Advice for Canada's 2030 Emissions Reduction Plan

Net-Zero Advisory Body

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ANNEX

Introduction

As Canada's Net-Zero Advisory Body (NZAB), we are proud to present our submission to the Government of Canada's 2030 Emissions Reduction Plan (ERP). This advice is intended to inform decision-making to reduce Canada's national greenhouse gas (GHG) emissions by 40 to 45 percent below 2005 levels by 2030. We are committed to supporting the most likely pathways for Canada to achieve net-zero emissions by 2050, with 2030 marking a critical step on this journey.

Originally launched in **February 2021** and formalized under the ***Canadian Net-Zero Emissions Accountability Act*** (CNZEAA) in June 2021, our legislated mandate is to provide independent advice to the Minister of Environment and Climate Change with respect to achieving net-zero emissions by 2050, including:

- GHG emissions reduction targets for 2030, 2035, 2040, and 2045;
- GHG ERPs by the Government of Canada, including measures and sectoral strategies that the government could implement to achieve a GHG emissions target; and,
- any matter referred to it by the Minister.

We are also mandated to conduct engagement activities related to achieving net-zero emissions and to take into account a range of factors, including environmental, economic, social, and technological considerations. We must also take into account the best available scientific information and knowledge respecting climate change, including Indigenous knowledge.

Our role is clear. The NZAB is an advisory body, not a governing body. We cannot make decisions for Canada, nor can we issue binding advice. Decisions on targets, actions, and other measures remain fully with the Government of Canada. In this context, we are confident our advice will be integral to federal decision-making.

Beyond the Government of Canada, the NZAB can provide advice on actions that could be implemented by others, such as individuals, communities, businesses, and other orders of government. While our advice is for the Government of Canada, it is meant to be widely useful, which is critically important given the limits of federal jurisdiction. Many of the decisions and issues along the pathways to net-zero will depend on leadership from all facets of Canadian society, and action by provincial, territorial, Indigenous, and municipal governments.

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There is a global imperative to achieve net-zero GHG emissions by 2050. Achieving this worldwide target is necessary to limit global warming to 1.5°C and to avoid the most catastrophic and irreversible impacts of climate change.

These were the opening words in our **inaugural publication** in June 2021. They bear repeating because they drive our work and advice. Urgent action is required to set Canada on credible pathways to a net-zero emissions state to reach this objective by 2050.

It has been clear for decades what needs to be done. In 1992 – thirty years ago – Canada ratified the United Nations Framework Convention on Climate Change, which committed us to help address "dangerous human interference with the climate system." Since that time, successive federal governments have brought forward plans to reduce Canada's GHG emissions. While important progress has been made in some sectors, Canada's GHG emissions have continued to trend upwards. Between 1990 and 2019, emissions increased by 21.4 percent, or 129 megatonnes (Mt) CO_2 equivalent (eq.)., driven primarily by increased emissions from oil and gas extraction and transportation.

Now, there are less than ten years to achieve Canada's 2030 target of a 40 to 45 percent reduction in GHG emissions, and fewer than thirty years to achieve the long-term target of net-zero emissions by 2050. Canada must generate verifiable and sustainable GHG emissions elimination pathways that will result in net-zero by midcentury, taking into account the best available science and Indigenous Knowledge.

Climate Science and Indigenous Knowledge Systems

There is no debate - the climate is changing. This is not opinion or theory. It is not a matter of different values or beliefs. It is a fact supported by authoritative climate science and based on the trusted accounts of Indigenous Knowledge Holders. Increasingly, the lived experiences of Canadians, especially Northerners, show how the climate is already changing. While there can be differing views about the ways to reduce emissions on the pathway to net-zero, there is no debate about the reality of climate change.

Science and Indigenous Knowledge Systems guide where the country and the world need to be in the future. For example, science-based targets, like net-zero by 2050, are essential. The years 2050 and 2030 are identified as critical milestones in the Intergovernmental Panel on Climate Change's **2018 report on 1.5˚C warming**. This report notes that "human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate." This landmark report explains that limiting global temperature rise to 1.5˚C temperature rise instead of 2°C or more would help mitigate serious impacts on human health and the environment. To avoid the worst impacts of climate change, GHG emissions must decline well before 2030 and be net-zero by 2050.

The CNZEAA requires the NZAB to take into account a range of factors, including the best available scientific information and knowledge, including Indigenous Knowledge, respecting climate change. The NZAB recognizes that finding respectful and thoughtful ways to listen to and learn from Indigenous Knowledge Holders and leading scientists will be critical to providing credible and holistic advice on pathways to net-zero. Moving forward under the CNZEAA, the NZAB will ensure that this is a priority in their work, consistent with an interdisciplinary approach. There is strength in the diversity of knowledge held by First Nations, Inuit, and Métis Knowledge Holders, climate scientists, physical and social scientists, and other experts. Looking to future NZAB advice, including through annual reports required by the CNZEAA, the NZAB is committed to making room for, listening to, and learning from scientific and Indigenous Knowledge Systems to form the strongest possible foundation for their advice.

Canada needs action, driven by a bold vision, fearless advice, and decisive implementation. Building on what we collectively know, there must be coordinated efforts to 'course correct' and put Canada on pathways to net-zero. This means putting in place known solutions and strategically investing in areas to forward innovation. We are past the point where incremental adjustments suffice - achieving Canada's 2030 emissions reduction target is pivotal after **decades** of missing the mark.

With the CNZEAA now in place, there is a clear process for Canada to set national emissions reduction targets and develop ERPs every five years to provide the direction, decisions, and details.

GHG Targets and ERPs under the CNZEAA

The CNZEAA:

- Legislates Canada's target to achieve net-zero by 2050.
- Affirms Canada's 2030 target is 40 to 45 percent below 2005 levels by 2030.
- Requires Canada to develop an ERP for its national GHG targets and ERPs for 2030, 2035, 2040, and 2045, as milestone years.
  - The target for 2035 is to be set, no later than December 1, 2024;
  - The target for 2040 is to be set, no later than December 1, 2029; and,
  - The target for 2045 is to be set, no later than December 1, 2034.
- Requires the ERP for 2030 to be made six months after the day that the CNZEAA came into force. Using the authorities in the CNZEAA, this deadline was extended to March 2022.
- Stipulates that an ERP for other targets must be established at least five years before the beginning of that year.

PURPOSE OF THIS SUBMISSION

This document is the NZAB's official submission to Canada's 2030 ERP. It builds on our **five foundational values and five design principles**. In addition, it marks the first year of our work. The core of this submission is our independent advice on our four **lines of inquiry**:

- **governance;**
- **buildings;**
- **transportation; and,**
- **oil and gas.**

Why these lines of inquiry?

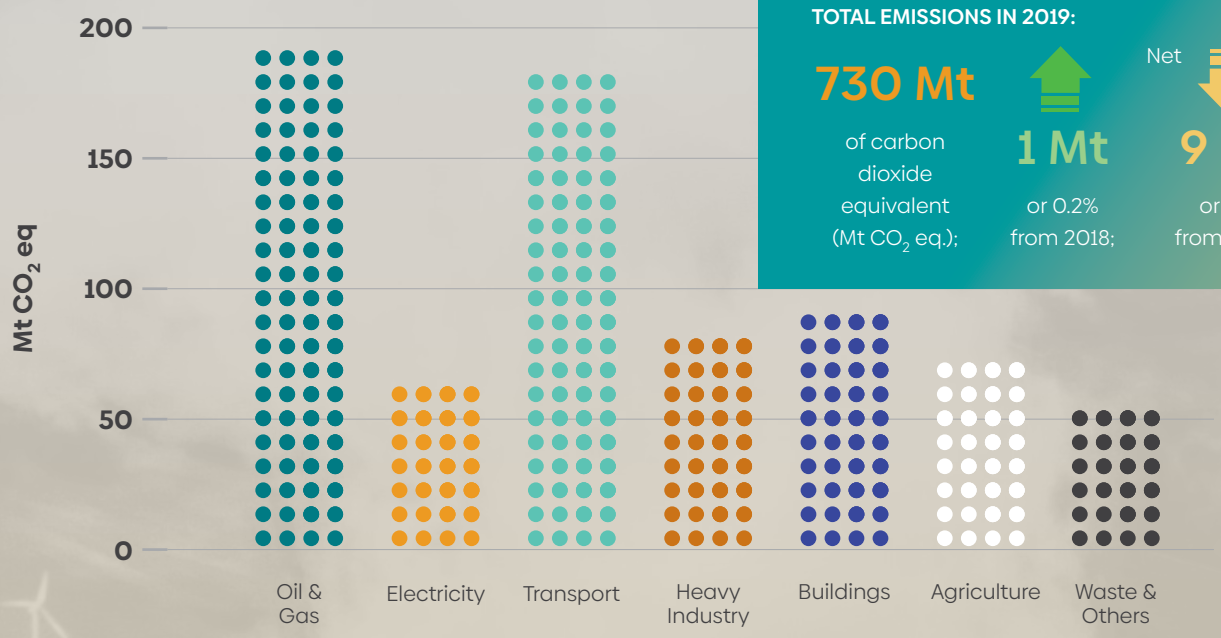
Consistent with the NZAB's Terms of Reference, the advisory body's work is structured along specific lines of inquiry, which are set at regular intervals in consultation with the Minister of Environment and Climate Change. These lines of inquiry may include specific sectors or thematic opportunities.

The three sectoral lines of inquiry - buildings, transportation, and oil and gas - were selected as they represent the three highest-emitting sectors in Canada.

The governance line of inquiry was selected based on the importance of institutional capacity, strategy, and relationships— both inside and outside of government—to net-zero success.

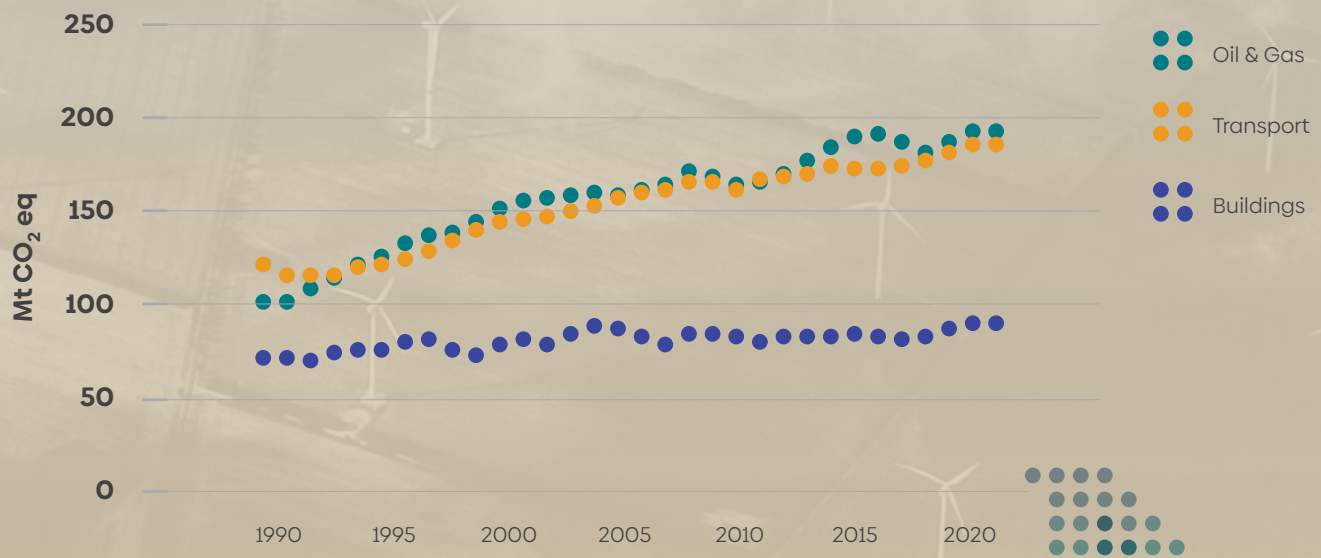
GHG emissions by economic sector, Canada, 2019 (most recent data)

National Inventory Report (Figure ES-7)



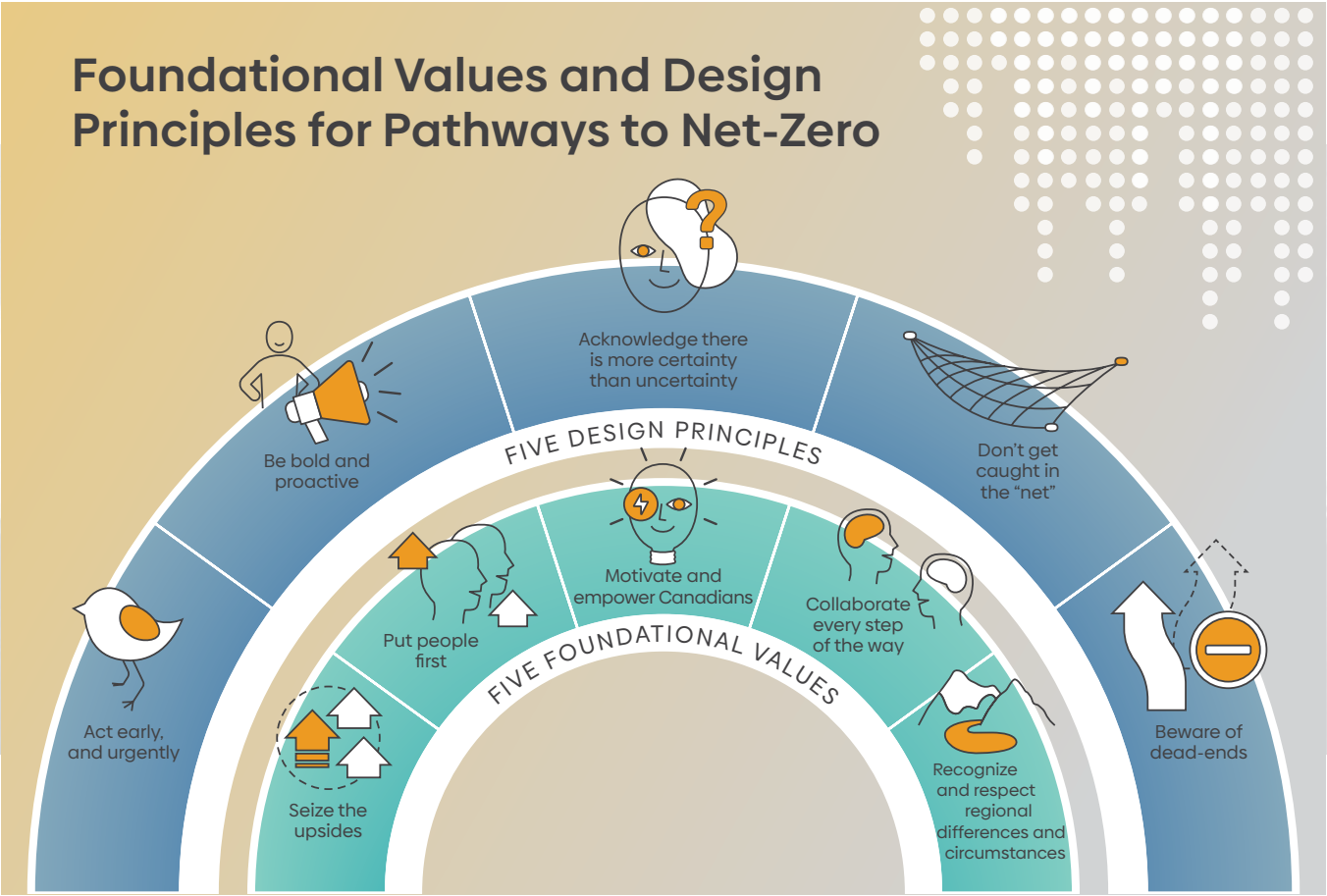
GHG emissions by economic sector, Canada, 1990 to 2019 (most recent data)

Canadian Environmental Sustainability Indicators: Greenhouse gas emissions (Table A.3)



APPROACH TO GOVERNANCE, BUILDINGS, AND TRANSPORTATION

In July 2021, the NZAB launched a work plan to begin developing independent advice on our lines of inquiry, taking into account our proposed priorities for **engagement**, **research, and analysis**, our **10 values and principles**, and our core definitions.



These 10 values and principles are referenced throughout this submission. We developed these to guide the development of transition pathways for Canada that are the most likely to achieve net-zero emissions by 2050.

What is a pathway?

A pathway connects where we are today with where we want to go. But it is not just a line on a graph. It captures the elements required to transform a system to better respond to societal needs and meet net-zero emissions goals. A pathway has a clear beginning and end, with connecting steps that will be refined over time.

What is net-zero?

As defined in the CNZEAA, net-zero emissions mean that "anthropogenic emissions of GHGs into the atmosphere are balanced by anthropogenic removals of GHG from the atmosphere over a specified period." Canada's net-zero commitment includes all forms of GHGs which are geographically bound to emissions generated within Canada, across all sectors. This definition is consistent with international GHG accounting standards in which each country accounts for emissions produced within its borders. Emissions from GHG-producing exports are accounted for in the country of use.

Throughout the summer and fall, we made significant progress on our mandate. We held constructive discussions through dedicated NZAB member subcommittees and targeted briefings with external experts. Consistent with discussions with the Minister of Environment and Climate Change, we sought to identify additional concrete steps that the Government of Canada could take to close the gap to achieve the 2030 emissions reduction target. As a result, our advice across the governance, buildings, and transportation lines of inquiry generally offers specific improvements to existing programs, or proposes new policies, programs, regulations, or other measures without being overly prescriptive on implementation.

2026 Interim Objective

The CNZEAA requires that the 2030 ERP include an interim GHG emissions objective for 2026. Respecting our preliminary mandate, the NZAB did not explore this matter. The NZAB's **five design principles**, however, offer insights into how the Government of Canada should set this interim objective.

APPROACH TO OIL AND GAS

Along with the other lines of inquiry, the NZAB originally explored additional concrete steps for the oil and gas sector to support the 2030 target. However, on November 1, 2021, we received a joint **letter** from the Minister of Environment and Climate Change and the Minister of Natural Resources. They requested specific advice from us on key guiding principles to inform the development of quantitative five-year targets for emissions reductions in the oil and gas sector. This request for advice was focused on reducing emissions associated with the production of oil and gas products, rather than their use, and, rather than reducing emissions specifically by reducing production. It was also specific to targets rather than caps. Twenty-one days after receiving this letter, we launched a dedicated public engagement period, largely focused on informing our advice on guiding principles for oil and gas targets.

With this context, our advice for the oil and gas line of inquiry is unique compared to the others. It responds to the request from

Engagement Process

To inform advice on Canada's 2030 ERP, the NZAB conducted various engagement activities throughout summer and fall 2021 and early 2022.

The NZAB:

- Heard from sector and scientific experts, decision-makers, the public, businesses and industry, and civil society organizations and associations, including those representing workers and Indigenous peoples.
- Hosted 15 discussions and briefings with decision-makers and sectoral experts.
- Received more than 1,200 submissions and comments via the NZAB's website.
- Held roundtables to learn from representatives of 58 organizations.

the ministers by outlining guiding principles for designing emissions reduction targets, as well as principles that will help set the conditions for success. Our submission also provides a consolidated list of the advice (Annex 1).

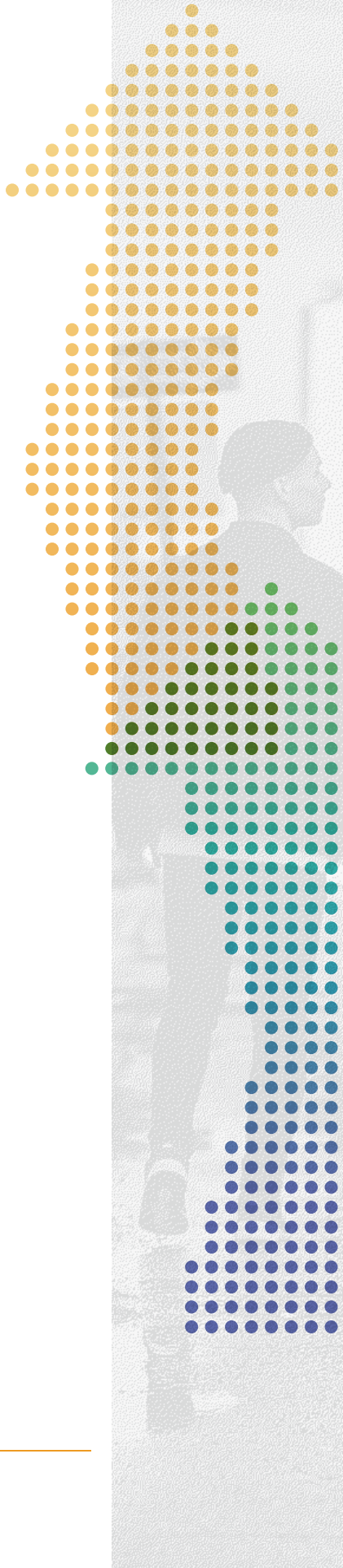
Our lines of inquiry cover extremely important, complex, and nuanced subjects. We set these lines of inquiry in July 2021, received the ministerial request for key guiding principles for oil and gas targets in November 2021, and were required to deliver this submission in time to inform the ERP. Given this limited timeframe, the advice in this submission should be understood as directional and subject to further refinement over time.

Canada's net-zero transformation calls for a new, systematic approach to decision-making in order to seize the benefits and minimize the costs. This transformation will require defining the desired end state, and then building toward it using a pathways approach. These pathways should avoid dead-ends and prioritize GHG emissions eliminations, not just emissions reductions, as expressed in our initial report: ***Net-Zero Pathways: Initial Observations***.

Consistent with our mandate, the NZAB will seek out solutions that move well beyond incrementalism. Doing so will require reimagining key assumptions, questions, and actors. The climate crisis and achieving net-zero is not just an environmental issue—it touches all parts of society. Getting to net-zero should catalyze rethinking approaches in key areas, including industrial policy, labour relations, reconciliation with Indigenous peoples, finance and trade, public engagement, and others.

As Canada's legislated advisory body on achieving net-zero, the NZAB will be providing independent advice for the next 28 years to guide decision-makers along the pathways to net-zero by 2050.

Governance Line of Inquiry



OVERARCHING ADVICE

We have preliminarily defined governance to include the institutional capacity, strategy, and relationships required—both inside and outside of government—to achieve net-zero emissions by 2050. Governance is about ensuring that everyone, including governments, industries, civil society, and citizens, understands their role and finds ways to achieve results. Shared leadership, where everyone contributes based on their responsibilities and areas of influence, is imperative to being on the most likely pathways to net-zero.

The imperative to **act early and urgently** must be supported and reinforced by effective governance structures and processes. There is scope to take additional steps to strengthen the alignment, culture, and structure of the Government of Canada to help the country achieve net-zero emissions. A key role of government is to demonstrate leadership and help create market certainty. Done effectively, this can catalyze private sector action at the scale required to achieve net-zero transformation. Ongoing government action will be needed to push, monitor, and assess progress.

Setting the right governance framework is also critical to ensure the country as a whole is positioned to **collaborate every step of the way**. Building on established processes, the Government of Canada should ensure that appropriate governance and accountability measures are in place to work effectively with other jurisdictions. Drawing on the expertise of local, provincial, territorial, and Indigenous governments will help ground-truth proposed net-zero pathways. A governance framework should ensure diverse perspectives are represented in this work.

Data, modelling, and analysis are crucial to measure progress, **avoid dead ends** and **seize the upsides** of the transition to net-zero. There are plentiful sources of science, data, and Indigenous Knowledge that highlight the severity of climate change impacts. There is a strong basis of evidence to support achieving deeper emissions reductions and eliminations across all sectors. We see potential to strengthen the quality and transparency of key emissions data, including the way data is collected, organized, and used. We also see potential to strengthen the alignment and transparency of models that inform analyses, modelling, and associated decision-making.

ADVICE FOR 2030:
STRENGTHENING GOVERNANCE FOR LIKELY PATHWAYS TO NET-ZERO BY 2050

1. **Direct that all federal agencies, departments, and Crown corporations publicly articulate their role in helping Canada achieve net-zero emissions**
   Require that every federal entity (department, agency, Crown corporation) critically assess what role it will play in helping drive Canada to a net-zero state. The intent is to ensure that the full breadth of federal organizations share the leadership responsibilities to attain net-zero. The assessments should be public, conducted on a common framework to allow comparisons among organizations, and include an assessment of required changes – up to and including strategic and legislative changes – that would equip the organization to play a more active role in the drive to net-zero.

2. **Mandate that all executives in the Government of Canada must take a course on climate change and net-zero**
   Focus existing budgets and service providers to require new mandatory training for the approximately 7,000 federal executives. This education should ideally be available by the end of 2022 and follow the public reports in Advice 1. The training should be explicitly grounded in the best available science, Indigenous Knowledge, leading reports and projections, as well as in the values and principles outlined in our report, ***Net-Zero Pathways: Initial Observations***.

3. **Prioritize the development of a climate change data, insights, and monitoring digital platform by the end of 2023**
   Build a comprehensive, publicly available digital platform to track and report on emissions data and key net-zero indicators for every major GHG emissions source and sink in Canada. This initiative should use innovative technologies that can provide close to real-time emissions data and accounting. This should drive governance and compliance, as well as track progress and offer rich insights to support decision-making. This platform should be treated as the authoritative source from a Canada-wide perspective and draw on the expertise of government, academia, civil society, labour, and industry. While the design, scope, and function will need to be designed for the Canadian net-zero context, existing examples of databases may be helpful guides, including from the International Energy Agency, the World Bank, the International Monetary Fund, and ubiquitous platforms such as the Google Environmental Insights Explorer.

4. **Ensure that the models and analytical approaches used to project and assess Canada's progress toward emissions reduction targets are transparent, robust, and coordinated**
   Trusted data, analysis, and modelling derived from complete and verifiable measurements are the foundation of our ability to develop the most likely pathways to net-zero, assess progress, and adjust trajectories accordingly. Current analysis and modelling are robust enough to compel early and urgent action. Nevertheless, we see opportunities to enhance the availability, verification, use, and transparency of analysis and modelling to strengthen Canada's modelling capacity and identify scaled-up action with more confidence over the medium and long-term. Governments, industry, and third-party experts from various fields, like labour, science, and economics, can work together more effectively if they have access to authoritative, transparent, and comparable modelling, analysis, and data. We intend to conduct further inquiries on these areas in 2022.

5. **Improve the coordination of engagement processes**
   Better connect and integrate the numerous consultation and engagement processes required to develop and implement climate action priorities, as well as their supporting communications strategies. This would reduce the risk of consultation fatigue for stakeholders and key partners such as Indigenous governments, ensure linkages across initiatives, and promote opportunities for joint action.

6. **Improve net-zero communications**
   Develop a public awareness and promotions campaign to help shift social norms toward net-zero, with a focus on consumer preferences. The individual choices of Canadians can make a significant difference to the emissions from key sectors, including transportation, buildings, and others tied to personal decision-making. A net-zero communications campaign will require the participation and engagement of other orders of government, the private sector, non-profit sectors, and communities. To be tangible, it should highlight the environmental impact of different existing technologies or personal choices, as well as the co-benefits of net-zero actions, including sustainable growth in new areas of the economy, reduced air pollution, improved health outcomes, and less urban noise. For example, electric vehicles have captured the imaginations of Canadians – the same could happen with air and ground source heat pumps with the right leadership, incentives, and education. Automakers could be encouraged to include messages in their advertisements to prioritize walking or cycling for short distances, learning from France's regulation that requires automakers to include messaging in vehicle advertisements about sustainable transportation options.

7. **Leverage intergovernmental platforms to identify gaps and overlaps in government actions and promote net-zero solutions**
   Facilitate further action through intergovernmental discussions with the aim of working toward common net-zero solutions. The Canadian Council of Ministers of the Environment, the Energy and Mines Ministers' Conference, and coordination between relevant advisory bodies at the national, provincial, and territorial levels could be central to these efforts.

8. **Develop a net-zero workforce**
   Act as a catalyst for the leadership of provinces and territories, colleges and universities, unions, industry, and other education providers, to ensure Canadian workers are set up to succeed in the net-zero economy. For example, and consistent with our lines of inquiry, advancing zero-emission vehicles (ZEVs) and net-zero buildings will require new or enhanced value chains that will create substantial new employment opportunities. To transition to these jobs, many Canadian workers will need new skills. Training for new workers, retraining for experienced workers, requalifying skills as new technologies emerge, and designing entirely new training programs will all be essential elements. The oil and gas workforce is likewise positioned to further contribute to net-zero as noted in *Advice 36*.

Buildings Line of Inquiry

Key Facts

The buildings sector includes commercial, institutional, industrial, and residential buildings.[1]

12%

In 2019, the buildings sector was the **third-highest source** of GHG emissions, responsible for 12 percent (90.7 megatons CO_2 eq.) of total national emissions.

18%

This number increases to **18 percent** when direct emissions from fossil fuel energy, non-energy emissions and indirect emissions from electricity use are included.

Buildings sector emissions would grow further if embodied carbon emissions in building materials were included.

OVERARCHING ADVICE

Buildings are long-term assets, which means that what is built or renovated today will still likely exist in 2050 and beyond. It is necessary to **act early and urgently**, shifting from the incremental approaches currently in place to a transformational approach. This will help **avoid dead-end solutions** that make the pathways to net-zero more difficult, by locking in building infrastructure, systems, and technologies that will need to be replaced or retrofitted again. It is likewise imperative to **avoid getting caught in the "net"**. The buildings sector must get as close to zero emissions as possible by 2050.

Fortunately, **there is more certainty than uncertainty**. The technologies needed to increase efficiency and replace fossil-fuel-based heating exist today. We know that achieving net-zero in the buildings sector will require scaling up in solutions in four areas: (1) net-zero energy sources to support eliminating fossil fuel combustion for heating; (2) efficient building envelopes; (3) efficient appliances and systems within buildings; and, (4) the use of low carbon and net-zero building materials. Given the existing technical solutions and potential for emissions reductions, the buildings sector is well positioned to make a significant contribution to reaching Canada's 2030 GHG emissions reduction target.

We also know that there are many **upsides to be seized** in retrofitting and building for net-zero, including the creation of new skilled jobs, adaptation to climate change, and human health benefits. There are clear paths forward to **motivate and empower Canadians** to see building retrofits as a concrete form of climate action with many co-benefits, including increased resilience to extreme weather events.

[1] *The NZAB's discussions and engagement have focused mostly on commercial and institutional buildings. Residential and industrial buildings may be explored further in future NZAB work.*

Efforts to decarbonize the buildings sector must move hand-in-hand with measures to improve the affordability of housing and energy to **put people first**. This means integrating the objectives of achieving net-zero, increasing the availability of affordable housing, and addressing energy poverty across all programs.

While moving quickly to implement what is known to work, the private and public sectors also need to be **bold and proactive** to swiftly develop and deploy innovative technologies to transform areas of uncertainty. This includes deploying readily available and affordable net-zero building materials and non-emitting heating options for buildings in the coldest climates.

Solutions will not be the same for all buildings. Strategies and technologies must reflect **regional differences and circumstances**. Heat pumps that run on clean electricity appear best placed to provide heating and cooling in many regions; however, district energy systems, biomass, and hydrogen - as a zero-emission fuel at the point of use - may be viable solutions to explore in particular contexts. First Nations, Métis, and Inuit must be involved in developing such solutions for their Nations in line with their rights and respecting Indigenous Knowledge. Northern, rural, and Indigenous communities will require dedicated solutions given their overall greater reliance on diesel, existing challenges with housing stock, differing ownership structures, and geographic considerations such as permafrost.

ADVICE FOR 2030: PUTTING THE BUILDINGS SECTOR ON THE MOST LIKELY PATHWAYS TO NET-ZERO BY 2050

9. Adopt a pathways approach in the proposed National Net-Zero Emissions Building Strategy

Begin the National Net-Zero Emissions Building Strategy, referenced in the Minister of Natural Resource's mandate letter, by backcasting from the objective of net-zero in 2050 to determine what policies, regulations, and funds will be needed, and on what timelines. For example, this exercise could look at the average lifespan and investment cycles for building systems for different classes of buildings and use this information to reverse-engineer policies and regulations.

10. Use regulations to send clear signals and provide certainty about the trajectory of building decarbonization

Adopt regulatory actions to send clear signals about the scale and pace of transition required. This should include restricting the sale of lower efficiency appliances and fossil fuel heating systems after a certain date and establishing mandatory building GHG emissions and energy efficiency standards. Lessons can be learned from similar approaches used to get the most-polluting passenger vehicles off the road.

Provide the necessary flexibilities for many isolated, northern communities, and Indigenous governments given their unique circumstances. Provide limited exemptions for buildings that cannot reasonably be retrofitted without undue damage, like heritage buildings.

Review existing goals or targets for 2030 such as the **Market Transformation Roadmap** to assess the level of ambition and formalize these goals or targets when necessary to ensure better alignment.

11. Accelerate and streamline the publication and adoption of national model building codes

Work closely with provincial, territorial, municipal, and Indigenous governments, consistent with the **mandate letter to the Minister of Natural Resources**, to accelerate the process of developing and adopting a net-zero emissions building code and a model retrofit code no later than 2024. Appropriate federal support and funding should be provided for implementation and compliance, including to help access other sources of funding.

Ensure the process to develop future iterations of the national model codes is faster and more responsive. The National Research Council, which leads this work for the Government of Canada, could be given a stronger mandate to define net-zero emissions building performance standards and lead their inclusion in national model codes.

Make new model codes performance-based and include GHG emissions reductions and EV requirements in addition to energy use. Model codes should disallow the use of fossil fuel combustion for heating and cooling in new buildings.

12. Use complementary policy tools to incentivize action in the buildings sector and reward success

Implement a range of instruments such as tiered codes, performance standards, guidelines, and benchmarking and labelling programs. The objective should be to incentivize early adoption and ambition beyond the minimum requirements established in the national building codes.

13. Prioritize transition of heating systems while ensuring the stability of the electrical grid

Recognize that efficiency improvements alone are insufficient to reach net-zero and that they should be undertaken to enable the ultimate elimination of fossil fuel combustion-based heating.

Prioritize funding from federal retrofit programs for applicants who are switching from fossil fuel-based heating systems and/or can demonstrate a clear plan to do so in the future.

Ensure there is a full understanding of how heating systems will impact electricity grids, taking into account the increased electricity demand. Ensure there is also an understanding of the factors that may help minimize the impact, such as efficiency improvements, improved energy storage, and innovative demand-side technologies.

14. Increase the ambition of federal actions on property and fleet operations

To demonstrate leadership, **greening government targets** for federal buildings can be made more ambitious. This includes the targets for real property (currently a 40 percent reduction of scope 1 and 2 GHG emissions by 2025 and ten percent every five years thereafter), for leased office spaces (currently 75 percent in net-zero carbon buildings

by 2030), and fleet operations (implementing the commitment to electrify all federal light-duty vehicles by 2030). These targets should be applied to all federal departments, agencies, and Crown corporations.

Ensure all retrofits of federal buildings and new builds meet the highest tiers of the proposed national model codes, require zero-carbon or zero-carbon ready space and hot water heating systems, be electric vehicle-ready, and prioritize the procurement of Canadian-made net-zero technologies and materials, including the use of wood products, as well as low-carbon steel and cement. The Government of Canada has an important role to play in demonstrating and growing the market for these innovations.

Require that all vehicles procured by the Government of Canada, including leased vehicles, be zero-emission.

Provide vehicle charging hubs on federal lands, such as post offices, airports, ports, and rail yards.

15. Integrate net-zero requirements into all building-related federal funding opportunities

Use funding for new buildings from federal departments, agencies, and Crown corporations to immediately prioritize net-zero projects. The goal should be that all federal funding for new buildings is directed to net-zero projects by 2025. Net-zero requirements should include energy performance, non-emitting energy sources, use of low embodied carbon in materials, and integration of ZEVS. For example, current energy efficiency requirements for projects funded under the National Housing Strategy's **Rapid Housing Initiative** could be expanded in line with achieving net-zero.

16. Encourage the use of a "shadow carbon price" to show the cost savings of retrofits

Support the development of new tools to enable all building owners and operators to be able to apply a 'shadow carbon price',[2] drawing on best practices from the **Greening Government Strategy**. This could be accomplished by providing information and tools that allow Canadians to calculate and see the business case for retrofits over time, as the price increases.

17. Seek out opportunities to decarbonize multiple buildings at once

Scale solutions and attract investment for deeper retrofits across multiple units. Such solutions are particularly viable for public institutions that have a large number of buildings in their portfolios, often concentrated in a small number of locations, such as ports, military facilities, or university and hospital campuses. These institutions can more easily take advantage of solutions such as district-level energy systems.

Evaluate the resourcing, accessibility, and depth of GHG emissions reductions achieved by the Canada Infrastructure Bank's **Commercial Building Retrofits Initiative**, consistent with the objective to aggregate projects. This will help determine if it is effective and how other programs could be designed to support the widespread decarbonization of large buildings.

[2] *A notional market price used for internal financial analysis and decision-making.*

Explore new business models for accelerating and coordinating retrofits in the residential sector, which would provide support and coordination services to help homeowners choose and navigate deep retrofits from start to finish.

18. Evaluate federal decarbonization programs for residential buildings to ensure maximum effectiveness and equity

Evaluate federal programs that support building retrofits to assess the success in reducing actual GHG emissions.

Develop federal programs and leverage existing provincial programs to be accessible to lower-income Canadians who are the most likely to experience energy poverty. These programs may involve more upfront grants, higher-value grants, and dedicated efforts at community outreach.

19. Support the development of innovative net-zero technologies for the buildings sector

Orient federal research funding related to buildings and construction toward defining and developing net-zero systems, materials, and production methods. It should include modelling the emissions of embodied carbon reductions these activities are expected to generate.

Conduct a full analysis of existing programs and gap areas to identify where more innovative models or supports are needed to develop and deploy net-zero technologies, with the goal of releasing a report with recommendations by 2023.

Transportation Line of Inquiry

OVERARCHING ADVICE

Canada needs to **act early and urgently** to decarbonize transportation, especially on-road transportation as it is the largest source of transport emissions. This will ensure that the transportation sector can meaningfully contribute to Canada's 2030 emissions reduction target and to set the sector on a path to net-zero emissions by 2050. To get to net-zero and **avoid dead-ends**, the transportation sector will need to pursue the following hierarchy of solutions: (1) reduce internal combustion engine (ICE)-driven trips and distances travelled, especially for personal transportation; (2) transfer to zero-emission and more communal and active modes; and, (3) improve the performance of vehicles. In most cases, these solutions are intermediate steps toward a broader transition that eliminates reliance on GHG emitting forms of transportation to the greatest extent possible.

It is critical to **motivate and empower Canadians** to reduce the number of single-passenger trips in motorized vehicles, and choose active and public transportation options by developing smart, optimized options for mobility. There are social, health, and environmental benefits to switching to collective and active modes of transportation.

In the light-duty vehicle sector (i.e., passenger cars, SUVs, small trucks), **there is more certainty than uncertainty**. The future of light-duty vehicles is electric—not hydrogen or internal combustion engines (ICE) that run on biofuels. Current and proposed federal measures for light-duty vehicles to be zero-emission are on the right track if effectively implemented. However, more needs to be done to **seize the upsides**, ensuring that Canada remains economically competitive in electric vehicle supply chains. The respective roles of

Key Facts

The transportation sector includes passenger, freight, and other types of transport for recreational, commercial, and residential uses.

The transportation sector was the **second-largest source** of GHG emissions, accounting for

25%

(186 megatonnes of CO_2 eq) of total national emissions.

Between 1990 and 2019 GHG emissions from the transport sector overall grew by

54%

Passenger transport grew by

38%

percent overall (cars emissions declined by 21 percent while light trucks, including trucks, vans, and sport utility vehicles–more than doubled).

Freight grew by

153%

governments and the private sector will need to be carefully considered in strategies (e.g., within a national industrial strategy for the sector) that most effectively spur supply chain investment.

In the heavy freight sector, it is time to be **bold and proactive**. Heavy-duty vehicles have long lifespans, and the technologies to reduce or eliminate emissions are not as mature as with passenger vehicles. Decreasing emissions from freight transportation in time to help contribute to Canada's 2030 emissions reduction target will be difficult and will require a step up in ambition, strategy, and investment. Similarly, the role of battery electric versus hydrogen heavy freight vehicles in a net-zero future will need to be more carefully explored.

Bold and proactive industry actions should be catalyzed by vehicle mandates, growing ZEV markets, and increased investment.

Industry efforts need to acknowledge there is **more certainty than uncertainty** along the pathways for the transportation sector to achieve net-zero.

The implementation of transportation decarbonization strategies will require adapting to **regional differences and circumstances**, including population growth, density distribution, infrastructure availability, local economies and climates, and grid capacity and resilience.

Electricity produced and distributed in Canada will need to be net-zero by 2035 to align with key milestones in the International Energy Agency's Net-Zero by 2050: A Roadmap for the Global Energy Sector report, and be reliable, and reasonably priced. Economically priced hydrogen solutions at scale will also be needed for a net-zero transportation system.

ADVICE FOR 2030: PUTTING THE TRANSPORTATION SECTOR ON THE MOST LIKELY PATHWAYS TO NET-ZERO BY 2050

20. Grow public transportation options

Use federal transit funding to encourage municipalities to implement safe, accessible, and equitable transit projects and transportation mode shift policies. Examples include parking disincentives, walking/cycling corridors, and fare integration.

Establish mechanisms to recover and grow communal transportation options, especially for underserved communities, such as incentives for transit use (e.g., subsidized passes) and car-sharing / bicycle-sharing.

Mobilize investments for intercity fast rail transportation and/or public bus transit. Initial investments for electric rail should consider the cost of rollout and be sequenced based on population distribution and project potential to maximize emissions reductions.

Explore 'mobility as a service', as it has the potential to integrate multiple transportation options into an on-demand service, leverage smart and connected systems, and reduce the need for car ownership and the number of kilometres travelled.

21. Regulate more ZEV vehicle sales as soon as possible

Regulate a sales mandate that requires at least 50 percent of all new light-duty vehicle (i.e., passenger cars, SUVs, small trucks) sales be ZEVs in 2030 as an interim step toward achieving Canada's mandatory target of 100 percent by 2035.

Engage with the United States and vehicle manufacturers to ensure that mandated levels of ZEV vehicle supply are met.

Align regulations with the most ambitious jurisdictions in the United States.

Regulate an interim sales mandate for zero-emission medium-and heavy-duty vehicle sales, on the pathway to 100 percent by 2040.

Develop and communicate an appropriate enforcement regime to ensure compliance.

22. Implement and expand measures that support electric vehicle uptake

Ensure North American common standards for electric vehicle charging infrastructure and for electric vehicle plugs are set.

Work with key partners to ensure that including standardized electric vehicle charging infrastructure for passenger vehicles is a required element in new buildings and major retrofits, consistent with Advice 11 and 14 on net-zero and retrofit building codes.

Identify new mechanisms for mobilizing capital for EV infrastructure and fleet transition, including by leveraging private sector investments. Advance mechanism development in step with the financing of net-zero ready buildings, as discussed in Advice 18 and 19.

Maintain electric vehicle purchase incentives with the addition of used electric vehicle eligibility and targeted incentives for low-income households and strategic vehicle types—ferries, city and school buses, garbage trucks, emergency vehicles, and others—to enhance affordability until price parity with ICE vehicles is achieved. ZEV alternatives like e-bikes, e-motorcycles, e-scooters, and e-snowmobiles should be considered for incentive eligibility.

Give special consideration to the barriers (e.g., charging infrastructure availability, affordability, regional climates) to ZEV uptake in underserved neighbourhoods and in rural and remote regions. An analysis of proposed solutions (e.g., plug-in hybrids, geographic charging infrastructure targets) should be examined with community input while focusing infrastructure investments in the areas that maximize emissions elimination.

Recognize that unique solutions (e.g., electricity and zero-emissions fuels) will need to be developed and made available in regions, particularly in Indigenous, northern, and remote communities. Unique solutions will also be needed in transportation subsectors where electricity cannot be provided for electric vehicles and where there is a large distance between remote communities.

23. Encourage ZEV adoption

Consider adopting an approach that combines financial incentives for the purchase of ZEVs with fees for the purchase of fuel-inefficient ICE vehicles.

Broaden Canada's existing **Green Levy (Excise Tax) for Fuel Inefficient Vehicles** to include additional ICE vehicle types, such as pickup trucks. A sliding scale for the implementation of this Green Levy should be developed based on the emissions produced from different vehicles. Revenue from a broadened Green Levy could increase available funding for ZEV incentives for individuals and organizations without limiting the fleet size and while encouraging smaller vehicles of all fuel types.

Carefully consider the impacts on and supports for low-income households and other vulnerable populations when exploring changes to the Green Levy and ZEV incentives.

24. Expand the strength and scope of the Clean Fuel Standard

Expedite the implementation and evolution of the Clean Fuel Standard to ensure it continues to drive technology development, and to follow global fuel regulation best practices. This will also prioritize downstream emissions reductions over upstream emissions reductions (e.g., fossil fuel production and processing) to cover a broader range of fuels (e.g., jet and bunker fuel) in future updates to the standard and to establish targets beyond 2030.

Optimize the Clean Fuel Standard so it not only reduces the emissions intensity of ICE vehicles during the transition but also serves as an additional catalyst for electric vehicle production and uptake.

25. Take a supply-chain lens to help the auto sector transition

Develop an industrial roadmap for building out Canada's ZEV and charging infrastructure supply chains. This will require the development and implementation of the "Mines to Mobility Strategy" and a "Critical Minerals Strategy," to support the private sector in building up Canada's battery supply chain from mining to end-of-life recycling.

Launch a Canada-U.S. Battery Alliance. This would provide a formal structure for stakeholders in both countries to identify shared priorities and requirements to lead to an integrated, world-scale battery supply chain. This initiative would advance the objectives of the "Mines to Mobility Strategy," and support ongoing, close integration of the Canadian and U.S. automotive sectors in a net-zero future.

Ensure that these strategies are developed in partnership with municipal, provincial, territorial, and Indigenous governments with prioritization of community interests and benefits and Indigenous rights in Canada and abroad.

Demonstrate leadership in battery research, manufacturing, and lifecycle circularity to improve battery performance and environmental impact, and to build a competitive advantage.

Offer incentives and subsidies to companies contributing to Canada's ZEV and charging infrastructure to reinforce and secure local supply chains.

26. Ensure sufficient investment for zero-emissions heavy freight

Redirect all current innovation investment and effort focused on diesel-based engines and efficiency improvements, to electric and hydrogen (or hydrogen biofuel – diesel and hydrogen) heavy freight mobility systems.

Support private sector success by ensuring federal program objectives and funding envelopes are well integrated to build out coherent systems and value chains for both electric and hydrogen-based freight.

Invest in specific new and extensive net-zero research and development for medium and heavy-duty vehicles, as well as their charging and fuelling infrastructures.

Test technologies and decarbonization innovations for long-haul trucking, rail, marine, and aviation subsectors now, and provide education to ensure operators are aware of opportunities.

Commission research and fund pilot projects on the implementation of hydrogen technologies in subsectors of aviation, marine, and heavy long-haul trucking routes where electrification is not feasible.

27. Drive innovation to reduce emissions in aviation and marine subsectors

Accelerate efforts to support global work to reduce emissions in the marine and aviation sectors.

Build on federal programs such as the **Hull Design Efficiency Challenge** and **The Sky's the Limit Challenge** to invest in reduced and zero-emission marine and aviation technologies and fuels.

Oil & Gas Line of Inquiry

Key Facts

26%

The oil and gas sector is the largest source of GHG emissions—it represents 26% of Canada's total GHG emissions (191 megatonnes of CO_2 eq, in 2019)

87%

GHG emissions from the oil and gas sector have increased by 87 percent over the past thirty years.

What is clear is that the oil and gas sector has a major role to play if Canada is to achieve its net-zero ambitions by 2050.

In November 2021, at COP26 in Glasgow, the Prime Minister announced Canada's intention to cut and cap GHG emissions from the oil and gas sector. Leading organizations that represent Canada's oil and gas sector, including the Canadian Association of Petroleum Producers and the Oil Sands Pathways to Net-Zero initiative – an alliance between Canada's six largest oil sands producers – had already signalled their support to attain net-zero emissions by 2050 prior to this announcement.

It is within this context that in fall 2021 the federal Minister of Environment and Climate Change and the Minister of Natural Resources **asked** the NZAB to develop key guiding principles to inform the development of the Government of Canada's quantitative five-year targets for emissions reductions in the oil and gas sector.

This section of our ERP submission fulfils the ministers' request. As with all the NZAB's work, these key guiding principles build on the ten values and principles from our inaugural publication: ***Net-Zero Pathways: Initial Observations***. They are designed to apply to scope 1 and 2 emissions from the oil and gas sector. Applicable scope 3 emissions are addressed through other NZAB lines of inquiry. Consistent with the CNZEAA definition of net-zero, exported emissions are excluded.

The oil and gas sector can be subdivided into **three stages of production** (upstream, midstream, and downstream), with significant differences within and between them.

There are 3 scopes of emissions in the sector:

- **SCOPE 1** emissions originate directly from sources that are owned or controlled by a sector (i.e., combustion, process, and fugitive emissions);
- **SCOPE 2** emissions are those generated indirectly; and,
- **SCOPE 3** emissions are indirect emissions resulting from an organization's operations (i.e., emissions from supply chains). These emissions are often combusted in other sectors or other jurisdictions (e.g., exported crude oil; gasoline in internal combustion engine vehicles).

In crafting these guiding principles, we were conscious of the tension between the fact that the oil and gas sector has made, and continues to make, significant contributions to the Canadian economy, yet is a large and growing emitter, all while domestic and global demand for most oil and gas products are predicted to dramatically decline. Furthermore, in a net-zero world, the competitiveness of oil and gas companies is expected to be tied to the carbon intensity of their products. Companies with the lowest carbon intensity products are expected to hold a larger market share in a declining global market.

Economic Contributions

- The oil and gas industry **contributed**

$118 billion

(or 5.7%) to Canada's GDP, employed over

178,500 workers

and exported

$86 billion

(or 16%) of domestic products in 2020.

- There were nearly **1,200 companies** involved in just the extraction of oil and gas in Canada in 2020:
  - 63% had fewer than five employees
  - 35.8% were small and medium-sized companies
  - 1.2% were large employers with more than five hundred employees
- The industry **supports** an estimated additional 2,711 supply and services companies outside of Alberta.

Demand Forecasts

The Canada Energy Regulator has **predicted** that demand for Canadian natural gas will decline from around 13 Bcf/d in 2021 to 8.5 Bcf/d in 2050. Even under a scenario in which the world fails to avoid more than a 1.5 °C increase in warming, demand for Canadian natural gas will decline.

While the International Energy Agency (IEA) has **forecasted** that global demand for oil and gas over the next 5 years will decline, short-term volatility in energy supply and demand is occurring during the economic recovery from the pandemic and in combination with new geopolitical tensions.

In a world where warming does not exceed 1.5 °C, the IEA forecasts that by 2050 global demand for gas will **decline by 55%** to 1,750 billion cubic metres, and demand for oil will **decline by 75%** to 24 million barrels per day (mb/d), from around 90 mb/d in 2020.

A common theme across all credible forecasts is that both domestic and global demand for oil and gas will decrease markedly over the next three decades. The trend over time is for demand scenarios to be revised downward, particularly as policy and regulatory signals around the world increase in stringency.

KEY GUIDING PRINCIPLES TO INFORM THE DEVELOPMENT OF QUANTITATIVE FIVE-YEAR TARGETS FOR THE OIL AND GAS SECTOR

PRINCIPLES FOR TARGET DESIGN

28. Do not set targets in isolation

Targets for the oil and gas sector should be set using a whole-of-economy lens

Emissions reduction targets for the oil and gas sector must be set in the context of broader efforts to reduce emissions from the Canadian economy by 40 to 45 percent below 2005 levels by 2030. Should the oil and gas sector not meet these GHG emissions targets by 2030, other sectors would be required to do even more for Canada to achieve its target, or other approaches like carbon removal would need to be invoked. Oil and gas sector emissions reduction targets should be coherent with national targets and should be made legally binding.

29. Set clear boundary conditions for success

Targets for the oil and gas sector should include clear parameters for the acceptable application of offsets, consistent with a credible net-zero plan for Canada

As stated in our inaugural report, **Net-Zero Pathways: Initial Observations**, the most likely net-zero pathways prioritize emissions eliminations and reductions. Removals and offsets should only be used as a last resort. If offset strategies overlap with other sectors' decarbonization plans, Canada may end up with a series of net-zero sectoral plans that do not actually achieve net-zero on an economy-wide basis. We advise strongly against policies that allow one sector to claim emissions reductions in a different established sector for which credible options already exist to eliminate emissions with no offsets required.

30. Recognize that fair may not mean equal

Targets for the oil and gas sector should apply to the entire oil and gas sector while avoiding a 'one-size-fits-all' approach

The oil and gas sector is diverse. Targets should be applied across all parts of the sector (e.g., up-, mid-, and down-stream) and to all firms (e.g., large, medium, and small). However, the diversity in sector structure may require a careful sequencing of targets or an approach that establishes different targets that factor in parameters such as company size or position in the value chain. While this implementation flexibility is consistent with the concept of net-zero, it is not intended to provide leniency for continued emissions. Successive reduction targets applied diligently, but flexibly.

31. Set and implement without delay

Targets for the oil and gas sector should be announced and come into force as soon as possible

Acting early and urgently through target setting is a powerful way to stimulate deep reductions and eliminations of GHG emissions while providing greater market certainty with clear policy signals. In order to provide certainty and give industry as much time as possible to comply, the Government of Canada should publicly announce the targets in

the 2030 ERP. Communicating early will give the policy and regulatory certainty requested by the oil and gas sector and the investment community.

32. Align the timing of targets with implementation feasibility

Targets for the oil and gas sector should consider that aggressive target-setting in some cases will not allow linear progress between now and 2030

Important prospective solutions to reduce GHG emissions at scale in the oil and gas sector, like carbon capture and storage, require large capital projects that take time to plan, approve, and build. While it is unrealistic to expect these solutions will be online by 2025, it is realistic to assume that they could be built and operating by 2030. Other emissions reduction solutions, like those targeting methane fugitive emissions, can be implemented now to potentially contribute to reducing emissions in 2025 but especially for 2030. Taking solution implementation feasibility into account when setting 2025 and 2030 targets is necessary.

33. Prioritize the largest sources of emissions

Targets for the oil and gas sector should focus on the biggest impacts

Targets should be applied aggressively and confidently to the most significant sources of GHG emissions. This generally aligns with the areas of the broader oil and gas sector that are the most equipped to achieve emissions reductions (e.g., larger firms), and with strategic targeting of methane emissions reductions because of its potency and availability of reduction approaches. Stratified application of emissions reduction is an accepted practice in Canada and has already been applied by the Government of Alberta in its TIER system.

When it comes to methane, Canada should explore the feasibility of achieving greater than 75 percent reductions by 2030 to limit added global warming potential, have methane reductions play a greater role in achieving the Canadian 2030 emissions reduction target, and potentially create international business opportunities for Canadian innovation and technology.

34. Drive new and more ambitious actions

Targets for the oil and gas sector should be ambitious and require new actions that go beyond what is already contemplated using existing proven solutions

Regulatory targets drive innovation. Targets should lead to a scale of emissions reductions that would not otherwise have occurred. At the same time, targets must be realistic and credible, while pushing the sector to go further than it would otherwise. Targets should result in visible leadership, innovation in technology and business models, and new investments. It is acceptable to set emissions reduction targets in the future for which there is not currently complete certainty on how to attain the target. The further away the target is (e.g., 2030 versus 2025 or 2026), the more this principle applies.

PRINCIPLES TO SET THE CONDITIONS FOR SUCCESS

35. Prioritize people and communities

Targets for the oil and gas sector should be accompanied by measures to directly address the needs of Canadian citizens

Achieving ambitious targets for the oil and gas sector will have impacts on Canadian workers, families, and communities—especially those who are directly connected to the oil and gas sector. Canadians affected will need to see and benefit from on-the-ground supports through accessible, targeted, supports (e.g., education, retraining, reemployment, retirement). Reducing GHG emissions is a shared responsibility, and so too is supporting those affected. Companies have as big a responsibility to support worker transition as governments do. Companies, governments, and unions all have a role to play. Smart, whole-economy industrial policy integrated with workforce planning could support clearer direction for energy-reliant communities, position Canada to capitalize on the clear economic opportunities associated with the global transition to a net-zero state and provide optimism about the future.

36. Provide certainty while continuously improving data and monitoring

Targets for the oil and gas sector should ensure regulatory certainty while continuing to improve data and monitoring at the same time

There is sufficient data to confidently set meaningful targets and provide predictability to the oil and gas sector. However, the best available science is showing that actual emissions are higher than those reported using current standards and accepted emissions accounting methodology. While continuous improvements to monitoring should be a priority and aligned with international standards, any resulting refinements in data should not result in changes in targets for 2025 or 2026, and 2030. This could undermine market certainty and deter action. Improved data and monitoring should be pursued to inform new policies, programs, and future targets beyond 2030. If new data provides significantly different data, any target adjustment should be done transparently and cautiously.

37. Show accountability through reporting

Targets for the oil and gas sector should be supported by better reporting that is accessible to Canadians

Enhanced and transparent reporting on progress will help Canadians see where and when emissions are reduced, and how industry is performing relative to targets. Innovative reporting methods, such as a public dashboard that collects and reports real-time data, should be implemented. Under all scenarios, reporting should be easy to understand to enable external groups and the public to track progress in a timely manner and hold industry and government to account. Doing so will help to build public trust in emissions reduction efforts.

38. Reinforce and strengthen existing regulations

Targets for the oil and gas sector should be achievable in part through the stronger application of carbon pricing

Carbon pricing[3] is designed to change the Canadian economy. It incents investment in net-zero-compatible services and products. The price on carbon—escalating to $170 per tonne CO_2e by 2030—should make net-zero solutions more economic compared to higher polluting alternatives. Although subject to the realities of a mature democracy where policies can change, the established carbon price schedule can provide investment certainty, increasing private sector investment. If the pricing system were to be applied across the oil and gas sector, with important adjustments to the exemptions that currently exist, it will help facilitate the GHG emissions reductions necessary to meet the targets. Removing loopholes would unlock the potential of carbon pricing. The economic conditions that are created by these regulations will lead to a stronger impetus for the oil and gas industry to direct more resources toward cleaner oil and gas production processes and produce low or zero scope 3 emission products that are fully compatible with a net-zero economy.

39. Provide only responsible supports to industry

Targets for the oil and gas sector should be accompanied by highly strategic public support for industry

When considering where and how to responsibly allocate its limited resources, the Government of Canada has a role in helping set the conditions for achieving net-zero emissions for the entire economy, not just the oil and gas sector. This means industry support measures will have to be rethought to bring them in line with net-zero goals, including through revision of indicators of success, apportionment, and more. It will be critical to provide targeted support to develop product mixes and business models that will help transform or create sectors across the economy that are critical to, and will permanently thrive in, a net-zero world. This approach should apply across Canada's current economy, including the existing oil and gas sector. To this end, government financial support should be provided only for the purpose of reducing GHG emissions intensity of oil and gas production, where oil and gas will be used in a way that yields no combustion scope 3 emissions.

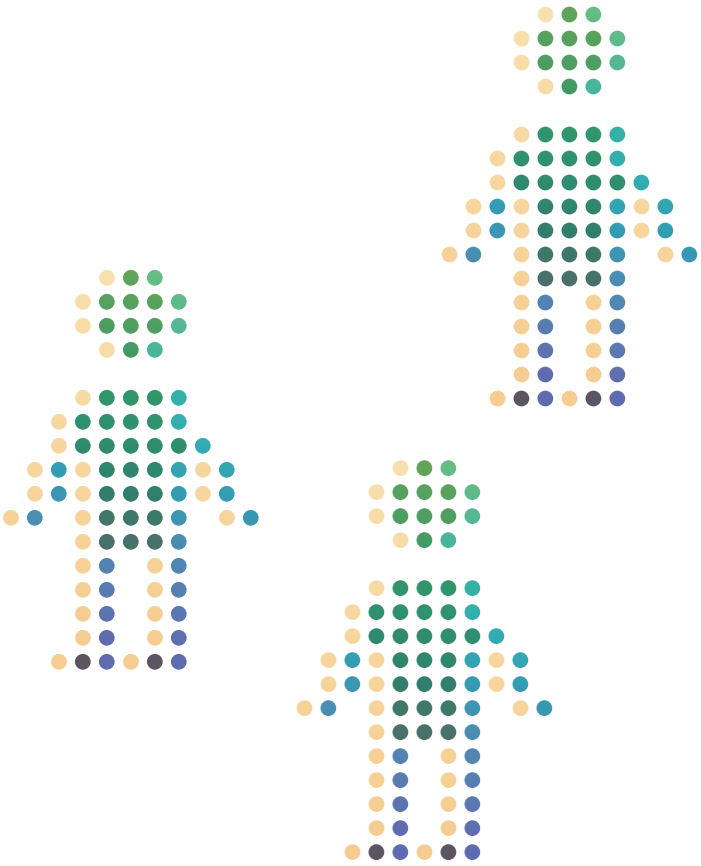
As for other industrial sectors, there is a legitimate role for significant government financial support for the existing oil and gas sector to create scalable innovations and products required for a net-zero economy. For example, there is a critical need for the production of fuels that are zero-emissions at the point of use, that will eventually eliminate scope 3 emissions across other domestic sectors, and position Canada to capitalize on the emerging global export markets for zero-emission fuels.

[3] The federal Greenhouse Gas Pollution Pricing Act establishes two parts different pricing regimes. There is a charge on fuels, and a regulatory trading system for large industrial emitters called the Output-Based Pricing System (OBPS). The extent to which carbon pricing can play a role in reducing emissions from this sector depends on how much of the pan-Canadian price on carbon applies to oil and gas facilities. Facilities' exposure to the pan-Canadian carbon price is determined by the OPBS and parallel provincial trading systems (e.g., TIER in Alberta).

40. Ensure approvals processes for projects are working toward, not against, the targets

Targets for the oil and gas sector should be supported by a regulatory regime that allows timely construction or implementation of net-zero projects

To ensure targets are met, it is imperative that regulatory processes, from start to finish, are aligned with the urgency of the climate crisis. New net-zero projects required for emissions reduction and elimination will need to be operational without undue delay in order to meet targets. Existing project review and approval processes may not be compatible with required timelines. The rigour of regulatory processes should not be compromised, but approval processes should not bottleneck progress on GHG emissions reductions and eliminations.



Annex 1
CONSOLIDATED LIST OF ADVICE

ADVICE FOR 2030:
STRENGTHENING GOVERNANCE FOR LIKELY PATHWAYS TO NET-ZERO BY 2050

1. Direct that all federal agencies, departments and Crown corporations publicly articulate their role in helping Canada achieve net-zero emissions
2. Mandate that all executives in the federal public service must take a course on climate change and net-zero
3. Prioritize the development of a climate change data, insights, and monitoring digital platform by the end of 2023
4. Ensure that the models and analytical approaches used to project and assess Canada's progress toward emissions reduction targets are transparent, robust, and coordinated
5. Improve the coordination of engagement processes
6. Improve net-zero communications
7. Leverage intergovernmental platforms to identify gaps and overlaps in government actions and promote net-zero solutions
8. Develop a net-zero workforce

ADVICE FOR 2030:
PUTTING THE BUILDINGS SECTOR ON THE MOST LIKELY PATHWAY TO NET-ZERO BY 2050

9. Adopt a pathways approach in the proposed National Net-Zero Emissions Building Strategy
10. Use regulations to send clear signals and provide certainty about the trajectory of building decarbonization
11. Accelerate and streamline the publication and adoption of national model building codes
12. Use complementary policy tools to incentivize action in the buildings sector and reward success
13. Prioritize transition of heating systems while ensuring the stability of the electrical grid
14. Increase the ambition of federal actions on property and fleet operations
15. Integrate net-zero requirements into all building-related federal funding opportunities
16. Encourage the use of a "shadow carbon price" to show the cost savings of retrofits

17. Seek out opportunities to decarbonize multiple buildings at once
18. Evaluate federal decarbonization programs for residential buildings to ensure maximum effectiveness and equity
19. Support the development of innovative net-zero technologies for the buildings sector

ADVICE FOR 2030: PUTTING THE BUILDINGS SECTOR ON THE MOST LIKELY PATHWAY TO NET-ZERO BY 2050

20. Grow public transportation options
21. Regulate more ZEV vehicle sales as soon as possible
22. Implement and expand measures that support electric vehicle uptake
23. Encourage ZEV adoption
24. Expand the strength and scope of the Clean Fuel Standard
25. Take a supply-chain lens to help the auto sector transition
26. Ensure sufficient investment for zero-emissions heavy freight
27. Drive innovation to reduce emissions in aviation and marine subsectors

KEY GUIDING PRINCIPLES TO INFORM THE DEVELOPMENT OF QUANTITATIVE FIVE-YEAR TARGETS FOR THE OIL AND GAS SECTOR

PRINCIPLES FOR TARGET DESIGN

28. Do not set targets in isolation
29. Set clear boundary conditions for success
30. Recognize that fair may not mean equal
31. Set and implement without delay
32. Align the timing of targets with implementation feasibility
33. Prioritize the largest sources of emissions
34. Drive new and more ambitious actions

PRINCIPLES TO SET THE CONDITIONS FOR SUCCESS

35. Prioritize people and communities
36. Provide certainty while continuously improving data and monitoring
37. Show accountability through reporting
38. Reinforce and strengthen existing regulations
39. Provide only responsible supports to industry
40. Ensure approvals processes for projects are working toward, not against, the targets

Net-Zero
Advisory Body