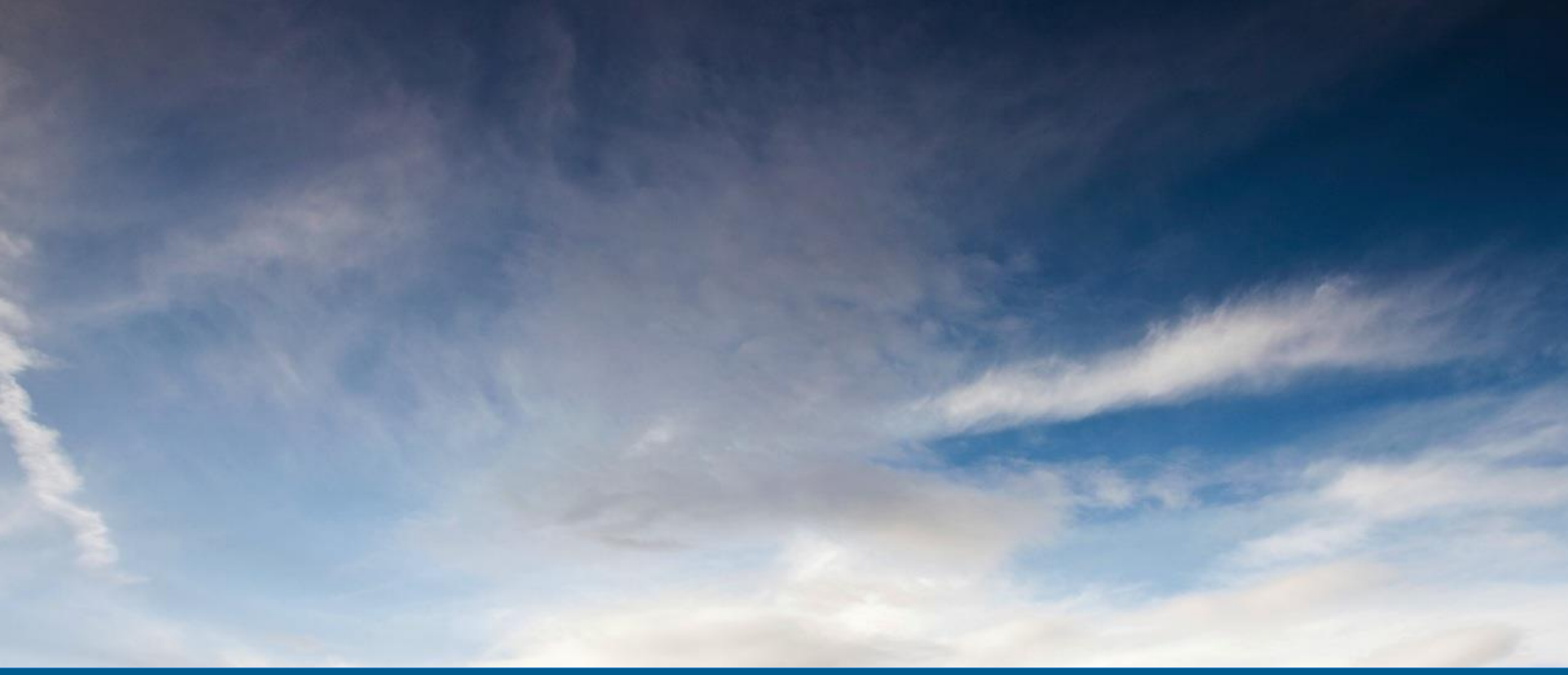

CMC | Low Carbon Pathways Group

PATHWAYS TO DEEP DECARBONIZATION IN CANADA

Chris Bataille, Dave Sawyer, and Noel Melton

CMC Research Institutes Inc.

Phase 2 Summary Report

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Comments: Chris Bataille cbataill@gmail.com
Dave Sawyer enviroeconomics@gmail.com
Richard Adamson richard.adamson@cmcghg.com

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DECARBONIZATION PATHWAYS PROJECT

The Deep Decarbonization Pathways Project (DDPP) is an initiative of the United Nations Sustainable Development Solutions Network (UNSDSN) and Institute for Sustainable Development and International Relations (IDDRI). The Canadian project team is one of 16 country teams exploring national deep decarbonization pathways. This group of countries includes about 75 per cent of global greenhouse gases (GHGs), 85 per cent of the total world economy and, for Canada, represents 90 per cent of our export trade.

Phase 1 of the project produced an interim report for the Climate Leaders' Summit in New York in September, 2014. Canada's Phase 1 country report was released at that time. The purpose of Phase 2, leading up to the United Nations Framework Convention on Climate Change's (UNFCCC) 21st Conference of the Parties (COP 21), is to develop a report to be tabled at COP 21 by the French presidency. Today, the DDPP has had a material impact on the UNFCCC negotiations, most notably adding the deep decarbonization language and emission trajectories to mid-century into the UNFCCC negotiating process and the global climate policy discourse, culminating in the G7 announcement in June 2015 to decarbonize by 2100.

The objective of the DDPP is to explore elements of deep decarbonization consistent with limiting global temperatures to +2° C while maintaining global prosperity. Based on a remaining budget of 800 to 1100 gigatonnes, the target is for all countries to hold greenhouse gas (GHG) emissions at 1.7 tonnes per capita by 2050. Setting this egalitarian global per capita emissions goal avoids contentious discussions about burden sharing associated with negotiating reduction targets.

It is with this global backdrop that this second DDPP Canada report is provided. We look outside of Canada's borders to identify global decarbonization trends that will affect Canada and our ability to achieve deep decarbonization. We focus on identifying resilient pathways that

policy can target regardless of the mitigation ambition, whether it is tentative, short-term steps or longer-term shifts towards deeper reductions.

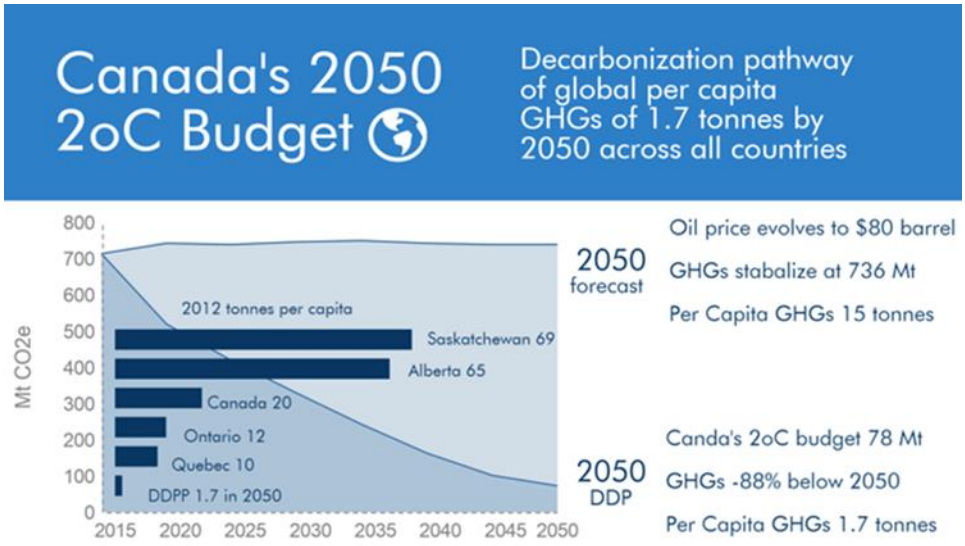
The Canadian DDPP team has been active in climate policy for a number of years, including developing many of the National Roundtable on Environment and Economy low carbon reports, including *Getting to 2050*, *Achieving 2050*, *Framing the Future* and *Parallel Paths*. The team has also worked with a number of Canadian jurisdictions, industry and non-governmental organizations to envision both short-term and longer-term policy pathways. This experience has enabled us to draw upon a long history of analysis and modelling to focus on Canadian deep decarbonization to 2050.

Complementing this domestic focus is our interactions with the 16 other project teams in the DDPP. Through a series of meetings and working groups, we have collectively begun to coalesce around deep decarbonization pathways that are resilient across countries but also mitigation ambition.

We observe that in virtually every country there are clean energy policies and technology drivers that are pushing global decarbonization trends. Several notable policy and technology trends are contributing to initial steps toward a +2°C world, including decarbonization of electricity production and energy-efficiency improvements in buildings and transport.

The benefits to Canada of these global trends are global technology spillovers, where access to clean and low-emitting technologies mean we are decarbonizing rapidly over time as new equipment is deployed to replace older stock. Global decarbonization trends will also help Canada to achieve deeper GHG reductions in the longer term as technology feasibility improves and costs fall.

Despite global trends towards progress in reducing the emission intensity of electricity production, buildings and transport, significant gaps in global technology exist that pose a challenge for Canadian deep decarbonization efforts, especially in primary extraction but also for emission intensive industries.



It is these twin themes that Canadian climate policy must now address: how to deepen and broaden current Canadian policy signals and technology deployment, and where policy attention will be required to push next generation decarbonisation technologies forward, particularly in liquid fossil fuels and industrial processes.

THE DDPC Emissions Forecast

The starting point for our exploration of Canada's decarbonization pathway is a reference case of GHG emissions between now and 2050. We use this reference case as a benchmark against which policy and subsequent technology deployment drives down GHGs in energy systems consistent with the 1.7 tonnes per capita UNSDSN DDPP target. To set the reference case, we use an energy and economic model, CIMS, to forecast demand for GHG intense goods and services, energy balances, technology deployment and ultimately emissions, and GEEM, a macroeconomic model, to forecast GDP, employment, economic structure and trade.

A significant determinant of any long-term GHG forecast for Canada is undoubtedly the future price of oil, where the trajectory of oil production and end use prices drive two very distinct energy economies. In a high oil price future, Canada can expect more oil and gas development, but also more economy-wide conservation, especially in transport, and low-emitting technology deployment. The opposite can be expected in a low oil price future.

Successive long-term GHG forecasts since 2007 had varied significantly primarily due to assumed oil and gas prices and the associated production and conservation responses. In our newest reference case, we adopt the oil and gas price and production from the 2013 National Energy Board (NEB) low price case scenario, given its similarity to currently prevailing conditions in the global oil market (Figure 1). The DDPC forecast is compared with various National Roundtable on Environment and Economy forecasts we have produced along with forecasts from the National Energy Board.[1]

[1] NEB and Environment Canada forecasts are to 2030. Post 2030 we linearly extrapolated the oil and NG price forecasts (these prices are established at the global and North American level) and used our GEEM macroeconomic model to calculate oil and NG output to 2050.

The reference case includes all major existing greenhouse gas abatement policies of both federal and provincial governments in Canada. In the reference case, national emissions are relatively stable over the forecast period, reaching 736 million tonnes (Mt) in 2050 (666 Mt of energy emissions).

This stability belies changes in emissions trends by sector, as shown in Figure 2. Emissions from fossil energy extraction and transport increase over the period, due to greater sector activity (and despite improvements to emissions intensity). Oil and gas sector emissions rise to 2020 as long-term oil prices eventually stabilize at $80/barrel in today's terms. Emissions from electricity decrease sharply from about 100 Mt in 2020 to under 30 Mt in 2050, due to a combination of provincial and federal regulations. Lastly, emissions from industry and buildings are relatively steady because growing sector output is more or less offset by improvements in emissions intensity as new high-efficiency equipment replaces old stock.

Figure 1: GHG Historical, DDPC Reference Case Compared with Past Forecasts

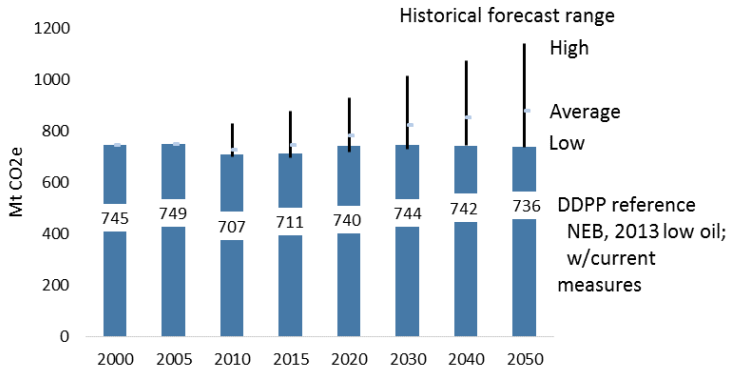
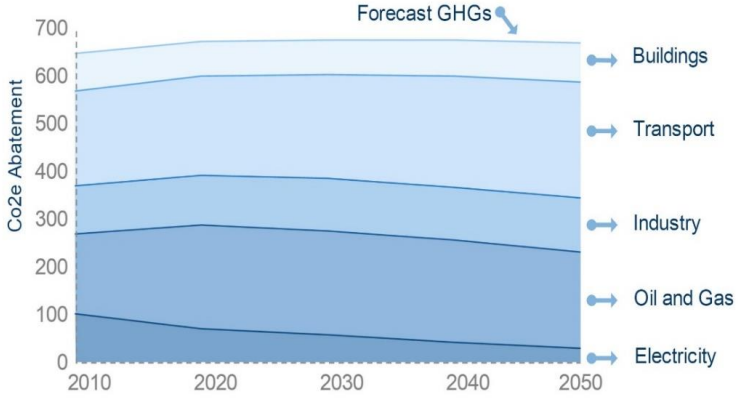


Figure 2: Reference Case Sector GHG Shares (no land-use GHGs)



Clearly, long-term oil developments remain uncertain, especially the extent to which global transportation demand will change in a decarbonizing world, the oil price that will fall from this, and the proportion of global demand that will be met by Canadian production. To capture this dynamic, we simulated alternative oil price pathways to compare against our DDPC reference case. Not surprising, we find a significant variation in alternative long-term GHG forecasts, with the oil price and associated production being a major determinant of Canada's emission trajectory, especially at the sector and regional levels.

To compare the impacts of oil price developments on Canada's economic structure, we run the NEB reference case unconstrained on production in a version of the GEEM macroeconomic model where most of the provinces are disaggregated, allowing for new equilibria to emerge in energy supply and demand, factor markets and final demand across all economic sectors. We then compare these economic outcomes to our DDPC reference case (which uses the NEB,

2013 low oil case) to trace out the structural change impacts on Canada's economy of the different oil price and production trajectories. In each of these pathways the price of oil has an "upstream" effect on crude oil production levels and a "downstream" effect on gasoline and diesel prices.

Reference case, NEB low benchmark. Reflecting the 2014 collapse in oil prices we adopted the NEB low price scenario, which at the time of report writing was the only publicly available and credible long-term forecast reflecting current market trends.

Reference high oil price, NEB medium benchmark. The basis for the high oil price assumption is the 2013 NEB medium reference benchmark. In this scenario, oil prices climb to USD $114 in 2035, which we then assume remains constant through 2050. Oil production consequently increases to 7.6 million barrels per day by 2050.

Overall, net emissions are dominated by the upstream fossil production in either oil price scenario, with transport emissions only somewhat offsetting upstream emissions. The key dynamics are threefold.

First, the higher oil prices scenario drives more fossil energy extraction,

Second, there is an offsetting net effect on emissions as oil prices impact long-term technology deployment and consumption in the North American transport sector.

Third, changes to energy prices induce minor fuel switching and changes to emissions in other sectors of the economy, such as buildings and industry.

Figure 3: Oil Price Impact on Production

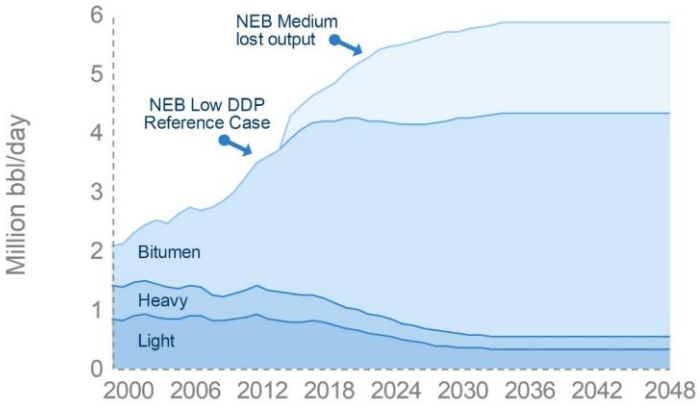


Figure 4: Oil Price Impact on GHGs

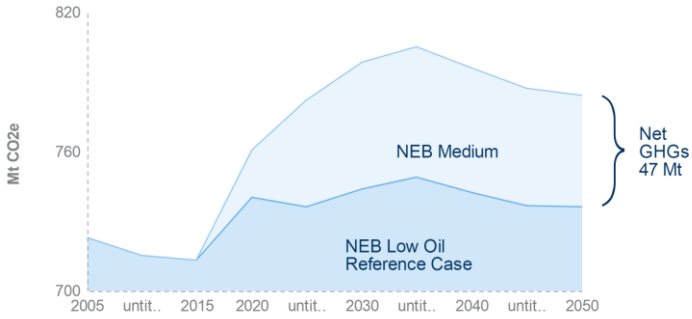
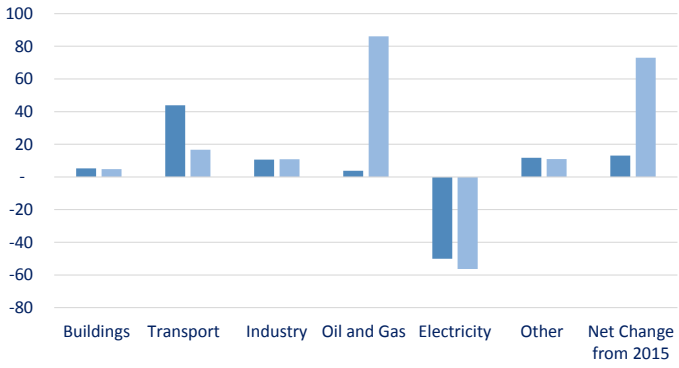


Figure 5: Change in Emissions in 2050 from 2015 Reference Case (Mt carbon dioxide equivalent)



CANADIAN DECARBONIZATION PATHWAYS

The deep decarbonization pathway for Canada (DDPC) we have developed is one scenario toward ensuring economic prosperity while achieving global per capita emissions of 1.7 tonnes per capita by 2050, consistent with roughly a two thirds per cent probability of limiting global average temperature increases to 2°C. This target was set by the UNSDSN DDPP initiative to be consistent across all countries, essentially taking the global budget required to limit temperature changes to 2° C in 2050 and dividing by a forecast of the global population.

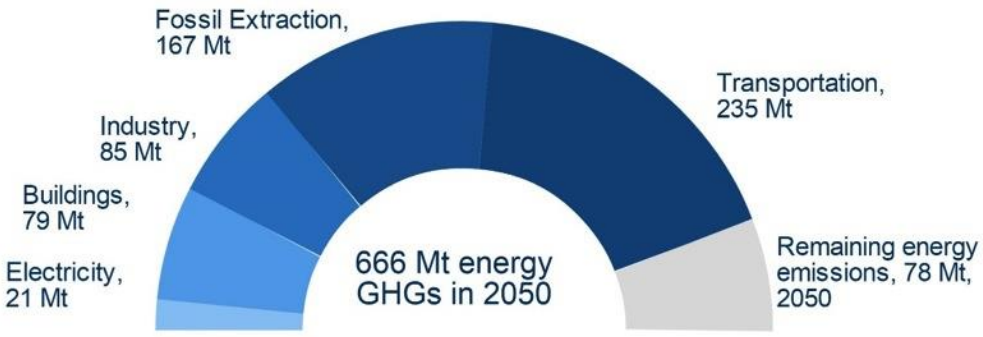
This DDPC implies dramatic reductions in GHG emissions in Canada, where per capita emissions are presently 21 tonnes, with our analysis and modelling indicating that this is truly a stretch scenario relative to current and forecast policy stringency.[2] The main benefit of revealing such a scenario, especially for Canada, is it identifies resilient policy pathways that can be implemented in the short term while being scalable to longer-term mitigation aspirations.

To achieve deep GHG reductions, the decarbonization pathway we simulate includes best-in-class regulations that strengthen existing policies for buildings and transport sectors, as well as a cap and trade system to drive abatement in heavy industry and oil and gas. The policy package also includes a complementary carbon price on the rest of the economy that essentially mops up reductions to reach areas where the regulations do not go, and returns the revenues to reduced income and corporate taxes. Details of the policy package are provided in the main report.

[2] Using the CIMS and GEEM capital stock turnover and macroeconomic modelling tools, we simulated an emissions trajectory falling to 1.67 tonnes per capita.

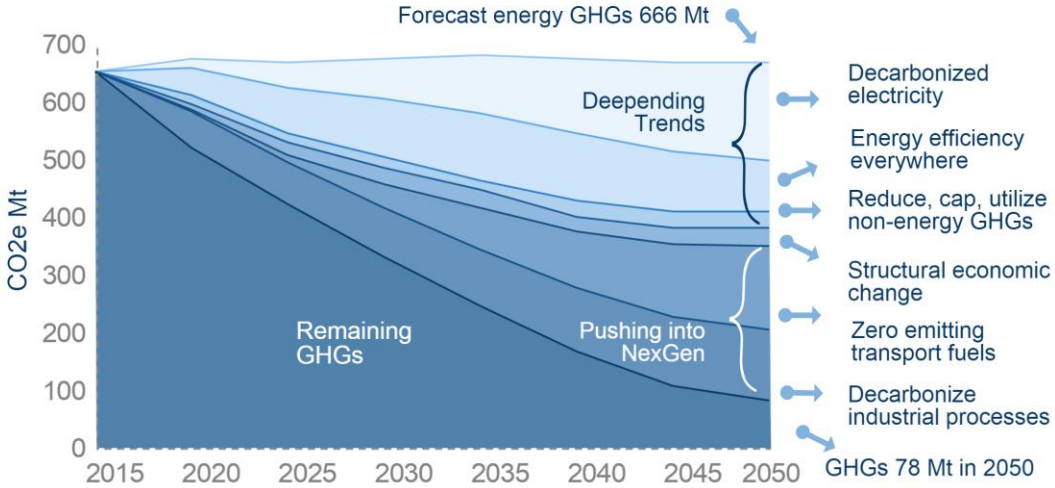
In the DDPC, GHG emissions steadily decline from today's levels to 78 Mt by 2050, excluding agriculture. This level represents a decrease in energy related emissions of 88 per cent relative to reference case emissions in 2050. Nearly half of remaining emissions in the decarbonization pathway are from fossil energy extraction in 2050 (see Figure 6), but our analysis shows that this amount would vary depending on production levels. A further third are associated with industrial activity. The buildings, transport and electricity sectors almost completely decarbonize by 2050, accounting for less than a quarter of remaining emissions.

Figure 6: 2050 Energy Emissions below Reference Case by Sector



Our analysis identifies six pathways under three main themes that emerge from our analysis and modelling. Some of these pathways reinforce current trends—for example, continuing efforts to decarbonize electricity generation and improve energy efficiency in transport and buildings. Other pathways require transformative technologies, such as CCS, alternative non-fossil fuel processes in industry and alternative fuels for transport. Lastly, structural economic change reorients the economy toward less emission-intensive activities. Figure 7 provides the graphical overview of the contribution of each of these pathways to decarbonization.

Figure 7: Deep Decarbonization Pathways to 2°C (excludes land-use emissions)



The six decarbonization pathways, organized under three themes, include:

1. **Deepening Current Trends.** This group of three pathways are the building blocks of current climate policy both in Canada and abroad. These pathways are characterized as having a broad and resilient portfolio of technically and economically feasible technologies now. Virtually every jurisdiction in Canada, and many globally, are pushing technology deployment and innovation with policy. To achieve deeper decarbonization, current policy and market trends are driving down costs and increasing technical feasibility, but need to be significantly deepened across the economy for deep decarbonization.
    - **Pathway 1: Decarbonized electrification.** Low-emitting electricity captures a much larger share of total energy use across the entire economy and provides a low-cost fuel-switching path for currently fossil fuel-based end uses.
    - **Pathway 2: Improving energy productivity.** Doubling down on current energy savings trends in buildings, vehicles and industry to capture the full stock of energy efficiency potential.
    - **Pathway 3: Reduce, cap and utilize non-energy emissions.** This includes two low-cost actions with especially high impact. First, capping and burning of methane from landfills (methane is a much stronger greenhouse gas than carbon dioxide). Second, in the oil and gas sector, reduction of wellhead and pipeline venting and leaks, and replacement of gas actuated devices with electric ones where possible.
2. **Pushing Towards Next Generation Technologies.** These two pathways cover large shares of Canada's total GHG emissions, yet policy and innovation signals both at home and abroad are weak. As a result, while there are many technically feasible options available to drive down emissions, few have been commercialized. A particular area of risk for Canada is a lack of commercial abatement opportunities in our large and growing industrial sector, particularly oil and gas and other primary extraction. Deep decarbonization requires pushing next-generation technologies to drive down costs and improve feasibility in the longer term.
    - **Pathway 4: Move to zero emission transport fuels.** There is a technological race between electric batteries, non-food crop biofuels and hydrogen to power our personal and freight transport fleets. Electric vehicles currently have an edge in personal and urban freight vehicles, but do not have the power density for freight transport with known technology. Scaling up non-food crop biofuels (which do have the necessary power density) to take advantage of Canada's large biomass resource, however, requires significant technological advances and innovation.

- **Pathway 5: Decarbonize industrial processes.** Significantly reducing both energy and process emissions faces technological hurdles, especially at deep decarbonization levels. Heavy industry is typically energy intense, and Canadian industry developed in a time with relatively low energy prices; it was, in fact, a competitive advantage for Canada. While many engineering pathways exist to virtually decarbonize heavy industry, they have not attracted significant innovation globally because there are few constraints on carbon to trigger innovation. Significantly reducing emissions from industrial processes will require the widespread deployment of new and transformative technologies that will require Canadian-specific and international innovation to become commercial.

3. **Pathways of Structural Economic Change (Pathway 6).** As the world transitions to a low-carbon future, and carbon becomes increasingly expensive, there will be natural shifts in the structure of Canada's economy. The shifts will be driven by our own policy, but also the demand for Canadian goods and services, particularly for Canada's oil and other natural resources. The question, then, is what does the structure of Canada's economy look like in a deeply decarbonized world? In a decarbonizing world, those economies that have become less exposed to trade in fossil fuels, while becoming more capital and labour intense based on the production of domestic renewable electricity and other renewables, will likely weather shifting global demands with greater ease and resilience.

   To test the implications of a decarbonizing world on Canadian oil and gas production, we simulated a range of oil price scenarios, all with the DDPC policy package applied. We then compare the economic outcomes to trace the structural change impacts on Canada's economy of the different oil price and production trajectories.

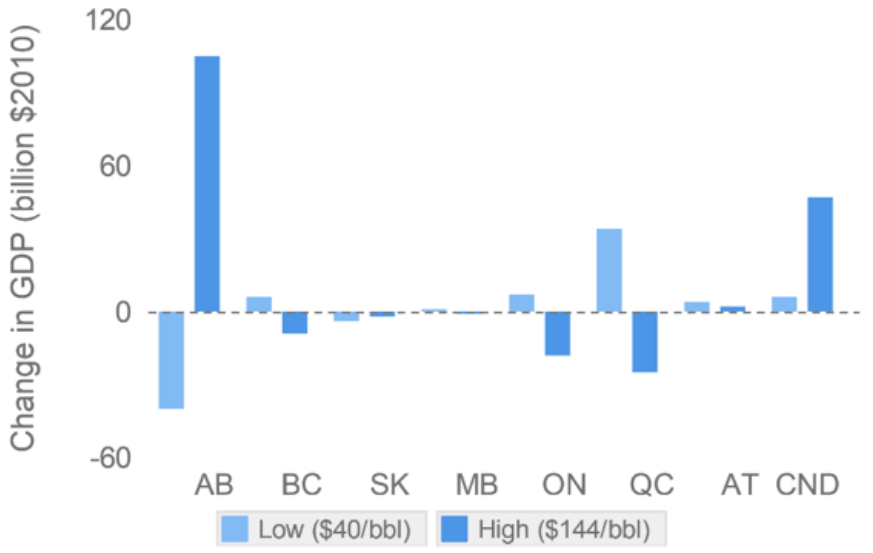
   We observe that it is oil prices, and not national decarbonization policy, that are the key determinant of Canadian oil production and therefore our regional economic structure. Overall GDP is relatively unaffected under the DDPC policy package, but with strong regional effects (Table 1 and Figure 13). Domestic deep decarbonization is feasible in all cases.

Table 1 Changes from 2015 in Regional GDP in 2050 (Relative to 2015=1)

	2050 DDP Reference ($80/barrel)*	MIDDPP ($80/barrel)*	HIDDPP ($114/barrel)*	LODDP ($40/barrel)*
AB	1.71	1.34	1.71	1.20
BC	2.42	2.14	2.10	2.17
SK	2.67	2.23	2.20	2.16
MB	2.71	2.50	2.47	2.51
ON	2.09	1.89	1.87	1.90
QC	2.29	2.47	2.40	2.57
AT	2.18	1.97	1.95	2.01
Canada	2.15	1.98	2.01	1.99

*Oil prices assumptions in 2050 rising form today's price

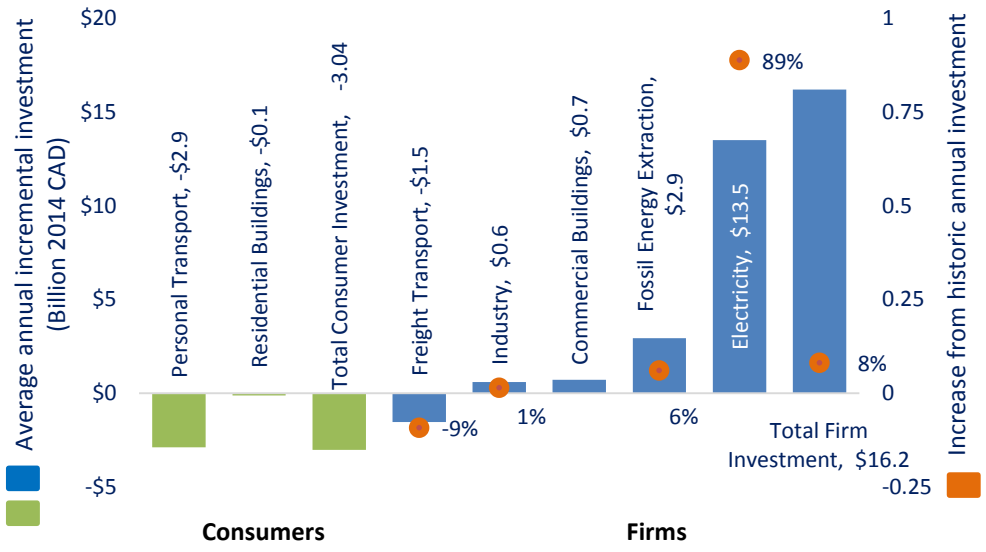
Figure 8 Impact of Changes in Oil Price on GDP in Decarbonization Scenario in 2050 (Relative to Reference)



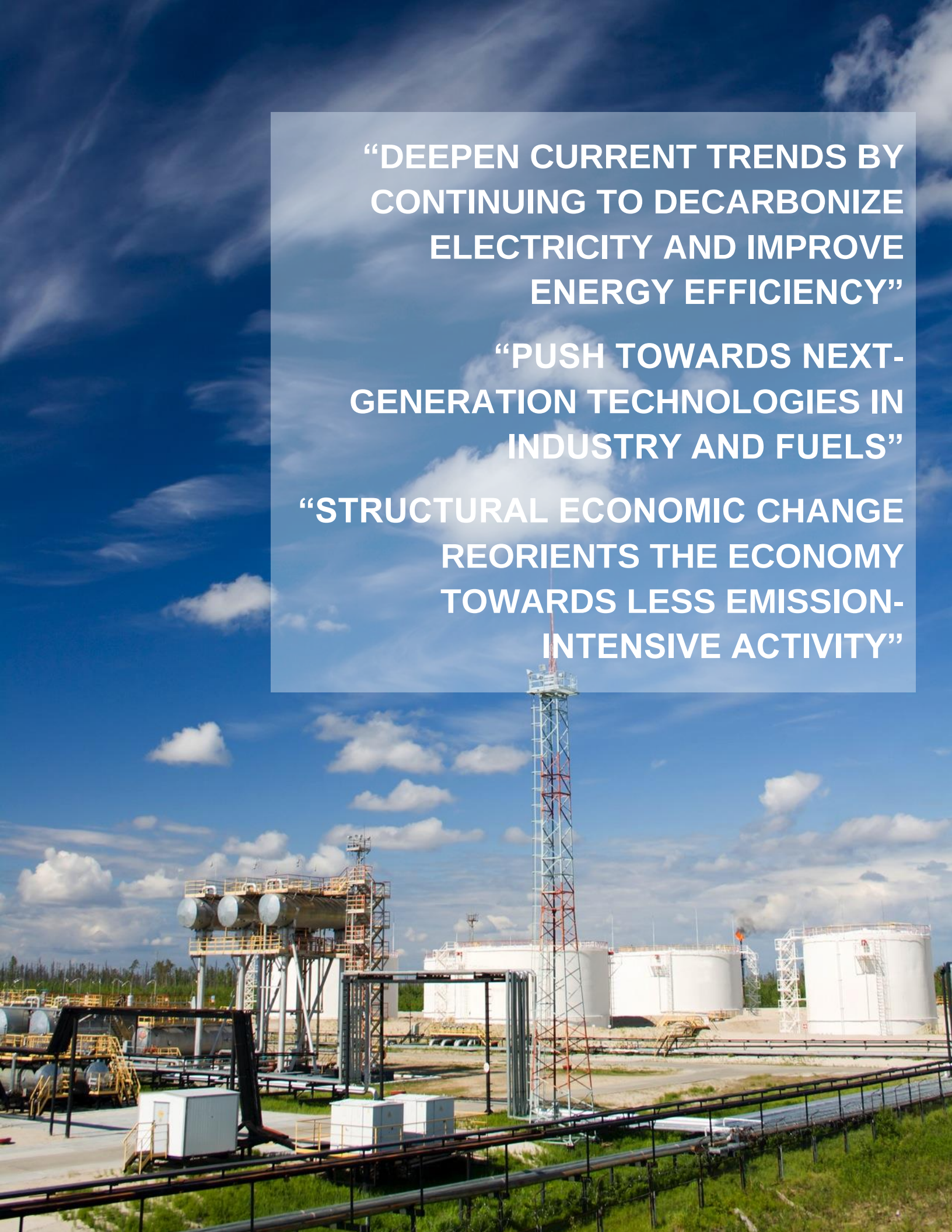
The level of transformational change outlined in the previous section **requires a significant restructuring of investment** to move the economy away from fossil fuels. In this section, we present the investments in deep decarbonization made by firms and consumers (investment for consumers is here defined as payments for durable goods like refrigerators, cars, appliances and houses).

Figure 9 provides a graphical representation. Even with the deep levels of decarbonization envisioned in the above scenario, capital investments are not that significant relative to historical levels (for oil and gas it is only +6% from recent history), and in some cases represent savings for the household sector. The biggest takeaway is that investment in the electricity sector must double from today's levels.

Figure 9: Change in Average Annual Investment Relative to Reference Case



Notes: All values are not discounted. Historic investment based on average annual values between 2000 and 2013 as reported by Statistics Canada (CANSIM Table 31-0002).



“DEEPEN CURRENT TRENDS BY CONTINUING TO DECARBONIZE ELECTRICITY AND IMPROVE ENERGY EFFICIENCY”

“PUSH TOWARDS NEXT-GENERATION TECHNOLOGIES IN INDUSTRY AND FUELS”

“STRUCTURAL ECONOMIC CHANGE REORIENTS THE ECONOMY TOWARDS LESS EMISSION-INTENSIVE ACTIVITY”

IN A DECARBONIZING WORLD WE SIMPLY DO NOT KNOW HOW THE DEMAND AND SUPPLY FOR OIL AND OTHER GHG-INTENSE GOODS WILL INTERACT AND WHERE PRICES WILL SETTLE.

CANADA'S INTENDED NATIONALLY DETERMINED CONTRIBUTION AND THE PATHWAY TO 2°C

Canada announced its Intended Nationally Determined Contribution (INDC) in May 2015, pledging a -30 per cent reduction from 2005 levels by 2030, which translates into 524 Mt in 2030 off a forecast of 798 Mt (including land-use GHGs). Canada's INDC is deep by any measure given current emissions trends, and is likely to be dependent on a suite of aggressive provincial policies and new federal policies. The Government of Canada has also now made a nod to deep decarbonization with its INDC.

An important question is whether or not the INDC is consistent with a 2°C pathway. Our assessment is that Canada's INDC is on one of several possible emissions reduction pathways consistent with a 2°C objective With the INDC 2030 target achieved, it would then be another policy and technology stretch to reduce emissions from a forecast level of 16 tonnes per capita in 2050 to the UNSDSN DDPP goal of 1.7 tonnes per capita in 2050. However, it would also not likely be the cost-effective pathway to 2050.

There are two key risks to the successful achievement of the INDC:

- **Policy credibility is key to deep decarbonization.** Aligning emission reductions with the 2°C pathway while achieving Canada's 2030 target would require a significant strengthening of current federal and provincial policies. This effort would also have to start immediately if costs were to be minimized and effectiveness assured. But there are obviously significant risks with achieving this INDC and deep decarbonization by mid-century, especially the lack of historical political action to align emission policies with stated aspirational targets.

- **Avoid policy delay, which is costly**. To the extent Canada delays policy action, costs rise and path dependency on high emitting capital stock locks Canada into a high emitting pathway. Strong and credible policy signals, aligned with long-term decarbonisation aspirations, set expectations that impact behaviour and technology deployment.

To the extent businesses and consumers do not believe Canada has a credible policy to achieve its emission reductions targets or policy is delayed, policy stringency, reflected in carbon costs, has to rise significantly above levels consistent with the more credible policy (Figure 10). Our estimates indicate that absent credible policy, carbon costs are more than double between now and 2030 for the same INDC target.

Figure 10: Canada's INDC and the DDPC 2oC Pathway

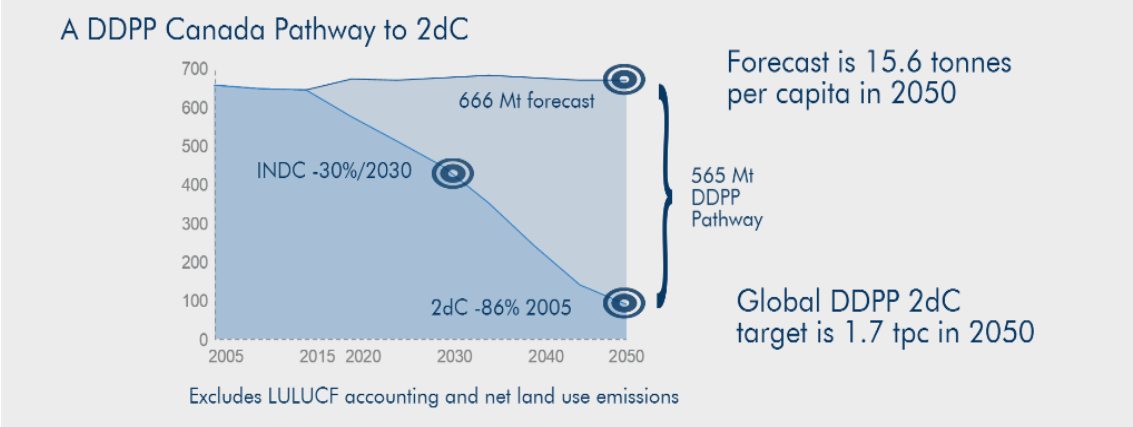
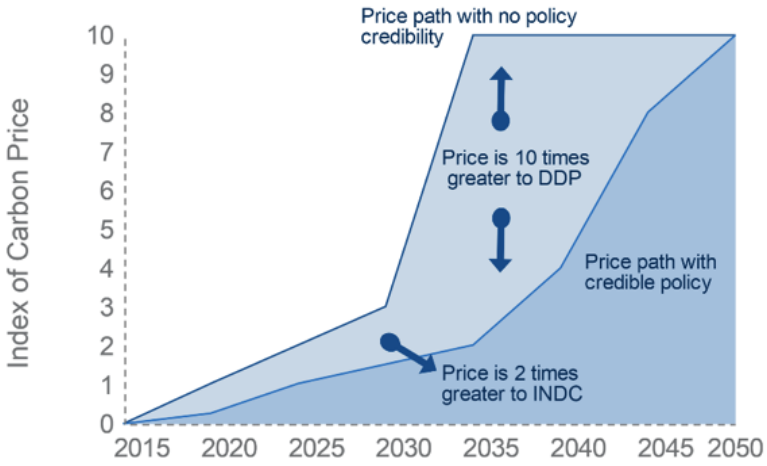


Figure 10 Canada's INDC and the DDPC 2oC Pathway



CANADA'S 2°C PREPAREDNESS

On policy architecture, Canada's deep decarbonization preparedness is mixed. Canada is likely on the right path in electricity, buildings and personal transport, but policy signals need to be tightened and certainly broadened. Québec and B.C. with their broad carbon pricing are probably most prepared, with encouraging signs from Ontario developing a broad-based cap-and-trade system with linkages to California and Québec. Alberta's recently announced policy update and signals of broadening the policy to cover more emissions is also a step in the right direction.

Doubling down on current policy signals in the electricity sector is central to deep decarbonization, with a need to trend towards zero-emissions electricity, ideally for all new baseload generation starting today. Following on this, if we go deeper towards decarbonization there will be significantly more electricity demand above current demand trajectories, with a doubling of investment to support the scaled up electrification. Finally, because of its trade regulation role, the federal government could provide very meaningful aid facilitating a national discussion and helping finance coordinated national transmission networks to move renewable electricity to load centres, for example from Manitoba, northern Ontario and Québec to southern Ontario.

Stronger signals are also needed that all new personal transport, appliances and buildings will eventually be regulated to zero GHG intensity by the late 2030s or early 2040s, but that regulations will be flexible, performance based, and reflect the diverse portfolio of existing and emerging technologies. Commercial buildings and vehicle efficiency have lagged behind personal transportation and this will need to change, with a significant short-term opportunity to ratchet down existing policy levers.

While Canada is prepared in some policy areas, in others it is not. In both industrial GHGs and liquid fossil fuels, concerted new mitigation policies will be needed to drive more reductions, but

also to send innovation signals. Canada has enormous opportunities associated with biofuel feedstocks (for heavy freight) and a large and very usable carbon storage capacity, especially underneath northeast B.C., Alberta and Saskatchewan, but these advantages must be supported and capitalized in areas such as:

- Coordinated national research and development and deployment support for bulk non-food crop biofuels for heavy freight and aviation.
- A clear national legal framework for use of carbon capture and storage (pipelining, liability, etc.), as well as upfront infrastructure support for carbon dioxide pipelining.

Canada's current policy path is insufficient to the challenge in heavy industry and the oil and gas sector. While mitigation solutions exist, innovation and commercialization signals provided by B.C.'s carbon tax, Alberta's SGER and Québec's cap and trade are far too weak to drive innovation consistent with longer-term decarbonization. Weak domestic innovation signals are consistent with weak global policy signals, diminishing the chance of global technology spillovers to help drive down costs and increase feasibility. In additional to stronger mitigation signals, complementary innovation policy is currently nascent, despite being critical to reduce fossil fuel-based process heat requirements, especially in primary extraction of all kinds.

For industry and the oil and gas sector, stronger polices to drive down emissions are needed, which will send innovation signals. These policy signals are an important step to galvanize the national business culture toward innovation, development of markets for nascent solutions and technical capacity building. To complement this primarily policy shift, complementary innovation investments will be required. But innovation research and development spending alone will be insufficient to make the transition towards deeper decarbonization.

Canada's currently fragmented subnational policies are a long-term decarbonization risk. With the current low levels of mitigation ambition, the risk of high-cost outcomes due to limited pools of regional abatement is not significant. But in time, with more ambition, risk will rise as regional low cost abatement opportunities are exhausted. Eventual linking of policies, whether through direct linking or indirect linking through national flexibility mechanisms such as offsets, is central to decarbonization. The same applies to regional and national innovation policies, to coordinate efforts across jurisdictions.

On economic structure, there is a large risk associated with Canada getting caught with a large GHG-intense primary extraction and heavy industry sector that just cannot compete in a world with border tax adjustments based on the GHG intensity of products, like the well-to-wheels California low-carbon requirement. We also note that economic resiliency is tightly tied with low-carbon-intensity technologies in manufacturing, buildings and transport systems, making oil price swings less impactful. Our analysis shows that Canada's economy can be resilient in a decarbonizing world, provided we implement policy to adapt soon. This requires policies as strong as or stronger than those of our trading partners, effective immediately. arrows

While it is true that unified and nationally consistent carbon pricing is needed to reduce emissions and drive innovation in corners of Canada's economy, pricing alone is not enough. Removing fossil fuel subsidies will be needed to unwind negative carbon prices in fossil fuel production and consumption. Complementary regulations will be needed to reach into the buildings and transport sectors, where carbon-pricing signals may not work as well (e.g., because of the separation between owners and renters in buildings, and unpriced benefits in transport). Adding broad-based innovation signals will also help drive down costs and increase feasibility in the longer term, with information programs helping to remove biases towards low-emitting and energy-saving equipment and behaviours. Indeed, information is always a policy complement and governments should continue to roll out information programs to help reinforce primary mitigation policies. Information, however, is not a substitute for strong policy signals using regulations or carbon pricing. Finally, there is a role for green public procurement, where governments can showcase new technologies in their vehicle fleets and buildings.

Looking forward, Canada needs to better understand its land-use emissions and their associated abatement potential. With decarbonization, there is a high probability that significant quantities of lower-cost emission reductions will be needed to push towards net-zero and net-negative emissions. This is a high priority frontier of Canadian climate policy knowledge. Indeed, understanding net negative emission sources is a trend that will only grow in importance in a deeply decarbonizing world.

In sum, our report card is mixed. We are doing well and need to do better with electricity, buildings and personal transport. However our track record for heavy industry, primary extraction and oil and gas will not support achieving the aggressive reductions required. To minimize both climate and economic risks, we need to become global leaders in decarbonization policy and innovation in these sectors, not laggards.

Canada's national circumstances may include some seemingly obvious impediments to long-term decarbonization, but with thoughtful, long-term policy, the costs and risks are manageable. Decarbonization is not about shuttering industry but rather using policy and enabling markets to realign investment across Canada's entire economy to compete in a decarbonizing world. With myopic and delayed decarbonization policy, all bets are off, and Canada lays exposed to increasingly hawkish climate geopolitics and continued market access barriers.