# How to Get Net-Zero Right Principles, tools and steps for safe, inclusive net-zero pathways

Isabelle Turcotte, Nichole Dusyk March 2021



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The Pembina Institute is a national non-partisan think tank that advocates for strong, effective policies to support Canada's clean energy transition. We employ multi-faceted and highly collaborative approaches to change. Producing credible, evidence-based research and analysis, we consult directly with organizations to design and implement clean energy solutions, and convene diverse sets of stakeholders to identify and move toward common solutions.



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# How to Get Net-Zero Right

Principles, tools and steps for safe, inclusive netzero pathways

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#### The journey to net-zero emissions

Momentum toward achieving Canada's commitment to net-zero GHG emissions by 2050 is picking up speed. Governments around the world — now including the U.S. and China — are also grappling with the challenges of meeting this goal. Canada needs to prioritize growth and economic recovery from the pandemic in a way that positions our industries and businesses as leaders in a decarbonizing global economy, while creating inclusive opportunities for all Canadians.

The carbon budget we use to map Canada's journey to net-zero is shaped by total emissions, direct reductions of emissions, removal of emissions, and offsets. The details and balance of efforts undertaken under each category of action will ultimately determine whether the journey will deliver deep decarbonization and maintain a safe climate. The ability of governments, corporations and communities to ensure this journey benefits all Canadians is paramount to acceptance and accelerated action. This paper is the first in a body of work by the Pembina Institute to support engagement and understanding on net-zero pathways across Canada. As a starting point for consideration, it puts forward a set of principles, and a series of tools and key steps, for decision-making that can underpin a safe, inclusive and effective approach.

We look forward to building on these reflections and recommendations with decisionmakers in government and in Indigenous and local communities, as well as with stakeholders in business, research and innovation, and civil society. This will include conversations around the proposed *Canadian Net-Zero Emissions Accountability Act* and the implementation of an updated national climate plan that can incorporate additional contributions to emissions reduction by 2030 from provinces, territories and all sectors of our economy.

Linda Coady Executive director The Pembina Institute March 10, 2021



### Executive summary

While the "what" of Canada's commitment to net-zero carbon emissions by 2050 is seemingly simple, the "how" is much more complex. There are infinite scenarios compatible with reaching net-zero, but not all are compatible with keeping global temperature rise below 1.5 degrees Celsius and delivering a more inclusive, resilient, and competitive economy. The Pembina Institute puts forward four principles that should guide the development of pathways that acknowledge the challenges, opportunities, and choices before us and reflect the needs of all Canadians. We also identify key steps in decision-making (moments when the principles could be embodied or ignored), and offer recommendations on tools necessary to set Canada up for success.

#### Principles guiding robust pathways to net-zero

1. Canada's pathways to net-zero must put people first, prioritizing systemic change in the economy for the benefit of all. Realizing the potential of the 2050 commitment requires a greater focus on social justice and inclusion achieved through conversations with Canadians in Indigenous communities, the private sector, workers and trade unions, local and racialized communities, as well as with youth, new Canadians, women and economically vulnerable populations. This will ensure that Canada's net-zero pathways respect Indigenous rights and reconciliation. It will also enable broader understanding of risks faced by different

groups in the transition to a net-zero economy and how targeted policies can be developed to avoid disproportionate impacts and create an economy that works for every Canadian.

- 2. Canada's pathways must be anchored in science and respect a carbon budget. While the net-zero by 2050 target speaks to the destination, the 1.5-degree goal speaks to the journey. There are infinite scenarios compatible with reaching netzero emissions, but not all are compatible with keeping global temperature rise safely below 1.5 degrees Celsius. The real measure of success of a net-zero pathway is whether it keeps cumulative emissions to a level that is in line with this 1.5degree goal. A carbon budget — the amount of emissions that can enter the atmosphere if we wish to limit warming to 1.5 degrees Celsius — is a key tool to ensure safe pathways.
- 3. Canada's pathways must prioritize early, deep, sustained, and technologically feasible direct emissions reductions in every sector. Robust pathways to netzero must see emissions peak as soon as possible, decline rapidly thereafter and reach a balance of human-caused (anthropogenic) sources and sinks. Delay leads to higher atmospheric carbon concentrations and higher temperatures, producing increasingly costly economic damages from climate change, and requiring more aggressive and likely costlier action later to limit even higher levels of atmospheric carbon. Moving boldly can secure Canada a spot at the starting line of the race to a low-carbon, global economy.
- 4. Canada's pathways must define an appropriate role for carbon removal and offsets. Achieving net-zero will require the use of carbon removal to address hard-to-decarbonize sectors or essential end uses that cannot yet be decarbonized. Carbon removal and offsets, however, cannot be approached as an alternative to mitigation, but rather in addition. Given the high cost, long lead time and other potential limitations on development of carbon removal technologies, Canada needs a framework in which decisions about the development and prioritization of use of removal technologies can be made in the context of overall economic decarbonization. Further, breaking down net-zero targets into three parts direct reduction, carbon removal, and emissions neutralized through offsets can help create transparency and robustness in a mitigation portfolio.

#### Steps for integrating net-zero principles

Unless they are integrated at key points in decision-making processes determining pathways to net-zero emissions by 2050, principles alone won't drive change. Canada needs a clearly articulated, shared approach toward achieving net-zero emissions at all levels of decision-making. That approach should require the following iterative steps to ensure guiding principles are put into action:

- 1. Set ambitious, national and sectoral targets and budgets for each five-year milestone period from 2025 to 2050, separating mitigation from removal.
- 2. Identify and clearly articulate plans to act on all available opportunities for direct emissions reductions for each sector for each milestone period. (For example, at the government decision-making level, uptake can be incentivized through regulations and financial support.)
- 3. Identify future direct emissions reductions opportunities and implement policies that incentivize aligned research and development efforts, including capital and supply chain mobilization, to make technologies that allow for direct reductions commercially available in the medium and long term, for each sector for each milestone period.
- 4. Having determined all available and future opportunities for direct emissions reductions and planned for incentivizing the deployment and development of direct mitigation technologies for each sector and for each milestone period, clearly articulate plans for appropriately scoped (based on removal capabilities and offset inventory expected to be available in each milestone period) and scaled deployment of carbon removal and offsets for those technically challenging or prohibitively expensive emissions in each sector.

While these steps speak to the second, third and fourth guiding principles (carbon budget, deep reductions, appropriate role for carbon removal, respectively), decisionmakers must also account for the first principle (putting people first while advancing systemic change) through each cycle of planning and decision-making for each milestone period. Simply put, without thoughtful and thorough planning for the social justice and inclusion dimensions of energy transformation and the development of a skilled, inclusive workforce, Canada won't fully realize market and mitigation opportunities in the low-carbon economy.

#### Tools to keep Canada on track

Along with embodying guiding principles at key steps in decision-making processes, the following tools will be critical to the success of a shared approach to pathways decision-making:

- 1. Implementation of the United Nations Declaration on the Rights of Indigenous Peoples.
- 2. A strategy for maintaining worker and community livelihood in the transition to a low-carbon economy.
- 3. Broad public forums to identify solutions and build consensus on net-zero priorities and pathways.
- 4. National and provincial carbon targets and accompanying carbon budgets set within a robust accountability framework.
- 5. A strategic assessment of climate change that adequately determines whether projects assessed are compatible with net-zero pathways.
- 6. A national 1.5 degrees Celsius energy supply and demand scenario to ensure government and corporate decision-making is compatible with global efforts to limit warming and Canada's net-zero goal.
- 7. Incentivized adoption of robust corporate net-zero commitments.
- 8. Offset programs and allocation mechanisms that ensure carbon credits are used to offset the hardest-to-abate emissions and meet the highest level of environmental integrity.

The Pembina Institute considers these guiding principles, key steps, and tools for integrating net-zero considerations as a solid basis for determining robust, safe and inclusive pathways to net-zero by 2050. We look forward to building on these and other efforts with communities of decision-makers and stakeholders across Canada as we strive for a less divisive, more resilient, and healthier future.

### Introduction

Announced on December 11, 2020 — the eve of the fifth anniversary of the Paris Agreement — Canada's new climate plan contains 64 measures supported by an initial investment of \$15 billion to ratchet up ambition on climate. This investment is part of the Government of Canada's commitment to invest between \$70 billion and \$100 billion<sup>1</sup> to put emissions reduction and job creation at the centre of Canada's strategies over the next three years for economic recovery from the COVID-19 pandemic and lay the foundation for resilience in the face of future crises. That's critical considering the rapidly increasing cost of climate change being shouldered by Canadians. In addition to new regulations and financial support to reduce emissions across the economy, Canada's new climate plan smartly relies on a significant increase in the price on carbon pollution. For this reason, it doubles as an economic plan, with key policy and spending commitments that will help to secure job and market opportunities for Canadians. Still, the keystone of the federal government's approach to tackling climate change is its commitment to achieving net-zero emissions by 2050.

First articulated by the currently governing Liberal Party in its campaign 2019 climate platform, this commitment is reflected in the Minister of Environment and Climate Change's 2019 mandate letter, which instructs the minister to "lead government-wide efforts to develop a plan to set Canada on a path to achieve a prosperous net-zero emissions future by 2050."<sup>2</sup> While it provides a cogent, potentially unifying goal for Canadians, its realization depends on the creation of a framework to guide and co-ordinate urgently needed decisive action and structural changes across the economy. Notably, the 2050 net-zero goal is supported by all federal parties in Canada. The Green Party also included this goal in its 2019 election platform.<sup>3</sup> The New Democratic Party's climate platform did not specifically commit to a net-zero by 2050 target. However, it committed to meet ambitious, science-based GHG emissions reduction targets in line

<sup>&</sup>lt;sup>1</sup> Government of Canada, "Government of Canada Releases *Supporting Canadians and Fighting COVID-19: Fall Economic Statement 2020*," media release, November 30, 2020. https://www.canada.ca/en/department-finance/news/2020/11/government-of-canada-releases-supporting-canadians-and-fighting-covid-19-fall-economic-statement-2020.html

<sup>&</sup>lt;sup>2</sup> Prime Minister of Canada, "Minister of Natural Resources Mandate Letter," December 13, 2019. https://pm.gc.ca/en/mandate-letters/2019/12/13/minister-natural-resources-mandate-letter

<sup>&</sup>lt;sup>3</sup> Green Party of Canada, *Honest. Ethical. Caring. Leadership: Election Platform 2019*, 18. https://www.greenparty.ca/sites/default/files/platform\_2019\_web\_update\_oct\_6.pdf

with the 1.5 degrees Celsius limit and to ensure that the provinces set and meet interim emissions reduction targets in the lead-up to 2030 and 2050.<sup>4</sup>

Erin O'Toole's successful 2020 campaign platform for the leadership of the Conservative Party of Canada included a commitment to work with the oil and gas industry to reach net-zero by 2050.<sup>5</sup>

Given the magnitude of change needed, the central importance of this commitment warrants thoughtful examination. The federal government should play a leadership role in, first of all, ensuring Canadians understand the social, economic and technological choices that need to be made in this transformation, and then aligning Canadians around the ones they want to make, and driving ambition toward a shared vision of a better future. Pathways to net-zero by 2050 must transparently acknowledge the challenges, opportunities, and choices before us, and reflect the needs of all Canadians.

In this report, we put forward four principles that should underpin the design and development of robust pathways:

- 1. Pathways must put people first, prioritizing systemic change in the economy for the benefit of all Canadians.
- 2. Pathways must be anchored in science and respect a carbon budget.
- 3. Pathways must prioritize early, deep, sustained, and technologically feasible emissions reductions in every sector.
- 4. Pathways must define and enable an appropriate role for carbon removal and offsets.

Identifying these principles is the first, and perhaps most important, step in determining safe and inclusive pathways to net-zero by 2050. Moving from theory to action, however, also requires integrating them at key points in decision-making processes, and identifying the tools that will be required in Canada to succeed.

<sup>&</sup>lt;sup>4</sup> Federal Party Survey on Environmental Platforms, 2019 Canadian Federal Election. https://election2019envirosurvey.ca/

<sup>&</sup>lt;sup>5</sup> Erin O'Toole, *Our Country: A Call to Take Back Canada* (2020), 22. https://www.macleans.ca/wp-content/uploads/2020/06/Erin-OToole-OurCountry-EN.pdf

# Principles and tools for robust pathways to net-zero emissions

#### Pathways must put people first

Truly realizing the potential of the 2050 commitment means designing pathways that achieve emissions reductions through transformative changes that align with all United Nations Sustainable Development Goals and result in benefits for all Canadians. The COVID-19 crisis has taken a huge and unequal toll on Canadians' lives and livelihoods.<sup>6</sup> The pandemic has laid bare and exacerbated inequalities; "lone mothers, recent immigrants, Indigenous people and young, less educated families" were found to be more financially vulnerable than other Canadian families.<sup>7</sup> Hundreds of organizations in Canada have signed on to the Just Recovery Principles, calling on governments to put people at the centre of recovery by prioritizing the needs of workers, building resilience to prevent future crises, building solidarity and addressing inequities among Canadians, and upholding Indigenous rights.<sup>8</sup> Canadians have never been more alive to the need for systemic change.

Meanwhile, in the U.S., President Joe Biden's climate plan includes an "environmental justice" component that calls for up to 40% of the investment his administration will direct toward clean energy for buildings, transportation, and new infrastructure be targeted to communities that are disproportionately impacted by workforce transition, health impacts, and/or physical risks from the impacts of climate change.<sup>9</sup>

<sup>&</sup>lt;sup>6</sup> Tiff Macklem, "Economic progress report: a very uneven recovery," address to Canadian Chamber of Commerce, September 10, 2020. https://www.bankofcanada.ca/wp-content/uploads/2020/09/remarks-2020-09-10.pdf

<sup>&</sup>lt;sup>7</sup> René Morissette, "Why certain Canadians were much more financially vulnerable to COVID-19," *Policy Options*, September 21, 2020. https://policyoptions.irpp.org/magazines/september-2020/whycertain-canadians-were-much-more-financially-vulnerable-to-covid-19/

<sup>&</sup>lt;sup>8</sup> Climate Action Network Canada, "Breaking – Just Recovery Principles Launched by Hundreds of Organizations," May 25, 2020. https://climateactionnetwork.ca/2020/05/25/breaking-progressives-release-principles-for-a-just-recovery/

<sup>&</sup>lt;sup>9</sup> Biden For President, "The Biden Plan to Secure Environmental Justice and Equitable Economic Opportunity." https://joebiden.com/environmental-justice-plan/

As we plan for the recovery, Canada has an opportunity to address shortcomings in our economy exposed by the pandemic, to advance systemic change that benefits all Canadians. Business, community, Indigenous, academic, and non-profit climate leaders across the country have shared their vision and recommendations for a better, more inclusive economic future that sets the country on a path to a net-zero. Reflecting a prevailing notion that "climate-positive policies also offer superior economic characteristics,"<sup>10</sup> many groups have identified "doable" investments required to seize opportunities that generate jobs while tackling climate change through building retrofits, clean transportation, and a clean grid.<sup>11,12,13</sup> This points to the importance of focusing the recovery on workers and increasing equity and wellbeing by more meaningfully integrating and creating opportunities for Canadians that have been disproportionately held back by systematic barriers.<sup>14,15</sup> Efforts to inform recovery packages also recognize that their success is linked to their ability to address poverty, inequality, and social exclusion.<sup>16</sup>

Responding to this advice, the Government of Canada, in the September 2020 speech from the throne, articulated protecting the health of Canadians, building a resilient economy, and taking strong action on climate change as pieces of the same puzzle, and made climate action one of the cornerstones of its plan to create jobs

<sup>&</sup>lt;sup>10</sup> Cameron Hepburn et al., "Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?" *Oxford Review of Economic Policy* 36 (2020) (preprint), 12. https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf

<sup>&</sup>lt;sup>11</sup> Task Force for a Resilient Recovery. https://www.recoverytaskforce.ca/

<sup>&</sup>lt;sup>12</sup> Ralph Torrie, Céline Bak and Toby Heaps, "Report: Building Back Better with a Bold Green Recovery," *Corporate Knights*, June 29, 2020. https://www.corporateknights.com/reports/greenrecovery/building-back-better-bold-green-recovery-synthesis-report-15934385/

<sup>&</sup>lt;sup>13</sup> Pembina Institute, *Green Stimulus: Principles and recommendations for a 2020 economic stimulus package* (2020). https://www.pembina.org/pub/green-stimulus-principles-and-recommendations-2020-economic-stimulus-package

<sup>&</sup>lt;sup>14</sup> Ralph Torrie, Céline Bak and Toby Heaps, *Building Back Better with a Bold Green Recovery: Synthesis report* (Council for Clean Capitalism, 2020). https://www.corporateknights.com/wp-content/uploads/2021/02/2020-09-14-Building-Back-Better-with-a-Bold-Green-Recovery\_FINAL\_enfr.pdf

<sup>&</sup>lt;sup>15</sup> Vanessa Corkal, Philip Gass, Aaron Cosbey, *Green Strings: Principles and conditions for a green recovery from COVID-19 in Canada* (International Institute for Sustainable Development, 2020). https://www.iisd.org/publications/green-strings-recovery-covid-19-canada

<sup>&</sup>lt;sup>16</sup> "Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?"

and build back better.<sup>17</sup> Pathways to net-zero must leverage these investments toward an energy transition that keeps us on track to meeting interim targets en route to the 2050 goal.

Sustainable development goals — which include targets for poverty elimination, gender equality, affordable and clean energy, decent work and economic growth, reduced inequalities, responsible consumption and production, and climate action — can positively or negatively interfere with each other, creating synergies or trade-offs.<sup>18</sup> The actions outlined here are key to maximize synergies.

#### Respect Indigenous rights and reconciliation

Pathways to net-zero must be pursued in collaboration with Indigenous Peoples, respecting inherent and treaty rights, acknowledging and providing restitution for past injustices, and embodying free, prior, and informed consent as set out in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and as supported by Indigenous leaders and communities in Canada.

Indigenous communities in Canada — especially those in remote and Northern regions — are extremely vulnerable to the impacts of climate change and are already experiencing negative impacts to their land, culture and way of life as a result of climate change. At the same time, Indigenous leaders and champions have been taking bold steps to place themselves at the forefront of climate action, including by moving to power their communities with renewable and local energy sources. Our pathways to net-zero by 2050 must address vulnerabilities to climate change, strengthen local clean-energy initiatives, and shift policies and practices that fail to account for local wisdom and experience and act as barriers to Indigenous leadership, decision-making and economic independence. This will include implementing policies to support economic reconciliation and energy autonomy as a component of self-determination for Indigenous communities.

Adopted by the United Nations General Assembly in 2007, UNDRIP "establishes a universal framework of minimum standards for the survival, dignity and well-being of the indigenous peoples of the world and it elaborates on existing human rights

<sup>&</sup>lt;sup>17</sup> Government of Canada, A Stronger and More Resilient Canada: Speech from the Throne to open the Second Session of the Forty-Third Parliament of Canada, September 23, 2020.

https://www.canada.ca/en/privy-council/campaigns/speech-throne/2020/stronger-resilient-canada.html

<sup>&</sup>lt;sup>18</sup> Intergovernmental Panel on Climate Change, "FAQ Chapter 5," *Global Warming of 1.5 °C*. https://www.ipcc.ch/sr15/faq/faq-chapter-5/

standards and fundamental freedoms as they apply to the specific situation of indigenous peoples."<sup>19</sup> Canada's Truth and Reconciliation Commission confirmed UNDRIP as a framework for reconciliation and called on governments at all levels to implement it.

In 2016, Canada officially endorsed UNDRIP, reversing its original objector status to the declaration. In December 2020, the federal government tabled Bill C-15, The United Nations Declaration on the Rights of Indigenous Peoples Act,<sup>20</sup> which requires the government to prepare and implement an action plan to achieve the objectives of the Declaration. In 2019, British Columbia became the first Canadian province to enact legislation implementing UNDRIP with The United Nations Declaration on Indigenous Rights Act,<sup>21</sup> which received royal assent in November 2019.

#### Protect affected workers and communities

The fossil fuel industry has made big contributions to Canadian society: providing jobs while powering our homes, cars, and grids. Today, however, the oil and gas sector is facing unprecedented pressures from dramatic fluctuations in the price of energy commodities, scarcity of capital, increasing automation, adoption of new disruptive technologies, shifting market demands, and climate commitments.<sup>22</sup> In the words of the UN Climate Change Executive Secretary, "oil producing countries must make the challenging but necessary transition to renewable energy in order to enable a low-carbon future and prevent the worst ravages of climate change" and see the transformation underway "not with a sense of fear, but opportunity."<sup>23</sup>

<sup>&</sup>lt;sup>19</sup> United Nations, "United Nations Declaration on the Rights of Indigenous Peoples." https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenouspeoples.html

<sup>&</sup>lt;sup>20</sup> Government of Canada, *Bill C-15, The United Nations Declaration on the Indigenous Rights Act (Canada)*. https://parl.ca/DocumentViewer/en/43-2/bill/C-15/first-reading

<sup>&</sup>lt;sup>21</sup> British Columbia, *The United Nations Declaration on Indigenous Rights Act, 2019 (BC)*. https://www.bclaws.ca/civix/document/id/complete/statreg/19044

<sup>&</sup>lt;sup>22</sup> Benjamin Israel et al., *The oilsands in a carbon-constrained Canada: The collision course between overall emissions and national climate commitments* (Pembina Institute, 2020). https://www.pembina.org/pub/oilsands-carbon-constrained-canada

<sup>&</sup>lt;sup>23</sup> United Nations, "UN Climate Chief Calls on Oil Producers to Undertake Rapid, Ambitious Energy Transition," June 20, 2018. https://unfccc.int/news/un-climate-chief-calls-on-oil-producers-to-undertake-rapid-ambitious-energy-transition

In navigating this transformation, Canada also needs to recognize that net-zero pathways must include emissions-intensive industries that cannot easily be electrified in the short term, and are going to take longer to decarbonize. This will produce both opportunities and challenges for workers and communities in regions dependent on oil and gas production. Direct involvement of workers and impacted communities at an early stage in the development of strategies and solutions for equitable transition is important at both a personal and organizational level. Training to provide access to new skills and employment opportunities can help minimize negative impacts and reduce economic inequality and political polarization.

#### Europe's Just Transition Fund

To address the transition, the European Commission proposed a €100 billion Just Transition Mechanism consisting of three parts.<sup>24</sup> The first is a Just Transition Fund that will be available to member states that have developed territorial just transition plans to support skills development, help small- and mid-size enterprises, and support investments in transition. The second is a private sector facility scheme to attract private investments and help regions tap into new sources of growth. The third is a public sector loan facility to help the public sector make investments in clean energy projects.<sup>25</sup> In response to the pandemic, as part of the €1-trillion European Green Deal, the Just Transition Fund will be boosted to €40 billion from €7.5 billion. The Just Transition Mechanism is now expected to mobilize €150 billion of public and private investment.<sup>26</sup>

In 2016, Canada's federal government committed to phasing out coal. In parallel, the Task Force on Just Transition for Canadian Coal Power Workers and Communities was tasked with engaging with affected communities and providing recommendations to the government for a just transition. The Task Force delivered its recommendations in 2019, mostly focused on income support and skills

<sup>&</sup>lt;sup>24</sup> European Commission, "The Just Transition Mechanism: making sure no one is left behind." https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-takeneu/just-transition-mechanism\_en

<sup>&</sup>lt;sup>25</sup> European Commission, "Financing the green transition: The European Green Deal Investment Plan and Just Transition Mechanism."

https://ec.europa.eu/regional\_policy/en/newsroom/news/2020/01/14-01-2020-financing-the-green-transition-the-european-green-deal-investment-plan-and-just-transition-mechanism

<sup>&</sup>lt;sup>26</sup> European Commission, "EU budget for recovery: Questions and answers on the Just Transition Mechanism," May 28, 2020. https://ec.europa.eu/commission/presscorner/detail/en/QANDA\_20\_931

retraining.<sup>27</sup> The Smart Prosperity Institute, in a 2020 review of key elements for a just transition for fossil fuel workers, has recommended that future studies should address research gaps and provide more clarity on key elements, including: "the kinds of skills required for working in clean energy industries and (...) non-energy industries (and) how to make retraining programs more effective."<sup>28</sup>

It is also important that the concept of equity in energy transition move beyond a narrow focus on training and retraining to include more broadly based economic diversification that can be regionally specific and appropriate. It is not as easy as simply providing jobs in renewable energy. Workforce and community equity in a net-zero context requires access to the full range of opportunities involved in energy system change including in new technologies and infrastructure for decarbonization as well as in manufacturing, supply chains and new industrial processes. It will also require opportunities to apply the skill set of current workers to achieve emission reductions across all of these areas.

#### Leave no one behind

Importantly, while Canada's commitment to expand the conversation on the transition to a net-zero economy to all directly impacted workers is fundamental, the conversation must also be broadened to remove barriers to opportunities for employment and advancement in the energy sector, and across the economy, and also deliver a more inclusive workforce. Indeed, researchers have found that absent policies to promote this goal, "the growth of alternative green industries will (...) primarily benefit Canadian-born white men to the exclusion of marginalized people."<sup>29</sup> Opportunities for growth in employment in sectors that will be in demand in a world that limits warming to 1.5 degrees Celsius are vast and varied. They will not only include new jobs in clean technology and renewable energy, but also encompass opportunities for building professionals, contractors, and trades to

http://publications.gc.ca/collections/collection\_2019/eccc/En4-361-2019-eng.pdf

<sup>28</sup> Sandeep Pai, Kathryn Harrison, Hisham Zerriffi, *A Systematic Review of the Key Elements of a Just Transition for Fossil Fuel Workers* (Smart Prosperity Institute, 2020), 36.

https://institute.smartprosperity.ca/sites/default/files/transitionforfossilfuelworkers.pdf

<sup>&</sup>lt;sup>27</sup> Task Force on Just Transition for Canadian Coal Power Workers and Communities, *A Just and Fair Transition for Canadian Coal Power Workers and Communities* (2018).

<sup>&</sup>lt;sup>29</sup> Hadrian Mertins-Kirkwood and Zaee Deshpande, *Who is included in a Just Transition? Considering social equity in Canada's shift to a zero-carbon economy* (Canadian Centre for Policy Alternatives, 2019), 6.

https://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2019/08/Who%20is%20included%20in%20a%20just%20transition\_final.pdf

design and construct high performance buildings and retrofit existing building stock; and for auto workers to join the zero-emission vehicle manufacturing economy. It is critical that new employment strategies include training for marginalized communities, immigrants, women, youth, and Indigenous and racialized communities.

#### Tools to ensure pathways are about people

#### Tool 1: Implementation of the United Nations Declaration on the Rights of Indigenous Peoples

Canada is only beginning the process of acknowledging and codifying the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Moreover, legislative action to implement UNDRIP is only one part of the much broader structural and institutional change necessary to protect Indigenous rights and seek justice for Indigenous Peoples.<sup>30</sup> Bill C-12, the Canadian Net-Zero Emissions Accountability Act, must also be situated in the government's commitment to UNDRIP and ensure that racialized Canadians and marginalized communities are not disproportionally affected. To this end, lessons may be drawn from New Zealand's example that makes explicit commitments to Indigenous Peoples in its climate accountability law. The New Zealand law requires:

- adherence to specific treaty rights
- prioritization of Indigenous representation on the Climate Change Commission
- the creation of a strategy to minimize the impacts of climate change mitigation on Indigenous Peoples
- that the social, health, environmental, ecological, and cultural effects of climate change on Indigenous Peoples is taken into account.<sup>31</sup>

Forward movement with this process is foundational to ensuring the success and equity of decarbonization efforts.

<sup>&</sup>lt;sup>30</sup> Joyce Green, "A governmental recognition of wrongs needs to be a precondition to any further policy or legislation focused on Indigenous title or government," *Policy Options*, September 26, 2019. https://policyoptions.irpp.org/magazines/september-2019/its-time-for-a-recognition-of-wrongsframework/

<sup>&</sup>lt;sup>31</sup> Canadian Institute for Climate Choices, *Climate Legislation in Aotearoa/New Zealand* (2020). https://climatechoices.ca/publications/climate-legislation-in-aotearoa-new-zealand/

#### Tool 2: Equitable and inclusive transition strategy

Canada cannot unlock pathways to 2050 without delivering on its commitment to support the future and livelihood of workers and their communities in the transition to a low-carbon global economy.<sup>32</sup> This requires continued action based on learning from the earlier phase-out of coal in Canada as well as the application of newer concepts on social and environmental justice and equality emerging from the COVID-19 pandemic. Research gaps on key elements of an equitable and inclusive transition need to be addressed, along with the application of practices from international experiences. Importantly, the conversation must also be broadened to remove barriers to opportunities for employment and advancement and deliver a more inclusive workforce.

#### Tool 3: Meaningful public engagement

To allow for the design of robust and transformative pathways that reflect and address the differentiated impacts, perspectives, and needs of Canadians across the country, the federal government should support participation and meaningful engagement with labour, Indigenous, health, youth, environmental and other groups, provinces and territories and business, throughout the design of pathways to 2050. Generation Energy serves as an example. This exploration of Canada's energy future in 2017-2018 engaged more than 380,000 Canadians in a national dialogue that resulted in development of an inclusive narrative around four pathways to a more sustainable, affordable energy future.<sup>33</sup> Canada's new Net-Zero Advisory Body has been tasked with leading meaningful engagement on pathways to 2050 and providing advice to government based on that engagement.<sup>34</sup>

https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050/advisory-body.html

<sup>&</sup>lt;sup>32</sup> This priority is reflected in the federal government's commitment to "advance legislation to support the future and livelihood of workers and their communities in the transition to a low-carbon global economy." *Source:* "Minister of Natural Resources Mandate Letter."

<sup>&</sup>lt;sup>33</sup> Natural Resources Canada, "Generation Energy." https://www.nrcan.gc.ca/climate-change/canadasgreen-future/generation-energy/20093

<sup>&</sup>lt;sup>34</sup> Government of Canada, "Net-Zero Advisory Body."

## Pathways must be anchored in science and respect a carbon budget

In recognition of the shared responsibility to respond to the threat of global climate change, 189 nations ratified the landmark 2015 Paris Agreement, committing to "holding the increase in the global average temperature to well below 2 degrees above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees above pre-industrial levels."<sup>35</sup>

#### The IPCC Global Warming of 1.5°C report and the 2050 target

Tasked by governments to look at the difference between a 1.5-degree and a 2degree increase in warming, the Intergovernmental Panel on Climate Change released its special report *Global Warming of 1.5°C*, documenting the impacts of temperature increase above pre-industrial levels and related global greenhouse gas (GHG) emissions pathways in 2018. It sent a powerful message to policy makers around the world. The difference could mean "11 million fewer people exposed to extreme heat, 61 million fewer people exposed to drought, and 10 million fewer people exposed to the impacts of sea level rise."<sup>36</sup>

#### Canada's changing climate

- In 2019, Canadian scientists released a report on Canada's changing climate. Among the author's headline statements were the following:
- Both past and future warming in Canada is, on average, about double the magnitude of global warming. Northern Canada has warmed and will continue to warm at more than double the global rate.
- The effects of widespread warming are evident in many parts of Canada and are projected to intensify in the future.
- A warmer climate will intensify some weather extremes in the future.<sup>37</sup>

<sup>&</sup>lt;sup>35</sup> United Nations Framework Convention on Climate Change, *Paris Agreement* (2015), 3. https://unfccc.int/files/essential\_background/convention/application/pdf/english\_paris\_agreement.pdf

<sup>&</sup>lt;sup>36</sup> Science Based Targets initiative, "1.5°C vs. 2°C – a world of difference," July 31, 2019. https://sciencebasedtargets.org/2019/07/31/1-5c-vs-2c-a-world-of-difference/

<sup>&</sup>lt;sup>37</sup> Government of Canada, *Canada's Changing Climate Report – Headline Statements* (2019) https://changingclimate.ca/site/assets/uploads/sites/2/2019/03/CCCR\_HeadlineStatements.pdf

A global temperature increase of only 1.5 degrees Celsius, with limited or no overshoot, is within reach but requires "global net anthropogenic  $CO_2$  emissions (in other words, carbon emissions created by human beings) (to) decline by about 45% from 2010 levels by 2030 (...) reaching net zero around 2050."<sup>38</sup> In September 2019, the UN Secretary-General's invitation to world leaders to convene at the Climate Action Summit with concrete plans to meet these 2030 and 2050 targets reinforced "1.5°C as the socially, economically, politically and scientifically safe limit to global warming"<sup>39</sup> and brought the net-zero target into bigger prominence. When nations later convened in Madrid for COP 25 in December 2019, 73 countries, 14 regions, 398 cities, 768 businesses and 16 investors were working to achieve this goal. In September 2020, China, the globe's biggest emitter, surprised the world when it announced its intention to reach net-zero by 2060. Today, six countries have enshrined this target into law, six have proposed legislation to do so, and about 110 are actively discussing a 2050 target.<sup>40</sup> In November 2020, Canada's federal government introduced Bill C-12, the Canadian Net-Zero Emissions Accountability Act, which aims to legislate five-year targets including a 2050 net-zero target and to create an institutional structure to ensure that those targets are achieved.

All told, half of the world's GDP, representing about half of global emissions, are covered by a net-zero commitment.<sup>41</sup> According to the Climate Action Tracker, an independent group of scientists monitoring carbon pollution and government actions to reduce it, these net-zero targets have put a 1.5-degree world "within striking distance."<sup>42</sup> Most recently, the new U.S. administration has also committed to achieving net-zero by 2050 and to establish an accountability mechanism to reach that goal, further boosting the momentum toward net-zero and a 1.5-degree world.

<sup>&</sup>lt;sup>38</sup> Intergovernmental Panel on Climate Change, *Global Warming of 1.5*°C: *Headline Statements from the Summary for Policymakers*, 2. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\_Headline-statements.pdf

<sup>&</sup>lt;sup>39</sup> United Nations, *Report of the Secretary-General on the 2019 Climate Action Summit and the Way Forward in 2020* (2019), 5. https://www.un.org/sites/un2.un.org/files/cas\_report\_11\_dec\_0.pdf

<sup>&</sup>lt;sup>40</sup> Energy & Climate Intelligence Unit, "Net Zero Tracker." https://eciu.net/netzerotracker

<sup>&</sup>lt;sup>41</sup> António Guterres, speech at the Finance in Common Summit, Paris Peace Forum, November 12, 2020. http://webtv.un.org/watch/ant%C3%B3nio-guterres-un-secretary-general-at-the-finance-in-common-summit-paris-peace-forum-/6209374192001/

<sup>&</sup>lt;sup>42</sup> Climate Action Tracker, *Paris Agreement Turning Point* (2020), 1. https://climateactiontracker.org/publications/global-update-paris-agreement-turning-point/

Despite the encouraging number of countries committing to net-zero by 2050, as of February 2021, only 75 Parties, representing 30% of global emissions, have submitted new or updated Paris pledges. Together, these pledges would only deliver a 0.5% reduction in emissions by 2030 compared to 2010 levels.<sup>43</sup> Encouragingly, the government of Canada delivered a strengthened climate plan in December 2020 that will deliver between 32 and 40% reductions by 2030 compared to 2005 levels, depending on further contributions at the provincial level and from business and industry.

Still, the challenge before us is immense. Researchers have estimated that economic lockdown measures imposed by governments across the globe to attempt to control COVID-19 would result in only a 7% decrease in global GHG emissions in 2020.<sup>44</sup> The same paper concluded that the rate of decrease would need to be sustained to maintain a safe climate. Such a decrease can only be delivered through structural changes in the way we produce and use energy as we rebuild our economy. Absent deeper change that decouples economic growth from emissions and addresses inequalities exposed by the pandemic, emissions will rebound in an economy that continues to leave Canadians behind.

#### Not all pathways are created equal

The IPCC 1.5°C report spurred governments, industry and investors to coalesce around the goal of net-zero emissions. The "what" is fairly straightforward: "net zero carbon emissions are achieved when anthropogenic CO<sub>2</sub> emissions are balanced globally by anthropogenic CO<sub>2</sub> removals over a specified period."<sup>45</sup> But the "how" is not as simple.

There are infinite scenarios compatible with reaching net-zero, but not all are compatible with keeping global temperature rise below 1.5 degrees Celsius. For simplicity, let's consider the following two hypothetical global scenarios to net-zero emissions by 2050. Under the first scenario, emissions remain steady to 2040 in

<sup>&</sup>lt;sup>45</sup> United Nations Framework Convention on Climate Change, *Nationally determined contributions under the Paris Agreement: Synthesis report* (2021), 5. https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contrib

<sup>&</sup>lt;sup>44</sup> Corinne Le Quéré et al., "Temporary reduction in daily global CO<sub>2</sub> emissions during the COVID-19 forced confinement," *Nature Climate Change* 10 (2020). https://www.nature.com/articles/s41558-020-0797-x

<sup>&</sup>lt;sup>45</sup> Intergovernmental Panel on Climate Change, *Global Warming of 1.5* °*C: Summary for Policymakers* (2018), 24. https://www.ipcc.ch/sr15/chapter/spm/

the absence of robust climate action. Late in the last decade, carbon removal measures are deployed such that net-zero is effectively reached in 2050 — as many emissions as were emitted in 2050 are removed that same year. Under the second scenario, economic sectors are transformed by a more comprehensive and steady stream of policies, ratcheted up over time as sectors adjust, to dramatically lower emissions (Figure 1). In this scenario, rather than supporting business as usual, carbon removal approaches are only used to address hard-to-abate GHG emissions (i.e. those emissions that are too difficult or costly to mitigate entirely) and emissions neutrality is also achieved in 2050.

Both scenarios result in net-zero emissions by 2050. However, the first one results in global temperature rise above 1.5 degrees Celsius, while the second maintains a safe climate by limiting the temperature increase to 1.5 degrees. Those starkly different outcomes are explained by the difference in cumulative emissions under each scenario.



#### Figure 1. Safe versus dangerous pathways to net-zero emissions by 2050

Scenario 1 (red) achieves net-zero but fails to safely limit temperature rise because it does not use a carbon budget and delays emissions reductions, resulting in a much greater release of total emissions into the atmosphere in the same time period. Scenario 2 (blue) uses early, deep, and sustained emissions reductions in adherence with a climate budget to achieve emissions mitigation required to limit global temperature rise to 1.5 degrees Celsius.

Global temperature rises linearly with cumulative global emissions.<sup>46</sup> Scientists have calculated the cumulative emissions — or carbon budget — associated with

<sup>&</sup>lt;sup>46</sup> Reto Knutti, "Relationship between global emissions and global temperature rise," *Climate Change* 2013: *The Physical Science Basis*, 4. https://unfccc.int/sites/default/files/7\_knutti.reto.3sed2.pdf

limiting global warming to 1.5 degrees Celsius. The world has warmed by 1.1 degrees since pre-industrial time.<sup>47</sup> Our carbon budget — the additional emissions that can enter the atmosphere if we wish to limit warming to 1.5 — is rapidly shrinking.

## Tools to ensure pathways are anchored in science and respect a carbon budget

#### Tool 4: Legislated, time-bound carbon budgets

A carbon budget that signals absolute limits on GHG emissions is an essential tool to map a safe journey to 2050. For this reason, Canada's Minister of Environment has been tasked with setting "legally-binding, five-year emissions-reduction milestones based on the advice of experts and consultations with Canadians." Legislating time-bound climate targets that adequately reflect principles of fairness and equity based on effort-sharing approaches, and also ensuring there is accountability for achieving them, is essential if we are to achieve early, deep, sustained and technologically feasible emissions reductions to arrive safely at net-zero by 2050. In November 2020, the federal government tabled Bill C-12, the Canadian Net-Zero Emissions Accountability Act.<sup>48</sup> Critical components of a federal accountability framework include:<sup>49</sup>

- Legislating 2030, 2050, and interim targets. In the Canadian context, this will need to include a more ambitious 2030 target to maintain a viable pathway to net-zero by 2050.
- A target-setting process that is based on science and expert advice.
- Scrutinization of plans and assessment reports in Parliament.
- An independent, expert net-zero advisory body to provide advice, recommendations, and assessments of the government's approach and progress.

<sup>&</sup>lt;sup>47</sup> United Nations Framework Convention on Climate Change, *United Nations Climate Change Annual Report 2019* (2020), 6. https://unfccc.int/sites/default/files/resource/unfccc\_annual\_report\_2019.pdf

<sup>&</sup>lt;sup>48</sup> Government of Canada, *Bill C-12, Canadian Net-Zero Emissions Accountability Act (Canada).* https://parl.ca/DocumentViewer/en/43-2/bill/C-12/first-reading

<sup>&</sup>lt;sup>49</sup> Julia Croome et. al., *A New Canadian Climate Accountability Act: Building the legal foundation to achieve net-zero emissions by 2050* (Ecojustice, Pembina Institute, et al., 2020). https://www.pembina.org/pub/new-canadian-climate-accountability-act

- A process for creating subnational targets and budgets to ensure that there is adequate and fair effort-sharing. These targets and budgets will ultimately be the defining guideposts for provincial/territorial and sectoral pathways to net-zero.
- The translation of targets to carbon budgets to clearly signal absolute limits on GHG emissions and fairly allocate responsibility for emissions reductions.

In addition, it has been suggested that the Act in its current form will need to be strengthened to:

- Include a national 2025 target.
- Set subnational targets and budgets.
- Ensure adequate enforcement of the Minister's responsibility.
- Enhance the expert advisory body to ensure that decisions related to net-zero, such as the use of international offsets, are based on the best available science.

### An annual, provincial carbon budget for the oilsands sector

In December 2016 — after many years of collaboration between environmental groups (including the Pembina Institute) and oilsands companies (including Suncor, Cenovus and Shell) to develop joint recommendations on stronger climate regulations — the province of Alberta legislated the Oil Sands Emissions Limit Act, limiting annual emissions from the oilsands at 100 million tonnes. This was a powerful accomplishment, but incomplete. The emissions cap isn't enshrined in regulations and will need to decline over time in alignment with Canada's overall emissions reductions goals.

Importantly, the journey to net-zero, and the carbon budget we use to map that journey, must consider total emissions, direct reductions, carbon removal, and offsets. The details and balance of efforts undertaken under each category of action determine whether the journey to net-zero will really deliver deep decarbonization and maintain a safe climate.

#### Tool 5: Accurate definition of net-zero in Canada's Strategic Assessment of Climate Change

All project reviews proceeding under the updated Impact Assessment Act will now require explicit consideration of whether the project's impacts "hinder or contribute to" Canada's ability to meet climate change commitments. Implementation of this requirement is determined by the strategic assessment of climate change (SACC).<sup>50</sup> However, in the absence of specific regional or sectoral carbon budgets, it remains unclear how to best assess whether a project will "hinder or contribute." This is particularly the case for projects that have significant absolute carbon emissions, or that won't extend beyond 2050. In addition, the equation that defines how net-zero is calculated contains loopholes (including the concept of "avoided" emissions — accounting for GHG emissions that won't be released into the atmosphere due to a lower-emitting option) that allow projects to claim to be net-zero while still having potentially significant absolute emissions.

To ensure alignment with net-zero pathways, all high-carbon projects built in Canada should be assessed under the Impact Assessment Act. Further, the SACC should prioritize mitigation of absolute emissions, even when net-zero criteria are met. Similarly, the need for a specific project being proposed, and its alternatives, must always be rigorously assessed. Finally, when determining whether a project is in the public interest, decision-makers need to be provided with a full assessment of the cumulative, lifetime emissions of the project — including upstream and downstream emissions — to ensure decisions are grounded in a full accounting of climate impacts in Canada and abroad.

To help ensure that subnational targets are met, the requirement that projects be aligned with net-zero pathways should be consistently applied on a collaborative basis in all assessments, regardless of whether they are led by federal, provincial, territorial, or Indigenous governments.

#### Tool 6: A 1.5 degree Celsius energy supply and demand scenario

The Canada Energy Regulator (CER) currently produces domestic energy scenarios that it publishes in the annual *Canada's Energy Future* report. The report provides a long-term outlook on domestic oil, gas, and electricity

https://www.canada.ca/en/services/environment/conservation/assessments/strategic-assessments/climate-change.html

<sup>&</sup>lt;sup>50</sup> Government of Canada, "Strategic Assessment of Climate Change."

production, use, and export. As such, it provides detailed information on the current energy mix and an indication of future trends. Canada's Energy Future 2020 report, for the first time, situated the CER's modelling in the context of Canada's commitment to achieve net-zero emissions by 2050. However, the energy future modelling contained in the report did not align with these targets. In future iterations, the CER should include a net-zero scenario that meets or exceeds Canada's 2030 and 2050 targets; assumes that the world is successfully taking steps to limit climate change to 1.5 degrees Celsius; and integrates global energy demand and links the market for all Canadian energy exports (including fossil fuels, electricity, and hydrogen) to global demand under a 1.5-degree scenario. This will provide an indication of the scope and scale of change required in Canada's energy system and facilitate informed dialogue on many of the technological and policy decisions that will be required.

#### Pathways must prioritize early, deep, sustained and technologically feasible direct emissions reductions in every sector

As a fossil fuel-producing country with a historical responsibility for global GHG emissions, as well as the capability, know-how and technology to lower emissions, Canada has a responsibility to act without delay.

### Pathways should support increased ambition, seize the opportunities and manage the risks of climate change

Article 4 of the 2015 Paris Agreement offers guidance on the journey toward reaching net-zero emissions by 2050: emissions need to peak as soon as possible, decline rapidly thereafter, and reach a balance of sources and sinks. As discussed previously, countries must increase their 2030 carbon reduction targets to put global emissions on track to net-zero by 2050 within the remaining global carbon budget.

Across Canada, provinces and territories will soon engage in consultation with the federal government to determine Canada's strengthened pledge under the Paris Agreement, in preparation for the 2021 United Nations Climate Change Conference of the Parties (COP 26) in Glasgow. Provinces and territories are being asked to increase their willingness to deliver on more ambitious emissions reductions by 2030 (at the latest) within the new national climate plan, in alignment with Canada's fair share toward keeping global temperature rise below 1.5 degrees Celsius. Delayed action not only spends our limited carbon budget earlier on, but also results in higher costs, for two reasons. First, delay leads to higher atmospheric carbon concentrations and higher temperatures, producing increasingly costly economic damages from climate change. Second, delayed action now means we will need even more aggressive and likely costly action later to limit higher levels of atmospheric carbon.

Opportunities are great, but so too is the risk — including economic risk for stranded assets and stranded workers. Well-designed pathways provide clear indication of the policies governments plan to put in place, providing certainty and predictability to help communities and companies adjust accordingly and avoid risks. Increasingly, investors are seeking to reduce their exposure to climate risks and ensure their investments advance climate objectives, relying on environmental, social and governance indicators to guide their choices. Mainstream investors are already betting on energy transition pathways that will meet consumer demand for products and services that reduce GHG emissions. The move toward sustainable finance, more transparent measurement and disclosure on climate risk, and divestment of high-carbon assets is growing worldwide.

By 2030, a \$26-trillion low-carbon economy is expected to create 65 million jobs to supply the energy sources, products and services that will be in demand in a decarbonized world.<sup>51</sup> Moving boldly to prioritize deep decarbonization in every sector is crucial to position Canadian industry to be competitive in a global decarbonizing economy — securing our access to growing international markets for low-carbon technologies, helping industrializing nations leapfrog inefficient technologies, and creating stable, well-paying careers for Canadians.

#### Pathways should embrace the circular economy

Paired with actions to move to clean and low-carbon energy resources, the circular economy is key to creating the kind of transformation needed to achieve the deep, sustained emissions reductions necessary to reach emissions targets and stay within a carbon budget, while meeting the global demand for natural resources

<sup>&</sup>lt;sup>51</sup> World Resources Institute, "The \$26 Trillion Opportunity." https://www.wri.org/blog-series/the-26-trillion-opportunity

within planetary boundaries. Canada's pathways to 2050 must harness the force of the circular economy.

In a circular economy, materials are used more sustainably, by recycling, reusing and using differently, and designing less resource-intensive products. The circular economy approach reduces emissions largely through better use of scarce supplies of raw materials. For example, in the case of the cement sector which has particularly hard-to-abate emissions, circular economy use of improved building design would decrease the demand for cement by 34%.<sup>52</sup> Analysis has shown that demand-side measures in a more circular economy can result in a reduction of emissions from steel, plastics, aluminium and cement in Europe by 56%, and that these measures are often economically attractive.<sup>53</sup> At home, for example, the Canada-wide Strategy on Zero Plastic Waste is deploying the concept of a circular economy to tackle the plastics problem. With a focus on prevention, collection and value recovery, the strategy is estimated to have the potential to "save \$500 million of annual costs, create 42,000 direct and indirect jobs, and prevent 1.82 million tonnes (megatonnes) of CO<sub>2</sub> equivalent greenhouse gas emissions."<sup>54</sup> The work of Canada's Expert Panel on the Circular Economy<sup>55</sup> promises to increase the knowledge base toward better integrating circular economy opportunities across the economy.

#### Tools to ensure early, deep emissions reductions

#### Tool 7: Climate-related financial disclosure, corporate net-zero alignment requirements

To increase accountability at the corporate level, corporate net-zero commitments should set milestone targets in alignment with, or exceeding, the federal government's targets. The uptake of a robust corporate 2050

<sup>&</sup>lt;sup>52</sup> Energy Transitions Commission, *Mission Possible: Reaching Net-Zero Carbon Emissions from Harderto-Abate Sectors by Mid-Century* (2018), 17. https://www.energy-transitions.org/wpcontent/uploads/2020/08/ETC MissionPossible FullReport.pdf

<sup>&</sup>lt;sup>53</sup> Material Economics, *The Circular Economy - a Powerful Force for Climate Mitigation* (2018), 5. https://materialeconomics.com/publications/the-circular-economy-a-powerful-force-for-climate-mitigation-1

<sup>&</sup>lt;sup>54</sup> Canadian Council of Ministers of the Environment, *Canada-Wide Action Plan on Zero Plastic Waste, Phase 1* (2019), 2. https://www.ccme.ca/files/Resources/waste/plastics/1289\_CCME%20Canadawide%20Action%20Plan%20on%20Zero%20Plastic%20Waste\_EN\_June%2027-19.pdf

<sup>&</sup>lt;sup>55</sup> Council of Canadian Academies, *The Circular Economy in Canada* (in progress). https://cca-reports.ca/reports/the-circular-economy-in-canada/

framework could be encouraged by making any financial support from government conditional on its adoption. Rather than creating a new framework, this effort should build on the Science Based Targets initiative framework (which is the subject of ongoing refinements), incorporating its strong science-based foundation and adding a just transition component that contributes to a just and inclusive work force through implementation of the net-zero target.<sup>56</sup>

Similarly, incentivizing the reporting of climate-related financial information based on the standards developed by the Task Force on Climate-Related Financial Disclosures (TCFD) and/or other recognized reporting frameworks would ensure companies are making resilience a key part of their plans while leading to strategic competitive advantage. As such, the federal government and provincial securities commissions should formally adopt TCFD disclosure requirements.

### To address climate, Canada's financial system needs to evolve

A February 2021 report by the Pembina Institute details investor interest in resilient recovery and actions to align private investment with a net-zero future. *Sustainable Finance for a Safe Climate: Perspectives on mobilizing capital for a swift, resilient recovery* shows that big and small investors alike in Canada are interested in supporting the transition to a clean economy. But, in order to start channelling more of their savings and capital to climate solutions, they need greater clarity on the rules from governments and regulators, and more transparency and disclosure on climate risk from companies.<sup>57</sup>

Furthermore, federal and provincial governments should continue to emphasize clean investments and a green recovery from the pandemic, prioritizing clean technologies over legacy solutions in procurement strategies at all levels of government. Recovery aid shouldn't be given to traditional polluting sectors unless that aid comes with green conditions for sustainability

<sup>&</sup>lt;sup>56</sup> Science Based Targets initiative, *Foundations for Science-Based Net-Zero Target Setting in the Corporate Sector*, Version 1.0 (September 2020), prepared by CDP.

https://sciencebasedtargets.org/resources/legacy/2020/09/foundations-for-net-zero-full-paper.pdf

<sup>&</sup>lt;sup>57</sup> Cedric Smith and Morrigan Simpson-Marran, *Sustainable finance for a safe climate: Perspectives on mobilizing capital for a swift, resilient recovery* (Pembina Institute, 2021), 38. https://www.pembina.org/pub/sustainable-finance-safe-climate

improvements.<sup>58</sup> This includes a requirement that companies align commitments and plans to meet net-zero emissions.<sup>59</sup>

## Pathways must define an appropriate role for carbon removal and offsets

Direct emissions reductions are the most effective way to respect a carbon budget and safely limit warming. Nonetheless, as we transition to a decarbonized global economy, carbon removal and offsets have an important role to play in robust 2050 pathways.

To help ensure carbon removal and offsets do not substitute for direct emissions reductions, and that their deployment is consistent with safely reaching net-zero by 2050, it has been suggested that mitigation be separated from removal targets.<sup>60</sup> Breaking down net-zero targets into three parts — direct reduction, carbon removal, and emissions neutralized through offset — can help create transparency and dissolve ambiguity on how to achieve net-zero targets by ensuring policy makers explicitly assess the feasibility of each element. This helps avoid delay in mitigation, and to identify and put in place policies to remove the barriers to the deployment of carbon removal measures at scale.

#### Carbon removal measures

Carbon removal will be part of Canada's toolkit to reach net-zero emissions. Indeed, the IPCC pathways to a 1.5-degree world all use carbon removal measures to some extent (both natural and technological).<sup>61</sup> In addition to deep and sustained direct emissions reductions, Canada needs a framework in which decisions about the deployment and prioritization of use of removal can be made in the context of overall economic decarbonization — given the high cost, long lead time and other

https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15\_Chapter2\_Low\_Res.pdf

<sup>&</sup>lt;sup>58</sup> Sustainable finance for a safe climate, 38.

<sup>&</sup>lt;sup>59</sup> Pembina Institute, *Areas for investment in Canada's economic recovery: Letter to federal Minister of Finance*, September 16, 2020. https://www.pembina.org/pub/areas-investment-canadas-economic-recovery

<sup>&</sup>lt;sup>60</sup> Duncan P. McLaren et al., "Beyond "Net-Zero": A Case for Separate Targets for Emissions Reduction and Negative Emissions," *Frontiers in Climate*, August 21, 2019. https://www.frontiersin.org/articles/10.3389/fclim.2019.00004/full

<sup>&</sup>lt;sup>61</sup> Intergovernmental Panel on Climate Change, "Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development," in *Global Warming of 1.5°C*, 96.

potential limitations on development of carbon removal technologies. This balance should recognize the shift over time as new mitigation measures become available.

The approach must also strike a balance between optimizing the co-benefits of carbon removal measures that involve nature-based climate solutions, mitigating the risks associated with increased pressure from land requirements and reducing uncertainty. This entails balancing opportunities for Indigenous Peoples, habitat creation and nature conservation while avoiding risks to Indigenous Peoples' rights, biodiversity, food production, energy demand and water supply. It also requires reducing uncertainty concerning technical feasibility, costs, and permanence.

The capabilities for carbon removal at the scale required in climate models do not currently exist.<sup>62</sup> While natural carbon measures are readily deployable and generally cost-effective, the need for carbon removal exceeds what natural carbon removal measures can provide.<sup>63</sup> Bioenergy with carbon capture and storage, the most widely selected removal measure in models to meet the requirements of limiting global temperature rise, is yet unproven.<sup>64</sup> Direct air capture, which holds significant promise as a carbon removal technology, is still under development. Similarly, while carbon capture, utilization and storage (CCUS) has been around for some time, adoption is not on track to meet the pathway laid out in the IEA sustainable development scenario.<sup>65</sup>

For all of these reasons, carbon removal cannot be approached as an alternative to mitigation, but rather an addition. It should only be used to address hard-to-decarbonize sectors or essential end uses that cannot yet be decarbonized — while planning for their direct reduction in the long term. Indeed, a tonne of carbon removed (e.g. by storing it in a tree or underground) is not the same as a tonne of carbon reduced at the source (e.g. by replacing natural gas-fired plants with renewable energy sources). A tonne removed is still a tonne emitted and is susceptible to leakage, recognizing that technological approaches offer a higher

<sup>&</sup>lt;sup>62</sup> James Mulligan et al., *Carbonshot: Federal Policy Options for Carbon Removal in the United States*, World Resources Institute (2020), 12. https://wriorg.s3.amazonaws.com/s3fs-public/carbonshotfederal-policy-options-for-carbon-removal-in-the-united-states\_1.pdf

<sup>63</sup> Carbonshot, 12.

<sup>&</sup>lt;sup>64</sup> Sabine Fuss, et al., "Betting on negative emissions," *Nature Climate Change*, 4 (2014), 850. https://www.globalcarbonproject.org/global/pdf/Fuss\_2014\_Betting%20on%20negative%20emissions. NatureCC.pdf

<sup>&</sup>lt;sup>65</sup> International Energy Agency, "Tracking Clean Energy Progress." https://www.iea.org/topics/tracking-clean-energy-progress

degree of permanence than natural approaches and that insurance mechanisms are being developed to deal with issues of permanence. A tonne directly reduced is a tonne that does not deplete the limited carbon budget, permanently. Further, in the global carbon budget, an emission that is not reduced in the present cannot be compensated by future emissions reductions. Delaying direct reductions therefore increases future reliance on carbon removal while potentially consuming some of the resource needed to deliver future negative emissions.

#### Role of offsets

A carbon offset is the acquisition of a quantity of GHG emission reductions to compensate for the same quantity of GHG emitted elsewhere. Offsets offer the advantage of helping to finance and hence incentivize mitigation projects in unregulated sectors while creating compliance flexibility and reducing regulatory compliance costs. Offsets are traded domestically and internationally, in compliance and voluntary markets. For example, the Alberta Emission Offset System was established to facilitate compliance for regulated heavy emitters under the province's carbon pricing system. As part of its corporate environmental responsibility or its pledge to reach net-zero, a company can take action beyond its environmental regulatory requirements by purchasing carbon offsets in a voluntary market.<sup>66</sup>

Though offsets are an important element of an overall mitigation strategy, as previously stated, offsets cannot serve as a substitute for direct emissions reductions. What's more, to successfully drive positive environmental and other sustainability outcomes, offsets must demonstrate the highest level of environmental integrity. There is considerable debate over the certainty and legitimacy of some types of offsets. For example, a 2019 study has concluded that all of the 115.6 million offsets produced by the U.S. Forest Projects Protocol, the most productive protocol in the California Compliance Market, are illegitimate (representing 79% of California's total compliance offset supply). The other three protocols in the market also have the potential to produce illegitimate offsets.<sup>67</sup>

<sup>&</sup>lt;sup>66</sup> Alberta Emission Offset System. https://www.alberta.ca/alberta-emission-offset-system.aspx

<sup>&</sup>lt;sup>67</sup> Jack B. Smith, *California Compliance Offsets: Problematic Protocols and Buyer Behavior*, M-RCBG Associate Working Paper (2019), 74.

https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/files/120\_final.pdf

Measuring, monitoring and verifying offset reductions to ensure the associated reduction is real, additional, verifiable, permanent, and enforceable is challenging. Establishing robust and transparent rules will be critical for Canada.

## Tools to ensure an appropriate role for carbon removal and offsets

#### Tool 8: Offset systems and compliance mechanisms

Successful integration of offsets in decarbonization strategies will depend on the rigour of the rules guiding their creation and use, in both voluntary and compliance markets. Canada's approach to carbon offsets must also address the challenge of allocating offsets — a limited resource — to the activities that are deemed critical and difficult to decarbonize. As part of this strategy, Canada must ensure that:

- Existing provincial offset systems and the upcoming federal offset system only include protocols that ensure the highest levels of integrity, with a strong focus on verification and risk mitigation measures
- Energy and climate regulations that include offsets as a compliance mechanism also set a limit on the portion of compliance that can be met through this option
- A mechanism is in place to ensure the integrity of offsets used as part of corporate net-zero commitments and their consistent use with the principle of prioritizing direct emissions reductions
- Mechanisms are developed for fair allocation of limited offsets; these will need to be responsive to a changing landscape of carbon pricing, regulation, and innovation
- A strategy for the use of international offsets under the Paris Agreement (i.e. Internationally Traded Mitigation Options) is developed to provide clarity on project type eligibility and clearly exclude projects that are not consistent with the spirit of the Paris Agreement and that will lock in long-term production and use of fossil fuels.

# Steps for integrating net-zero principles

Determining Canada's pathways to net-zero emissions by 2050 is essentially an exercise in making choices that can result in a healthier, more just and inclusive society, and a prosperous economy that will be competitive as the world decarbonizes to safely limit warming to 1.5 degrees Celsius. To make the most of this opportunity and avoid loopholes that can lead to the release of more GHG emissions than will be permitted under a carbon budget on a journey to 2050, Canada needs a clearly articulated, shared approach to net-zero at all levels of decision-making — project, corporate, sectoral, municipal, provincial, and national.

That approach should require decision-makers to complete the following steps:

- Set ambitious, time-bound milestone national and sectoral targets and budgets from 2025 through 2050, separating mitigation from removal targets. *Associated principle: Pathways must be anchored in science and respect a carbon budget.*
- 2. Identify, and clearly articulate plans to act on, all available opportunities for direct emissions reduction for each sector for each milestone period; (e.g.: At the government decision-making level, uptake is incentivized through regulations and financial support.)

### Associated principle: Pathways must prioritize early, deep, sustained, technologically feasible reductions in every sector.

- 3. Identify future direct emissions reductions opportunities and implement policies that incentivize aligned research and development efforts, including capital and supply chain mobilization, to make technologies commercially available in the medium and long term for each sector for each milestone period. *Associated principle: Pathways must prioritize early, deep, sustained, technologically feasible reductions in every sector.*
- 4. Having determined all available and future opportunities for direct emissions reductions and planned for incentivizing the deployment and development of direct mitigation technologies for each sector for each milestone period, clearly articulate plans for appropriately scoped (based on removal capabilities and offset inventory expected to be available in each milestone period) and scaled deployment of carbon removal and offsets for those technically challenging or

prohibitively expensive emissions in each sector. Associated principle: Pathways must define an appropriate role for carbon removals and offsets.

While these steps speak to the second, third and fourth guiding principles articulated in section 2 (carbon budget, deep reductions, appropriate role for carbon removal, respectively), decision-makers must also account for the first principle (putting people first while advancing systemic change) through each cycle of planning and decision-making for each milestone period. Simply put, without thoughtful and thorough planning to address the need for a socially equitable and inclusive transition, Canada won't fully realize market and mitigation opportunities in the low-carbon economy.

### What's next

Reaching net-zero by 2050 is not straightforward. The journey, not the destination, will shape the future for Canadians. To contribute to building a common understanding around net-zero and what is at stake in the journey ahead, this report puts forward key principles, steps for integrating principles, and tools to inform the development of pathways to 2050. This is Canada's journey to a safe climate, a more inclusive, resilient, and competitive economy.

Over the coming months, the Pembina Institute looks forward to building on these reflections and recommendations with decision-makers in government, Indigenous and local communities, as well as stakeholders in business, research and innovation, and civil society. This includes work to strengthen and implement Canada's 2050 toolbox and dive deeper on steps for integrating principles.

One important venue for such engagement is the upcoming consultation on Canada's net-zero pathways, which will be established by Canada's Net-Zero Advisory Body toward providing advice to the Minister of Environment on pathways to 2050. Importantly, this must include setting guideposts for provincial/territorial and sectoral pathways by setting sectoral GHG targets and budgets. The conversations should also bolster the federal government's consultation on Canada's new climate plan with provinces and territories toward delivering increased ambition for 2030.

Achieving robust pathways will require leadership at all levels of decision-making — project, corporate, sectoral, municipal, provincial, and national. We look forward to leveraging the leadership of governments, communities and companies that have committed to net-zero — to support the development of more robust and aligned frameworks for Canada's pathways to a net-zero future.