Fund

Opportunity

The oil and gas extraction sector directly employs roughly 100,000 salaried personnel and hourly wage earners. In 2019, it contributed 5.6% of our GDP and provided \$131 billion in annual export revenue, up 32% from 2015 (when oil prices hit a valley). The value of exports is expected to drop significantly in 2020.

According to BNP Paribas, “the economics of oil for gasoline and diesel vehicles versus wind- and solar-powered EVs are now in relentless and irreversible decline.” The transformation to net-zero carbon energy is happening.

This means that we need to rapidly diversify our economy to produce zero-carbon commodities, particularly in regions that are heavily dependent on oil and gas extraction for jobs. In addition to the growing markets for energy from solar, wind and hydro, there are potential multibillion-dollar markets close to the conventional energy industry that don’t involve combustion: bitumen-based carbon fibres and activated carbon,⁴¹ clean hydrogen,⁴² sustainable aviation fuels⁴³ and geothermal energy.⁴⁴ These markets will grow quickly, driven by policy and economics – and Canada has all the ingredients to be a supplier of choice.

Canada also has the opportunity to attract investment to establish a competitive supply chain for EVs. There are already a number of companies that are making and assembling parts for electric buses and light freight trucks. We have businesses with expertise in batteries, auto-parts manufacturing, assembly, autonomous vehicle technology and materials. Canada also has tier-one automotive manufacturers, as well as world-class nickel resources, nickel being a key mineral for electric batteries.

⁴¹ Alberta Innovates. (2020). *Carbon fibre could transform Alberta’s oil industry*. < <https://albertainnovates.ca/impact/newsroom/carbon-fibre-could-transform-albertas-oil-industry/> >

⁴² Hydrogen Council. (2020). *Path to Hydrogen Competitiveness: A Cost Perspective*. <<https://hydrogencouncil.com/en/path-to-hydrogen-competitiveness-a-cost-perspective/>>

⁴³ Le Feuvre, P. (2019, March 19). *Are aviation biofuels ready for take off?*. IEA. < <https://www.iea.org/commentaries/are-aviation-biofuels-ready-for-take-off> >

⁴⁴ Canadian Geothermal Energy Association. (n.d.) *Canadian National Geothermal Database and Territorial Resource Estimate Maps: Alberta*. <<https://www.cangea.ca/albertageothermal.html>>

As part of a low-carbon recovery, Canada can build on this advantage by establishing an EV manufacturing hub to harness the economic benefits of the growing global market for ZEVs.

A five-year Natural Resources and EV Innovation Fund to catalyze Canadian champions in fast-growing industries of the future where we have competitive advantages (lightweight bitumen-based carbon fibres, renewable jet fuels, clean hydrogen, batteries and electric vehicles) could make Canada the supplier of choice for \$125 billion zero-carbon commodities per year by 2030, creating 500,000 person-years of employment.

Proposals

The Natural Resources and EV Innovation Fund could be modelled on the successful Alberta Oil Sands Technology and Research Authority (AOSTRA), with the following criteria⁴⁵:

1. Right goal: The goal of the fund should be rapid research, development and deployment to de-risk breakthrough technologies and to produce zero-carbon commodities on a commercial scale to sell into growing global markets where Canada has a competitive advantage. Opportunity areas include bitumen-based carbon fibre and activated carbon, clean hydrogen, geothermal heat loops, sustainable aviation fuels, batteries and EVs. Assuming moderate levels of follow-on investment by the private sector to deploy the new technologies to produce the zero-carbon commodities, it's estimated that investment in these sectors on this scale would create more than 100,000 permanent jobs over the next 10 years.

2. Right structure: The fund should be independently delivered by an organization with strong technical capacity, with the government setting goals that prioritize public benefit over the long-term with two buckets: one for R&D, working with regional innovation bodies) and one for commercial deployment.⁴⁶ As with AOSTRA, the ownership of intellectual property (IP) should remain in public hands so that it can be widely used for the benefit of all Canadians. And unlike AOSTRA, which was strictly an R&D vehicle, the fund should have a mandate to make direct investments to deploy these commercial technologies and would take minority equity stakes in exchange for these direct investments.

It is important to note:

⁴⁵ Hastings-Simon, S. (2019). *Industrial Policy in Alberta: Lessons from AOSTRA and the Oil Sands*. < <https://www.policyschool.ca/wp-content/uploads/2019/11/Industrial-Policy.Hastings.-Nov-1-FINAL-USE-NOVEMBER-CORRECTED.pdf> >

⁴⁶ The R&D bucket could be run out of Innovation, Science and Economic Development (working with regional innovation bodies) and the commercial component could fit nicely within Infrastructure Canada's mandate.

- AOSTRA made its investment over 30 years and then hit the exit after they had proven the viability of steam-assisted gravity drainage (SAGD) technology in extracting bitumen from underground oil sands deposits. Given the realities of today's strained provincial and corporate balance sheets, the pace of change in global energy markets, and the scale of the incumbent industry (which makes the stakes higher for getting it right), we are looking at a compressed time scale that requires more investment in less time.
- It is important to get IP protection right. We can invest a lot of money and develop successful technologies, but we may lose out on their benefits if we lose control of IP. The government will need to fund 100% cash for R&D up to the point of deployment in order to own IP for any research that involves non-Canadian entities. Industry co-investment may give partners usage rights but not IP ownership.

3. Right scale: We propose a 10-year investment of \$40 billion by the federal government – split equally between EVs and zero-carbon natural resources – with the objective of securing an additional \$105 billion from the private sector and provinces. The fund should be fully endowed to insulate it from changing political priorities and to take advantage of low interest rates.

The opportunities that could be supported by the fund include:

Electric vehicle manufacturing: Bloomberg New Energy Finance (BNEF) recently estimated that EVs will be 10% of global passenger vehicle sales by 2025, rising to 28% in 2030 and 58% in 2040.⁴⁷ The global EV battery market is expected to grow 16% per year.⁴⁸ Canada needs to harness a portion of this market to maintain and grow jobs in the auto and auto-parts sector.

Carbon fibres and activated carbon: For the period of 2017 to 2023, global demand for activated carbon is expected to be 1.3 million tonnes. If oil sands–derived activated carbon could capture 15% of the total global market by 2030, it would create asphaltene and bitumen requirements of 1.4 million tonnes, which would require feedstock of 160,000 barrels per day, generating \$21 billion in annual revenue. Similarly, Alberta Innovates estimates a potential \$44 billion in annual revenue from carbon fibre by 2030. By diverting a part of current oil sands activity to high-value advanced materials such as carbon fibre, activated carbon and asphalt binder, Alberta Innovates estimates that the added economic potential could be in the range of \$84 billion annually.

Hydrogen: BNEF recently characterized hydrogen as a clean-burning molecule that could become a zero-carbon substitute for fossil fuels in hard-to-abate sectors of the global economy, including heavy industry applications for making steel and cement. Trucks are the dominant mode of

⁴⁷ Bloomberg New Energy Finance. (2020). Electric Vehicle Outlook 2020. <<https://bnef.turtl.co/story/evo-2020/page/3/1?teaser=yes>>

⁴⁸ Reportlinker. (2020, March 23). *Global Electric Vehicle Battery Industry*. <<https://www.globenewswire.com/news-release/2020/03/23/2005010/0/en/Global-Electric-Vehicle-Battery-Industry.html>>

moving freight in Canada, and while the largest long-haul rigs make up only 9% of the freight truck population, they account for 47% of commercial truck-fuel consumption. Hydrogen could replace fossil fuels in freight trucks.

Geothermal: There will be a growing need for carbon-free electricity and heat as Canada winds down coal-fired electricity generation and builds decarbonized industries. Canadian geothermal resources – the heat found deep underground in hot aquifers and rocks – are concentrated in western Canada and can be harnessed for both power and heat, including greenhouses for high-value crops such as cannabis. Alberta is estimated to have as much as 389 GW of geothermal energy capacity that could be developed, 24 times more than the province’s current electricity generation capacity.⁴⁹ The Canadian Geothermal Energy Association (CanGEA) estimates that 60,935 of Alberta’s inactive and active wells may be suitable for geothermal energy production based on the temperature at the bottom of the well. The existing businesses, infrastructure and workforce in Alberta have skills that are vital to building a geothermal industry: exploration and drilling, engineers who know thermal dynamics, and sedimentary rock.

Sustainable aviation fuel: The World Economic Forum’s report on the Net Zero Challenge puts the cost of abating a tonne of CO₂ in the aviation industry at \$200.⁵⁰ Under the International Energy Agency’s (IEA) Sustainable Development Scenario, sustainable aviation fuel is projected to grow to 18 billion litres by 2025 and 37 billion litres by 2030. Natural Resources Canada has already identified renewable jet fuel – derived from sustainably produced biomass while minimizing the use of arable lands – as a technology that could be deployed in Canada in the near-term.⁵¹

7. Summary and How to Pay for It

According to Finance Canada, there are more than 170 corporate tax giveaways that add up to more than \$156 billion per year. Many of these measures have a public benefit rationale including support for small business, charitable deductions for corporations, R&D tax credits and regional assistance funds). But there are others with less of a clean public benefit rationale. We estimate

⁴⁹ Pembina Institute. (2017). *Heat Seeking: Alberta’s geothermal industry potential and barriers*. <<https://www.pembina.org/reports/heat-seeking.pdf>>

⁵⁰ World Economic Forum. (2020). *The Net-Zero Challenge: Fast-Forward to Decisive Climate Action*. <http://www3.weforum.org/docs/WEF_The_Net_Zero_Challenge.pdf>

⁵¹ Government of Canada. (2018). *Readiness of Producing and Deploying Liquid Drop-In Fuels in Canada*. <<https://www.nrcan.gc.ca/energy/transportation/alternative-fuels/resources/21270>>

up to quarter of the forgone revenue resulting from these tax breaks could be recovered through tax reform.

In addition, the Canada Revenue Agency estimates that tax avoidance by roughly 15,000 large corporations operating in Canada is costing Canada \$6.7 to \$7.9 billion per year, and the real number is likely higher, as this analysis did not include base erosion and profit shifting activities which tend to account for the majority of tax avoidance.⁵² A 2017 six-month investigative analysis by the *Toronto Star*, *Corporate Knights* and Paul Rhodes, an International Financial Reporting Standards (IFRS) expert, found that the 100 largest companies in Canada avoided \$62.9 billion in taxes over a six-year period, for an average of \$10.5 billion per year.⁵³

That's the same amount of public investment that is needed to catalyze the Building Back Better Canada Plan. Redirecting this public money to a resilient recovery could leverage an additional \$681 billion in mostly private-sector investment (with some contributions from other levels of government), create 6.3 million person-years of employment and deliver more than \$44 billion annually in energy savings to Canadians, while putting us on the path to net-zero emissions within a generation.

⁵² Government of Canada. (2019). *Tax Gap and Compliance Results for the Federal Corporate Income Tax*. <<https://www.canada.ca/en/revenue-agency/corporate/about-canada-revenue-agency-cra/tax-canada-a-conceptual-study/taxgap-compliance-results.html#nx3>>

⁵³ Chown, O., Heaps, T. (2017). *The High Cost of Low Corporate Taxes*. Toronto Star. <<https://projects.thestar.com/canadas-corporations-pay-less-tax-than-you-think/>>

BUILDING BACK BETTER SUMMARY

Estimated capital mobilized and impact of low-carbon recovery measures for Canada

	Cumulative Investment 2021-30 Billion \$		Jobs created 2021-30 (2)	Jobs per Million \$ (2)	Average Annual Jobs 2021-30	Gross Value Added (GVA) Billion \$ (3)	GVA Multiplier (3)	Annual Mt GHG reduction by 2030 (4)	Annual Energy Savings by 2030 Billion \$ (4)
	Federal (1)	Other Capital Mobilized (1)							
Building Back Better Homes	\$14.7	\$208.8	2,010,761	9.0	213,020	\$491.5	2.2	35.6	\$12.5
Building Back Better Workplaces	\$6.0	\$107.1	1,018,260	9.0	112,010	\$215.0	1.9	21.8	\$7.4
Greening the Grid	\$6.7	\$122.6	905,100	7.0	90,510	\$284.5	2.2	75.0	
Building Back Better EV Uptake	\$11.9	\$100.8	834,059	7.5	83,345	\$236.8	2.1	65.7	\$23.9
Building Back Better Active Mobility	\$2.0		18,000	9.0	9,000	\$4.4	2.2	0.7	
Building Forest Natural Capital	\$16.0		143,760	9.4	14,376	\$33.6	2.1	13.5	
Building Agriculture Natural Capital	\$6.0		84,000	14.0	8,400	\$12.6	2.1	22.0	
Natural Resources and EV Innovation	\$40.5	\$105.0	1,091,250	7.5	109,125	\$305.6	2.1	TBD (5)	
Building Back Better Industry	\$4.8	\$37.0	234,080	5.6	23,408	\$87.8	2.1	8.0	
Sum for all Programs (2021-30)	\$108.6	\$681.3	6,339,270		633,866	\$1,671.6		242.3	\$43.7

Chart notes: (1) Federal contribution is front-loaded in the first two years to maximize stimulus impact, bring costs down and incentivize complementary policies essential to crowd in private capital and sustain the momentum. (2) Includes direct and indirect jobs as per Statistics Canada and Torrie Smith Associates analysis. Job years correspond to 1 job for 1 year; job multipliers measure only employment created during spend. In practice, economic stimulus/recovery could create jobs that become self-sustaining, resulting in more job years than shown here. (3) Based on gross-value-added (GVA) multiplier at a sector level as per McKinsey & Co. (4) Based on analysis by Torrie Smith Associates available here: <https://www.corporateknights.com/wp-content/uploads/2020/04/CK-Residential-Retrofit-Calculator-200602.xlsx>, <https://www.corporateknights.com/wp-content/uploads/2020/04/CK-Commercial-Building-Retrofit-Calculator-200422-1.xlsx>, <https://www.corporateknights.com/wp-content/uploads/2020/04/Carbon-Free-Grid-Calculator-200527.xlsx>, <https://www.corporateknights.com/wp-content/uploads/2020/05/CK-Transport-Calculator-200611-V9.xlsx> (5) Most of the greenhouse gas reductions from these investments would be concentrated downstream in what is known as scope 3 emissions, resulting from displaced emissions by light-weight carbon fibres as one example.

APPENDIX

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