

Canada's promised goal: “Net-Zero Emissions by 2050”

WHY WE NEED AN HONEST PUBLIC DISCUSSION ABOUT
THE FAILURE OF CANADA'S EMISSIONS REDUCTION TARGETS

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Introductory comment

Five years ago, in late November 2020, Canada’s Minister of Environment and Climate Change announced that Canada would enact legislation committing Canada to achieve “Net-Zero Emissions by 2050”. A new law, passed by Parliament on June 30, 2021, laid out a timetable for announcing specific emissions reduction targets for 2030, 2035, 2040, and 2045.

On July 12, 2021, in accordance with the new legislative timetable for the public disclosure of our emissions reduction targets, the government announced that Canada’s commitment to reduce our emissions by 2030 had been increased to a promised reduction in the range of 40% to 45%

by 2030, below the 2005 level. Before that announcement, Canada's promised reduction by 2030 was 30%, which had been set in 2015.

It has been recognised since at least 2018 that a 30% reduction target falls far short of what would be required to align Canada's climate policy with the 1.5°C goal. Our "enhanced" reduction target announced in July 2021 raised expectations that Canada would adopt stringent new climate policies aimed to reduce our emissions. In 2005 Canada's annual emissions were 759 Mt CO₂eq (millions of tonnes of CO₂eq). A 40% to 45% reduction by 2030 would mean that our national emissions would decline to within a range 420-456 Mt CO₂eq.

Unfortunately, it is now clear that Canada's emissions reductions are not remotely on track to meet that 2030 target. The emissions that are the subject of these commitments are quantified and reported in Canada's *National Inventory Report*, which Canada submits annually to the UN Framework Convention on Climate Change (UNFCCC). The most recent edition of the *Inventory Report* was published in April 2025. There is a time delay in compiling and reporting the emissions data in these reports with the result that the most recent *Inventory Report* provides us with Canada's emissions data only up to 2023. Our total annual emissions in 2023 were 694 Mt CO₂eq. That represents a reduction of only 8.5% below the 2005 level.

While official emissions data for the 2024 year are not yet available (they will likely not be publicly released until April 2026) the *Canadian Climate Institute* on September 20, 2025, released a report with a *provisional* estimate showing that our national emissions did not decline at all in 2024: they "flatlined" in 2024 and remained at 694 Mt. To achieve Canada's promised 40% reduction target would require cutting Canada's emissions down to 456 Mt by 2030 - which would mean annual reductions of about 40 Mt every year from now to 2030. Annual reductions on that scale are unachievable.

Canada's 40% reduction target is now beyond reach. The new *Canadian Climate Institute* report concludes that "Canada is on track to reduce emissions just 20 to 25 per cent below 2005 levels by 2040": <https://440megatonnes.ca/insight/canada-emissions-flatlined-in-2024-early-estimate-shows/>. That is the predicament we face. The purpose of this discussion paper is to take a close look at Canada's declared climate policy goal and the sufficiency and candour of our existing scheme of emissions reduction targets for 2035, 2040, and 2045.

1. The meaning of the term "net zero emissions" in Canada's climate policy

The term "net zero emissions" used in the Government of Canada's presentation of our climate policy refers to net-zero "anthropogenic emissions". That is the definition used in the *Canadian Net-Zero Emissions Accountability Act* passed by Parliament on June 30, 2021, namely, all greenhouse gas (GHG) emissions released by all industrial activities within Canada including oil and gas production and other economic activities (transportation, agriculture, mining, logging, etc.). The promised "net-zero goal" relates solely to what are more commonly referred to as human caused emissions. The full definition of "net-zero emissions" is found in the Definition section of the *Canadian Net-Zero Emissions Accountability Act* which defines it as follows:

Net-zero emissions means that anthropogenic emissions of greenhouse gases into the atmosphere are balanced by anthropogenic removals of greenhouse gases from the atmosphere over a specified period (emphasis added).

A viable net-zero policy rests on the expectations and commitment that by 2050 the amount of “remaining emissions” will be fully offset by emissions “removals”. That raises essential questions about the capacity of the envisioned carbon dioxide removal (CDR) technologies that will be feasible by 2050. The crucial question, essential to assess the viability of Canada’s “Net-Zero by 2050” policy, is whether the required amount of “removal” capacity will be available by 2050 and during the following years to balance the projected amount of Canada’s remaining emissions after that date.

Section 4 of the Net-Zero Act provides:

The purpose of this Act is to require the setting of national targets for the reduction of greenhouse gas emissions based on the best scientific information available and to promote transparency and ambitious action in relation to achieving those targets, in support of achieving net-zero emissions in Canada by 2050 and Canada’s international commitments in respect of mitigating climate change (emphasis added).

Meeting the “Net-zero emissions by 2050 goal” with respect to Canada’s defined national emissions would require rapid and deep cuts in the level of emissions across all industries and economic sectors in Canada, above all in the oil and gas sector which is the largest contributor to our annual emissions. It would require cuts on a scale and at a pace that at present is not even contemplated in most public and political discussions.

It would also require the future construction in Canada of Carbon Capture and Storage (CCS) installations on an unprecedented scale and development of other Carbon Dioxide Removal (CDR) technologies to remove equivalent amounts of CO₂ from the atmosphere to offset the portion of the ongoing emissions that we continue to release.

At present, the envisioned future CDR technologies that have the capacity to remove CO₂ directly from the atmosphere either do not exist or exist only in very small-scale experimental forms: see Part 7 below “Feasibility of Large-Scale Carbon Dioxide Removal by 2050”.

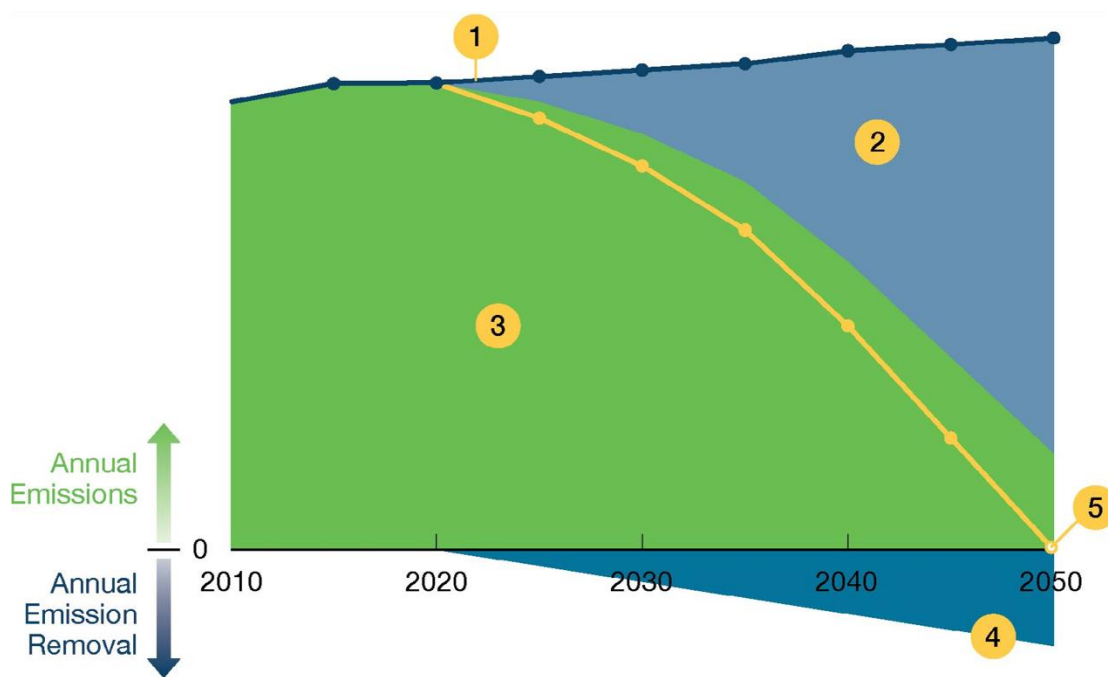
In assessing the government’s “Net-Zero by 2050 goal”, it is important to recognize that Canada’s reported Oil and Gas sector emissions include only those emissions released within Canada’s territorial borders and exclude the much larger share of the emissions released into the atmosphere when our exported oil and gas is combusted as fuel in foreign jurisdictions (see my discussion of oil exports and “downstream emissions” in Part 12 below). That is a fundamental defect in the “net-zero by 2050” goal in the way we and other states have defined it. If we take the net-zero emissions goal as the sole or exclusive measure of what we must do to control our emissions, and if we and other major oil producers ignore the hugely consequential climate impact of the downstream emissions from our exported oil and gas, we will fail in our efforts to avoid a terrible future.

2. Canada announces its Net-Zero Emissions by 2050 goal (November 2020)

Initial details of Canada's Net-Zero goal were publicly released in a report published by the Canada Energy Regulator (CER) in November 2020. It explained the basic concept of the plan using a graph (which I reproduce below) accompanied by a brief explanatory text: "GHG Emissions Remaining after Mitigation and Emissions Removal". Adjacent to the graph the report included a short paragraph summarizing the concept of "net-zero":

Reaching net-zero emissions does not necessarily require eliminating all emissions everywhere. Instead, residual emissions can be balanced by enhanced biological sinks and negative emissions technologies.

— Canada's Energy Future 2021 report, page 67 (emphasis added)



Source: Canada's Energy Future 2020, November 24, 2020, Figure NZ.1 at p.67

The graph depicts the level of Canada's annual emissions as starting to decline (starting to curve downward) in 2020. But there is no scale or numerical measure included in this graph to tell us what the reduced level of Canada's emissions is supposed to be by 2050 or what the projected amount of "remaining emissions" might be in 2050. It just reads "annual emissions", with the years given along the horizontal base.

The graph includes a notation indicating the amount of "Annual Emissions Removal" but omits any numerical scale or measure of what the required volume of annual removals would have to be achieved by "negative emissions technologies" or by means of "enhanced natural sinks".

On the far right-hand side of the diagram, by the year 2050 a substantial but unspecified volume of emissions is still being released into the atmosphere. Hypothetically offsetting that volume of remaining emissions, an equivalent volume of “emissions removals” (represented on the graph by numeral 4) is assumed to be achievable by 2050 to ensure that the overall result for that year will be “net-zero”. Numeral 5 points to the “0” baseline, indicating that “removals” by 2050 will completely balance remaining emissions.

The CER in its 2020 report did not provide any quantitative information about the future levels of “residual emissions” or any estimate of the annual level of “removals” that would be needed by 2050 to “balance” that number.

Therefore, the graph envisions that if we fail to adopt new policies within the next 30 years to achieve the needed deep reductions by 2050 (i.e., policies that allow us to massively reduce our emissions by ending our energy dependence and economic dependence on fossil fuels) we can nevertheless halt any further increases in the amount of CO₂ released into the earth’s atmosphere by deploying technologies that will have the capacity to capture emissions at industrial sites before they are released into the atmosphere, or actually remove CO₂ from the atmosphere.

3. The Canadian Net-Zero Emissions Accountability Act (June 30, 2021)

The promise that Canada will achieve “net-zero emissions by 2050” was given legal form in the *Net-Zero Accountability Act* (the “Net-Zero Act”) passed by Parliament on June 30, 2021. A careful reading of the legislation reveals that this legislation provides no quantified emissions target in 2050. We can only judge the prudence and viability of Canada’s plan (or of any national net-zero plan) if we know what the magnitude of the remaining emissions will be in 2050. However, when Parliament on June 30, 2021, passed the *Net-Zero Act*, the new law delayed the public disclosure of key climate targets for many years. Section 7 of the legislation sets deadlines for when the government must reveal the national emissions reduction target for 2035, 2040, and 2045, each designated a “milestone” year:

7 (4) The Minister must set the national greenhouse gas target

for the 2035 milestone year, no later than December 1, 2024;

for the 2040 milestone year, no later than December 1, 2029;

for the 2045 milestone year, no later than December 1, 2034

Canada’s only existing greenhouse gas target is a promised 40% to 45% reduction by 2030 below the 2005 level. In late 2024, in accordance with section 7(4) of the new legislation, the Federal Government released a brief statement that Canada’s emissions reduction target for the 2035 milestone year is a 45% reduction below the 2005 level – which merely repeats the earlier target announcement but extends the time frame for the promised 45% reduction to 2035.

The new law does not legally require the government to establish or disclose to Canadians the emissions target for the year 2040 until December 1, 2029 – five years from now. The Act provides that the Minister is not required to reveal the target for the 2045 year (that is, the expected level of Canada’s “remaining emissions” in 2045) for another ten years.

The law enables the government to conceal from the public for many more years the long-term emissions implications of Canada's current plans to continue expanding oil and gas production.

The announcement of a "net-zero emissions by 2050" goal does not provide a climate plan for Canada. It allows the Government of Canada more time to delay the day of candour – to delay a truthful accounting of the contradiction between Canada's existing policies, which continue to support the ongoing expansion of the oil and gas sector and to delay the kind of action required now to give us a realistic chance of avoiding a catastrophic outcome.

We have no way of knowing if Federal Government Ministers and their advisors (Deputy Ministers and senior bureaucrats) may have already developed projections and scenarios that estimate what our remaining emissions will likely be by 2050 based on Canada's existing emissions reduction policies and on planned future climate policies. If they possess that information (they almost certainly do) they are not revealing it to Canadians. The other possibility is that even the most senior Ministers of our government have no realistic idea of what our remaining emissions will be by 2050.

If Canadians do not have access to that kind of information, it is impossible for us to assess the viability of Canada's Net-Zero by 2050 pledges. If "residual emissions" (i.e., remaining emissions) are going to remain at very high levels, the amount of carbon removal required by 2050 will far exceed the capacity of feasible "removal" technologies (see Part 7 below).

4. Canada's declared Net-Zero Emissions by 2050 goal is misleading Canadians

The term "net-zero emissions" is a concept that is important and indeed essential to developing and understanding emissions reduction policy. Net-zero emissions means that after a certain future date (i.e. 2050) Canada (and hopefully all countries by 2050 or a few decades later) will cease releasing any additional amounts of CO₂ into the atmosphere or alternatively, if it proves necessary that we continue to burn some amount of fossil fuels, that we "capture" all of the ongoing CO₂ emissions at the site of the emitting facilities by means of Carbon Capture and Storage (CCS) technology or we rely on envisioned future Carbon Dioxide Removal (CDR) technologies to remove equivalent amounts of CO₂ from the atmosphere to offset any portion of the ongoing emissions that we continue to release. "Net-zero emissions" means there are no additional net-positive emissions. Any ongoing amount of "remaining emissions" in and after 2050 is fully offset by removals.

Canada's "net zero" emissions policy is misleading because the declaration that we will achieve "net zero" emissions in Canada by 2050 does not identify or commit us to any quantified emissions reduction objective for that year. The information disclosed by the Federal Government does not provide Canadians with any information about (1) what our "remaining emissions" will be in 2050 and does not disclose (2) any evaluation or estimates about what future level of "removals" might be feasible by 2050. We are missing therefore the two kinds of information that are essential if we wish to assess the viability and feasibility of the government's declared "Net-Zero emissions by 2050" policy.

It is important to emphasize that the Federal Government publicly announced its “Net-Zero Emissions by 2050” in November 2020, almost exactly five years ago. Legislation enshrining this “national greenhouse gas target” in legal form was passed by Parliament in June 2021. The government has had five years to develop scenarios and studies that could provide Canadians with some quantified estimates of what Canada’s “remaining emissions” will be by 2050 and with some appraisal of what level of emissions “removal” capacity will be feasible by that date.

5. “Net-zero by 2050” promises by other high-emitting countries

Similarly, other advanced industrial countries that have promised “net-zero emissions by 2050” goals do not disclose any details showing what the level of *remaining emissions* will be in these countries by 2050 (all of which will have to be fully “captured” by CCS or subsequently removed from the atmosphere by carbon dioxide removal (CDR) technologies).

The UN Environment Programme’s *Production Gap Report* published November 20, 2024, notes at page 53 that the net-zero pledges made by many countries “do not specify how much they will depend on CDR, nor the level of residual emissions they plan to maintain when they achieve net-zero CO₂ and GHG targets.” (emphasis added)

6. Parliamentary Committee dismisses warning about the risks posed by a climate plan that relies heavily on promised future carbon removals

Shortly before Canada’s *Net-Zero Emissions Accountability Act* was passed into law in June 2021, the Parliamentary Standing Committee on Natural Resources examined the proposed legislation.

Canadian climate scientist Kirsten Zickfeld, who is one of the world’s leading experts on the relationship between rising greenhouse gas emissions and warming (and who served as a lead author on the IPCC’s *Special Report on Warming to 1.5°C* published in October 2018 and also on the IPCC’s recent Sixth Assessment Report), filed a written submission to the Parliamentary Committee that warned of the risks posed by a climate plan that relies heavily on future “emissions removals”:

<https://www.ourcommons.ca/Content/Committee/432/ENVI/Brief/BR11354997/br-external/ZickfeldKirsten-e.pdf>.

In her submission to the Parliamentary Committee, Zickfeld referred to an article, *Beyond “Net-Zero”: A Case for Separate Targets for Emissions Reduction and Negative Emissions*, Duncan P. McLaren, et al., *Front. Clim.*, 21 August 2019. The McLaren article proposes that in formulating their net-zero plans national governments should develop and disclose two targets, namely one target for “remaining emissions” and the other disclosing the projected level of carbon “removal” that will be available and feasible by 2050. The Parliamentary Committee declined to consider this proposal. The McLaren article is found at:

<https://www.frontiersin.org/articles/10.3389/fclim.2019.00004/full>.

7. Feasibility of large-scale Carbon Dioxide Removal (CDR) by 2050

The “Net-Zero emissions by 2050” commitments announced by the world’s advanced industrial economies, including by Canada, are based on the premise or assumption that very large-scale installations of Carbon Capture and Storage (CCS) technology and of Carbon Dioxide Removal (CDR) technologies will enable us by 2050 to declare that we have ceased any further “net positive” additions to the cumulative amount of carbon in the atmosphere – meaning that all remaining CO₂ emissions thereafter will be fully offset (or “balanced”) by massive amounts of “removals” to be achieved by those technologies.

We don’t know how large these envisioned annual future removals after 2050 will have to be because we do not know what the annual level of remaining emissions will be in Canada (or globally) by 2050. Nor has Canada revealed any quantitative information or even any preliminary estimates about what levels of annual “carbon removal” capacity may be feasible in Canada by 2050.

However, we now have available a series of recent authoritative studies that have estimated the future global “carbon removal” capacity that will be feasible by 2050, including analyses published by the International Energy Agency (IEA) and reports by other leading climate research bodies: see the IEA’s report *A Net-Zero Roadmap: A Global Pathway to Keep the 1.5°C in Reach* (2023) and the IEA’s *The Oil and Gas Industry in Transition* (November 23, 2023).

Our predicament is that global oil, gas, and coal combustion emissions reached 37 GtCO₂ (billions of tonnes of CO₂) in 2022. That global number must be reduced to “net-zero” by 2050. Canada is the world’s 4th largest oil producer. Yet our oil production is still increasing.

The International Energy Agency (IEA) recently concluded that CCS technology could scale up to a maximum global capacity of 6 GtCO₂ annually by 2050. Carbon Dioxide Removal (CDR) capacity in terms of the upper bound of what may be feasible by 2050 is estimated by the IEA to be 1.7 Gt CO₂ per year. Promises that CCS and CDR technologies will allow us to safely delay near-term reductions in global oil and gas production are completely unsupported by the evidence and are profoundly misleading.

The IPCC AR6 WG3 report published in 2023 concluded that once warming exceeds 1.5°C, rising for example to 1.7°C or above, the scale of the emissions “removals” that would be required in future to roll us back to a more survivable level of warming using envisioned CDR technologies is enormous:

Obtaining net-negative CO₂ emissions requires massive deployment of carbon dioxide removal (CDR) in the second half of the century, on the order of 220 (160-370) GtCO₂ for each 0.1°C degree of cooling (based on the assessment of the likely range of the transient response to cumulative CO₂ emissions ...

— IPCC AR6 Working Group III, Chapter 3 section 3.5.2.1 (emphasis added)

To roll back warming by just 0.1°C we would need to “remove” from the atmosphere about 220 GtCO₂, which is equivalent to removing the accumulated emissions from all oil, natural gas, and coal combustion in every country in the world over five years.

The IEA explains in its report *A Net-Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach* (2023) that with even a relatively limited amount of “overshoot” (for example if warming reaches 1.7°C) an effort to roll back that higher level of temperature by even 0.1°C or 0.2°C would require that we (our children and grand-children) rely on CDR technologies to remove over 5 GtCO₂ every year during the second half of this century, seeking to achieve total removals of about 250 GtCO₂ by 2100.

In recent years leading climate scientists have criticized the way governments and industry are promoting the promised future benefits of CCS and CDR technologies to justify delaying near-term reductions in oil, natural gas, and coal production. See: *Climate scientists: the concept of net zero is a dangerous trap*, James Dyke, Robert Watson, and Wolfgang Knorr, *The Conversation*, April 22, 2021: <https://theconversation.com/climate-scientists-concept-of-net-zero-is-a-dangerous-trap-157368>. Dyke, Watson, and Knorr in a more recent article published on August 30, 2024, again addressed the issues of net-zero, overshoot, and carbon dioxide removal: *The overshoot myth: you can’t expect to keep burning fossil fuels and expect scientists of the future to get us back to 1.5°C*.

Thomas Homer-Dixon in 2020 warned about the massive scale of proposed carbon removal projects that would be required to meet the Paris Agreement commitment to limit warming to 1.5°C if the start of deep reductions in global fossil fuel production is delayed for another ten or fifteen years:

To reach the Agreement’s goals, the scale of the proposed [carbon removal] projects would have to be breathtaking. Keeping temperatures from rising above the 1.5°C target in 2100, for instance, would require removal from the atmosphere of at least a half-trillion tonnes of carbon dioxide in a global effort starting almost immediately and extending beyond the end of this century ... removing it would require the largest industrial project in history by far, and one that would absorb a large fraction of the world’s economic output for decades.

— Thomas Homer-Dixon, *Commanding Hope: The Power we have to Renew a World in Peril* at page 222 (emphasis added)

That was written in 2020, just as Canada and other advanced economies began to announce their promised “net-zero emissions by 2050” goals. Homer-Dixon’s estimate of “at least a half-trillion tonnes of carbon dioxide” (500 billion tonnes of CO₂) would mean removal of at least 10 GtCO₂ every year for 50 years – and even that massive undertaking, if it were feasible, would roll back less than about 0.3°C of temperature “overshoot”.

Our predicament is that we are heading for “overshoot” far above 1.5°C. (i.e., far in excess of 1.7°C or 1.8°C). If we continue to delay deep and rapid cuts in global oil, natural gas, and coal production until after 2040, we will likely see long-term warming of 2.7°C by 2081-2100, with mid-term warming of 2°C as early as 2041-2060: see the IPCC’s SSP2-4.5 Scenario, Box SPM.1 and Table APM.1 at pages 13-14, in the IPCC AR6 Working Group 1 Report (2023), Summary

for Policy makers, found at https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf.

Recent studies tell us that the upper feasible level of annual removals by carbon dioxide removal (CDR) technologies is likely in the much lower range of 1.7 GtCO₂ per year (far below the 10 GtCO₂ per year required in Thomas Homer-Dixon's example). The economic and environmental costs of these schemes is enormous. In the case of proposed BECCS technologies (Bioenergy with Carbon Capture and Storage) the massive scale of the BECCS infrastructure would require allocating a substantial share of the world's available croplands (and water resources) to grow sufficient biomass material to be burned in these future facilities to extract the CO₂ which would then have to be transported by pipeline networks and injected underground for permanent storage (under conditions that ensure it can never escape into the atmosphere). The scale of the biomass required for BECCS will compete with demand for land and water to support global food supply. We are already seeing worsening drought conditions and escalated temperatures that are adversely affecting crop yields.

CCS and envisioned future CDR can play only a very limited role in achieving the required deep emissions reductions needed by 2050 to give us any remaining chance to limit warming to 1.5°C. My Working Paper, *Canada's Oil Future: Reliance on Carbon Capture and Carbon Removal Technology is a Dangerous Trap* (November 2024) includes a more detailed discussion of the recent evidence and sources; it can be found at <https://allard.ubc.ca/sites/default/files/2024-11/2024%2001%20Gooderham%20Canadas%20Oil%20Future.pdf>

8. Missing Canada's 2030 greenhouse gas target

To meet its commitment under the terms of the Paris Agreement to achieve a 40% reduction of our total national emissions by 2030 below the 2005 level, Canada would have to reduce our emissions from 759 Mt (the 2005 level) down to 456 Mt in 2030 – an absolute reduction of 303 Mt.

Up to the end of 2023 (see page 74 in the 2023 Edition of Canada's *National Inventory Report*) we have achieved a reduction of only 65 Mt (slightly more than an 8% cut). Further, the *Canada Climate Institute's* recent report indicates that in 2024 Canada's emissions remain at 694 Mt, with no improvement on the 2023 level.

Therefore, as of the start of 2025 we are still 238 Mt short of our 2030 target.

That total of 694 Mt CO₂eq reported for the year 2023 comprises all of Canada's seven (7) economic sectors. Canada's largest emitting sector is the Oil and Gas sector (208 Mt), followed by Transportation (157 Mt), Buildings (83 Mt), Heavy Industry (78 Mt), Agriculture (69 Mt), Electricity (49 Mt), and Waste and Others (50 Mt).

More than half of our annual emissions are released into the atmosphere by just two economic sectors: the Oil and Gas sector and Transportation. The experience of the past 18 years shows that transportation sector emissions (all passenger cars, all freight transport by trucks, rail, domestic aviation and marine transport) have achieved no significant decline at all.

Transportation sector emissions totalled 156 Mt in 2005 and increased slightly to 157 Mt in 2023. Carbon pricing (which was abandoned on passenger cars in early 2025) and a promised transition to electric passenger vehicles (which is now being deferred) have yielded no absolute reductions. These measures may, however, have avoided some further increases.

Buildings (residential and commercial heating, hot water, air conditioning) have shown a very small decline from 85 Mt down to 83 Mt. Improvements in heating technologies and design have reduced energy intensity but rapid expansion of new building space has eclipsed those gains.

Agriculture showed a small increase (from 66 Mt in 2005 to 69 Mt in 2023), while the Waste and Other sector a small decline from 54 Mt to 50 Mt. The net result in those two sectors is an insignificant 1 Mt decline.

The only large-scale reduction achieved by any economic sector in Canada between 2005 and 2023 was Electricity: following the shut-down of coal-fired electricity initially in Ontario and then in other provinces, emissions in that sector fell rapidly from 116 Mt in 2005 down to 49 Mt in 2023.— a massive 67 Mt reduction. That was Canada’s “low hanging fruit”. It offered us, twenty years ago, a singular opportunity to begin deep cuts in our emissions. But we have now exhausted the easy part of that transition (moving away from coal-fired power) and we cannot look to the Electricity sector to give us any additional large-scale cuts in the near future.

The only other sizable reduction (apart from the Electricity sector) was in Heavy Industry where emissions fell from 88 Mt in 2005 down to 76 Mt by 2023. That sector comprises seven different industries (Iron and Steel, Pulp and Paper, Cement, Chemical and Fertilizers, etc.) which have achieved some modest declines over the past eighteen years. But further reduction in the short term will be very limited in scale. Deeper cuts will require major technological transitions and changes in industrial processes, which can only occur incrementally over a decade and longer.

Transportation, Electricity, Industry, and Buildings sectors are not on track to deliver any substantial additional emissions reductions between now and 2030.

9. Oil and Gas: Canada’s largest emitting sector

The oil and gas sector accounts for the largest share of Canada’s annual emissions: 208 Mt in 2023 (31% of our national total). Those emissions are released from production and processing in the oil sands sub-sector in Alberta (89 Mt in 2023); from conventional oil production across Canada including offshore oil in the Atlantic provinces (38 Mt); and from natural gas production and the LNG industry (52 Mt). In addition, another 28 Mt is released by petroleum refining and by oil and gas transmission activities.

There is no prospect that between now and 2030 the current high levels of oil and gas sector emissions are going to substantially decline. Emissions levels are largely driven by the levels of production. The past record in Canada’s oil sands shows that when production has been significantly rising, technology innovations and improved productions methods (i.e., by the use of solvents and by electrification of some processes) can reduce *emissions per barrel* (carbon intensity per barrel during the production process) and have successfully done so during the past

20 years, but those gains have been effectively wiped out by increased levels of production. During its recent period of production expansion, oil sands emissions increased from an annual level of 37 Mt in 2005 to 89 Mt in 2023. Notwithstanding reductions in *emissions per barrel* (about 1% per year in recent years) total oil sands emissions have continued to increase.

The *Emissions Reduction Plan 2030* published on March 29, 2022, by the Federal Government confirms that none of the government's proposed new climate policies, including plans to subsidize large-scale deployment of Carbon Capture and Storage (CCUS) technology in the oil sands industry, are intended to bring about any decline in the currently projected growth of Canada's oil production. Indeed, the text of the ERP affirms that the aim of government policy will be to continue to maximize production:

The government will work closely with the provinces and the sector to manage competitiveness challenges, remain attuned to evolving energy security and climate risk considerations, maximize opportunities for ongoing investment in the sector, and minimize the risk of carbon leakage. The intent of the cap is not to bring reductions in production that are not driven by declines in global demand. Mechanisms like the CCUS investment tax credit will help support decarbonization.

— 2030 Emissions Reduction Plan, March 29, 2022, p.53 (emphasis added)

The government's plan is clear: Canada's oil production will continue to increase until other countries eventually begin to consume less oil. In the meantime, Canada's production levels will be guided solely by "global demand".

The promised solution is Carbon Capture and Storage (CCS) technology. During the past several years the oil industry and Federal Government Ministers have made bold claims that large-scale adoption of CCS will make possible substantial emissions reductions even while oil sands production continues to grow.

On October 14, 2022, a consortium of nine oil sands producers (who account for 90% of Canada's oil sands production) announced a total of \$24.1 billion will be spent between now and 2030 on emissions reductions in the oil sands: see <https://pathwaysalliance.ca/news-release-22oct14/>. Of that amount, \$16.5 billion will be allocated to deployment of CCS technology (almost half of which, \$7.1 billion, will be funded by Canadian taxpayers through subsidies paid by the Federal Government). The oil sands producers have declared they will reduce their annual upstream emissions by as much as 22 Mt CO₂eq by 2030, with 12 CO₂eq of that amount to be achieved by CCS technology.

An analysis by the Pembina Institute in 2022 found that CCS could possibly achieve emissions reductions of 7 Mt – 15 Mt in the oil sands sub-sector by 2030: "Getting on Track: a primer on challenges to reducing carbon emissions in Canada's oil sands:

<https://www.pembina.org/reports/getting-on-track.pdf> ; also March 21, 2022: <https://www.pembina.org/reports/decarbonizing-canadas-oil-and-gas-supply.pdf>.

In a very recent study published in October 2025, the Pembina Institute concludes that when it is fully operational the Pathways project will reduce oil sands emissions by 10.8 Mt CO₂eq per year: https://www.pembina.org/sites/default/files/2025-10/A_Not-so-Grand_Bargain.pdf

In late 2023 the Federal Government released a proposed new regulatory plan that would implement a cap-and-trade carbon pricing scheme covering Canada's oil and gas sector which would "cap" the further growth of emissions in that sector: see *Regulatory Framework for an Oil and Gas Sector Greenhouse Gas Emissions Cap*, December 7, 2023. But this proposal does not envision any reduction in oil and gas production levels. Annex 1 of the document confirms that oil and gas production will continue to expand in Canada at least up to 2030, including new LNG production in B.C. The government's promise is that the emissions generated by oil and gas extraction activities can be reduced even while production levels are increasing.

The government's "cap" plan released in 2023 claims that by 2030 the level of emissions at oil sands extraction and upgrading sites will be reduced by 20 Mt per year, with a portion of that reduction to be achieved by CCS technology (as noted above emissions in the oil sands sub-sector reached 87 Mt in 2023). The promise is that natural gas production and processing emissions will be reduced by 6 Mt. Emissions at conventional oil production sites will be reduced by only 1.0 Mt. The new emissions "cap" scheme also promises reduction in the annual level of methane emissions released by oil and gas operations.

But this cap-and-trade regulatory plan has not yet been implemented. *The Regulatory Framework* document is found at:

<https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/oil-gas-emissions-cap/regulatory-framework.html>

It is possible that the new "cap" scheme, if it is quickly adopted and fully implemented by 2030, could cut CO₂ emissions in the oil and gas industry by some amount in the range of 10 Mt CO₂ up to as much as about 30 Mt CO₂ per year by 2030 (if we accept the Federal Government's estimates). But a reduction of Canada's oil and gas sector emissions even at the high end of that range by 2030 by as much as 30 Mt will not address our predicament. Counting from the beginning of 2025, we are still 238 Mt short of our commitment to achieve a 40% reduction of Canada's total emissions by 2030.

10. The foundering of Canada's policy to curb oil and gas emissions

As I write this in October 2025, the dominant political and policy discussion in Canada is advocating the approval of a new oil pipeline from Alberta to Prince Rupert or Kitimat on the North-West Coast and demanding the cancellation of the long-standing ban on oil tanker traffic on B.C.'s northern coast to facilitate increased oil sands production and exports to Asia.

In addition, a series of emissions-intensive new LNG facilities in B.C. (LNG Canada phase 2, Woodfibre, Cedar, and the Ksi Lisims LNG project) are scheduled to be in operation by 2030. There are also calls by the oil industry that the Federal Government should abandon its proposed "cap" on emissions in the oil sands and cancel the existing industrial carbon price that applies to oil producers. The consumer carbon pricing system in Canada has already been abandoned. The major oil sands producers are demanding higher levels of public subsidy and additional financial benefits before they commit themselves to proceed with the costly Pathways CCS project.

Fears about the effect of new tariffs and serious threats by the United States against Canada's export-dependent economy are driving some of these new proposals and demands. Public anxiety about our future economic security is being used to justify abandoning existing curbs on increasing oil and gas sector emissions. At a meeting to discuss tariffs with the U.S. President in Washington on October 8, 2025, Prime Minister Carney proposed that the construction of the Keystone XL pipeline project (cancelled by President Biden in early 2021) should be approved.

This shift in public mood may foretell the abandonment of Canada's existing commitment to establish a series of binding greenhouse gas targets that will guide us through the 2030s and 2040s. The oilsands industry and the Province of Alberta are now offering what they call a "Grand Bargain": the advocates of the new pipeline propose that the oil industry will proceed with the construction of the Pathways CCS project *if in exchange* the Federal Government will approve the proposed new pipeline to the West Coast. The Pembina Institute in its October 2025 report presents three emissions scenarios that describe the options we are being offered:

i. "Current Measures Scenario"

The first scenario assumes that the Pathways carbon capture (CCS) project does not get built and that oil sands production continues to increase to 2034 before leveling out. This scenario is based on the Canada Energy Regulator's "Current Measures Scenario" which assumes that Canada's oil sands production will continue to increase for at least another decade and that no new climate policies will be implemented in Canada that will limit that expansion. In this scenario the annual level of oil sands industry emissions will not fall below 85 Mt CO₂eq. There will be no emissions reductions at all in the oilsands industry over the next 10 years.

ii. "Current Measures Plus Pathways Scenario"

The second scenario assumes that oil sands production will continue to expand to 2035 but accepts that the Pathways CCS project will become fully operational by 2030, or soon after. Based on those assumptions the annual level of oilsands emissions will fall by 10.2 Mt CO₂eq. By 2035 emissions from the oilsands will decline to 75 Mt CO₂eq per year.

iii. "Grand Bargain Scenario"

The third scenario assumes that the Pathways CCS project will become fully operational and that annual emissions will fall by 10.2 Mt CO₂eq but it also assumes that the proposed new pipeline is built (adding 1.0 million bpd of new pipeline capacity to the West Coast) which will allow oil sands production and exports to increase by an additional 800,000 bpd by 2034. Under this scenario oil sands emissions increase to an annual level of 90 Mt CO₂eq. Increased emissions resulting from the growth in oil sands production facilitated by the new pipeline more than offset the emissions reductions provided by the completion of the Pathways CCS project.

These three scenarios fairly describe the choices we are being offered. A possible fourth option, halting further production growth and starting to wind down Canada's oil and gas production, is absent from the public and political discussion.

Given these three options and the divided and conflicted state of political discussion in Canada, the best outcome we can anticipate is a small 10 Mt CO₂eq decline in oil sands industry emissions by 2030 (the second scenario) which is an insignificant reduction given the massive shortfall we face to meet Canada's 40% emissions reduction by that date. The alternative is no reductions at all (the first scenario) or, if the proposed new pipeline to the West-Coast is built, another 10 years of *increasing* oil sands emissions in Canada. All three scenarios mean that the Federal Government's 2030 and the 2035 greenhouse gas targets are far beyond reach.

11. "Enhanced biological sinks": the limits of nature-based solutions

The Canada Energy Regulator's report published in 2020 included a short paragraph telling Canadians that our remaining emissions can in future be "balanced" not only by new removal technologies but also by "enhanced biological sinks" that will remove carbon dioxide from the atmosphere (see Part 2 above).

Nature-based methods of carbon removal include planting new forests and the reforestation of previously deforested areas, wetland restoration, soil carbon sequestration, and other strategies aimed at preserving and enhancing carbon storage in ecosystems and on agricultural lands. But given the current annual level of fossil fuel combustion emissions (37 GtCO₂ per year) the potential that we can achieve removals by means of "enhanced biological sinks" on a scale that would materially contribute to "balancing" any significant share of that is very slight.

The *Production Gap Report* (2023) estimates that on a global scale removal of 2.2 GtCO₂ per year may be feasible by these nature-based methods of increasing sequestration. The IEA's *Direct Air Removal* report (June 2023) gives a range of 0.5 to 5.0 GtCO₂ per year. It is however acknowledged that a major uncertainty underlying heavy reliance on nature-based solutions is the "impermanence" of methods that aim to preserve and enhance storage in terrestrial or aquatic ecosystems. The risk is that successfully stored land carbon could be subsequently lost back to the atmosphere due to future disturbances such as wildfires and deforestation. A paper by climate scientists Matthews and Zickfeld (March 17, 2022) points out that portraying nature-based mitigation activities as equivalent to and interchangeable with fossil fuel CO₂ emissions reductions rests on the assumption that the "removed carbon" will be permanently sequestered:

This is a critical assumption that has not been well acknowledged in the literature to date; indeed, anything less than permanent storage would result in only a temporary climate benefit that would not match the multi-century to millennial-scale warming caused by fossil fuel CO₂ emissions. However, the permanence of carbon storage in natural ecosystems cannot in reality be guaranteed, given its vulnerability to both human-driven (e.g., deforestation or other land-use change) and climate-related (e.g., wildfire, drought, or insect) disturbances that could occur at any time in the foreseeable or unforeseeable future.

— D. Matthews and K. Zickfeld, et al., "Temporary nature-based carbon-removal can lower peak warming in a well-below 2°C scenario", *Communications Earth & Environment* (2022) 3:65, p. 4.

The authors of this paper warn that we should assume that some or all this carbon storage by nature-based solutions will be temporary.

Further, if high levels of carbon emissions from fossil fuel combustion continue to 2040 and beyond, the promised benefit of nature-based carbon removals will be lost. The relatively modest scale of annual removals by A/R in that case will be very quickly offset by the ongoing release of higher levels of CO₂ from oil, gas, and coal burning.

In the case of Canada's emissions, the Council of Canadian Academies' *Expert Panel on Canada's Carbon Sink Potential* (December 2022), in a report by a panel of fifteen experts examined the prospects for enhancing carbon storage and reducing emissions in Canada's forests, wetlands, grasslands, agricultural lands, and coastal zones.: https://cca-reports.ca/wp-content/uploads/2022/12/Carbon-Sinks_EN_Final.pdf. The panel estimates that the overall cost-effective mitigation potential within Canada's territory (i.e., carbon sequestration or emissions reductions) could reach approximately 40 Mt CO₂eq per year by 2030, which the Panel notes is equivalent to about 6% of Canada's current annual emissions. The report however addresses the high level of uncertainty about the attainable future level of removals by proposed nature-based climate solutions (NBCSs). It also warned of the risk of very large-scale emissions releases from Canada's vast landscape, driven by rising temperatures, wildfires, and deforestation: "the global climate risks of increasing (and accelerating) emissions from Canada's terrestrial, aquatic, and coastal ecosystems are substantial – in contrast to the more modest benefits of NBCSs" (Section 7.4, page 184).

That warning was given in 2022. During 2023 wildfires on an unprecedented scale across Canada released 1.7 billion (Gt) tonnes of CO₂ into the atmosphere, representing 25% of total global wildfire emissions for 2023: <https://atmosphere.copernicus.eu/2023-year-intense-global-wildfire-activity>. That single fire season release was equivalent to (and would completely offset) about 40 years of envisioned future carbon removals at the rate of 40 Mt CO₂ per year.

Yet forest fire emissions within Canada's national boundaries are not included in our annual national emissions accounting. The extraordinary rise in the annual level of Canada's forest fire emissions during the past two decades is a "feedback loop" driven by human-caused rising surface temperatures. They in turn are driving further warming. In this context the claim that "Enhanced biological sinks" will play any significant role in balancing Canada's "remaining emissions" by 2050 is unwarranted.

12. "Downstream emissions" released into the atmosphere by Canada's exported oil

Canada's promised emissions "cap" relates only to the volume of emissions released into the atmosphere from oil extraction and processing activities within Canada. Oil sands emissions from production activities within Canada (referred to as "upstream emissions") account for less than 15% of the total life-cycle emissions released by every barrel of oil Canada produces. The other 85% of the emissions per barrel (the "downstream emissions") occur after we export our oil when it is refined and combusted as fuel in vehicle engines and released into the atmosphere as tailpipe emissions.

The downstream emissions from our exported oil exceed *the combined total of all the GHG emissions released every year within Canada's borders* from all our industrial activities, transportation (cars, trucks, rail, domestic air), all buildings, agriculture, electricity generation, and all oil and gas extraction and processing operations within Canada. Downstream emissions from our exported oil reached 765 Mt in 2023. Downstream emissions from Canada's total fossil fuel exports including natural gas reached 1030 Mt in 2023. They will continue to increase in line with our expanding oil exports. They are not counted in Canada's reported annual emissions: <https://ecojustice.ca/news/groups-question-canadas-climate-leadership-after-new-data-shows-skyrocketing-fossil-fuel-export-emissions/>

The Supreme Court of Canada in its decision on March 25, 2021, in the *Greenhouse Gas Pollution Pricing Act* case, relying on the scientific evidence presented to the Court, clearly and precisely acknowledges the *borderless* way emissions released in one jurisdiction will affect (and drive climate change) in all other jurisdictions. In the Carbon Pricing case, the Court was required to examine the scientific evidence which explains why GHG emissions released within one province in Canada will impact all the other provinces:

“It is also an uncontested fact that the effects of climate change do not have a direct connection to the source of GHG emissions; every province's emissions contribute to climate change, the consequences of which will be borne extra-provincially across Canada and around the world”

— References re: *Greenhouse Gas Pollution Pricing Act*, para. 187 (emphasis added)

Whether they are released by cars and trucks in New York or Shanghai, emissions from our exported oil are contributing directly to climate breakdown in B.C. and Northern Quebec, and they are driving the escalating heat in India and all South Asia, and the horrific drought in the Horn of Africa and across the Sahel, the retreat of glaciers in the Himalayas and Central Asia, acidification of the world's oceans.

Under international law we may well be obligated to take responsibility for our downstream emissions. The International Court of Justice's (ICJ) released an Advisory Opinion on July 23, 2025, *Obligations of States Regarding Climate Change*, regarding the obligations of oil producing and exporting states under international law with respect to the combustion emissions released by their exported oil. The ICJ ruled that in the case of climate change and “cross-border harm” caused by a state's activities, “the relevant conduct is not limited to conduct that itself directly results in GHG emissions” (i.e., within a state's own borders) but that the relevant conduct also includes “activities such as ongoing production” of oil and gas (para 94 at p. 40, emphasis added).

The Joint declaration of two of the judges in particular, Judge Bhandari and Judge Cleveland, provides a comprehensive statement of why in the case of climate change, under international law the obligation to avoid causing cross-border harm includes an obligation to wind-down oil production. Considered in the context of the principles outlined in the ICJ's Advisory Opinion, Canada is acting in breach of its obligations under international law.

On June 20, 2023, the Canada Energy Regulator (CER), the Federal Government's energy agency, released a report entitled *Canada's Energy Future 2023*. The agency had been instructed in December 2021 by the Minister of Natural Resources to develop scenarios to determine the lower and declining oil production levels in Canada over the next 10 to 20 years that would be safely aligned with an effective global effort to stay within the 1.5°C warming threshold. When the agency released its report in the summer of 2023 it concluded that to align our oil production with that goal our current production level (it reached 5.1 million bpd in 2022) would need to peak at 5.7 million bpd by 2027 and then fall sharply to 2.8 million bpd by 2040. Canada's oil production would have to decline 50% by 2040.

I provide a detailed summary of the findings in the *Canada's Energy Future 2023* report in my Working Paper, *Driving Global Heating to 1.7°C and Above: The New Canada Energy Future 2023 Report and Canada's Projected Oil Production to 2050*, October 2023, Centre for Law and the Environment, Allard School of Law UBC, found at:

<https://allard.ubc.ca/sites/default/files/2023-10/CLE%20Working%20Paper%20No.%201%3A2023--Driving%20Global%20Heating%20to%201.7C%20and%20Above.pdf>.

Canada's promised "Net-Zero by 2050" goal, by remaining silent about our increasing oil production levels, entirely ignores the implications of the downstream emissions from our exported oil and natural gas.

Concluding comment

If we carefully examine Canada's declared Net-Zero Emissions by 2050 goal, the fundamental question that remains unanswered is whether promised future "removal" technologies will have the capacity to "balance" the annual level of Canada's remaining emissions in 2050 and after. Under this scheme if we allow relatively high levels of industrial emissions to continue to 2030 and beyond (including high levels of emissions from ongoing oil sands operations and other oil and gas sector activities) by 2050 the annual level of Canada's remaining emissions will continue at elevated levels far beyond the level we can ever "balance" by carbon removal.

Any true "balancing" that gives us even a fair chance to limit warming to 1.5°C or even to 1.7°C or 2°C will require that we immediately begin very deep and rapid cuts in fossil fuel use.

The Government of Canada's "Net-Zero Emissions by 2050" tells us nothing at all about what the level of "remaining emissions" is expected to be 25 years from now. Under the existing requirements set out in the *Net-Zero Act*, the Government of Canada has no obligation to reveal those numbers until December 1, 2039.

The flawed character of this hollow climate plan becomes clear when we discover, as we have now discovered, that the original 40% to 45% reduction by 2030 target is an illusion. The reduction will very possibly be as little as 20%. That is less than the original commitment made in 2015 by our government at the Paris Conference.

We may have run out of time to salvage or reconstruct this "Net-Zero" scheme which is so completely dependent on the implementation of deep greenhouse gas reduction targets through

2030 to 2045. Without effective and binding reduction targets, our children and grandchildren have no assurance that Canada's remaining emissions will be reduced enough by 2050 so that it is feasible they can eventually be "balanced" by future removal technologies.

On October 14, 2025, *The Globe and Mail* published an article by one of its senior columnists who has covered the Federal Government's climate policy for many years. I reproduce below three short extracts from his lengthy article:

Ottawa is preparing to lay out a new climate-change vision that will deprioritize Canada's commitments to reduce domestic greenhouse gas emissions, in favour of ways to reap economic advantages from the global transition towards low-carbon energy.

It's to be presented in the new "climate competitive strategy" that the government is aiming to release before the end of this month – a subject of speculation since Prime Minister Mark Carney first promised it in early September with little explanation ...

Ottawa is unlikely to officially change national emissions targets which currently involve a reduction of at least 40 per cent below the 2005 level by 2030 – because it is too difficult legislatively and as a matter of international process. Instead, the strategy is expected to play down and perhaps tacitly acknowledge they won't be reached. To the extent it mentions those sorts of goals, it will likely be through an emphasis on the net-zero by 2050, not nearer-term landmarks.

— *The Globe and Mail Report on Business*, "New climate plan targets clean tech over emissions cuts", Adam Radwanski, October 14, 2025 (emphasis added)
<https://www.theglobeandmail.com/business/article-mark-carney-climate-competitiveness-strategy-emissions-targets-energy/>

Radwanski's article notes that "While Mr. Carney and his cabinet have been tight-lipped", it is based on "interviews with nearly a dozen people familiar with the document's development". The report may be speculative to some degree, and the substance of the government's new "climate-competitive strategy" may be subject to change. Nevertheless, given the future consequences of these approaching policy decisions and the public silence of the responsible government ministers, this article warns us of fundamental policy changes we may see within the next few months.

In the scheme enshrined in the *Net-Zero Accountability Act*, the amount of the "remaining emissions" by 2050 is a crucial unknown that will make the difference between a possibly safe and viable outcome if the remaining emissions are relatively small and one that masks a pathway to catastrophic failure if they continue at high levels. Until the government can tell us what the proposed target for Canada's "remaining emissions" is going to be in 2050 and can demonstrate a commitment to meet serious interim reduction targets for 2035 and 2040, there is no goal and there is no plan.

About David Gooderham

David Gooderham practiced law in Vancouver for thirty-five years in civil litigation. He was called to the Bar in British Columbia in 1975 and retired at the end of 2012. He attended the University of Toronto, taking an honours degree in economics and political science and an LLB from the University of Toronto Law School in 1970.

During the past 12 years he has been participating in and writing about the public review processes and the evidence that the Federal Government has relied on to justify the authorization of pipeline approvals, offshore oil projects, and the ongoing expansion of Canada's oil production in the context of climate change. With long experience in how expert evidence is used in the judicial process, and how it can be abused, he has documented the repeated failures and refusals by the government to properly consider the available evidence of climate science and to assess the global emissions implications of plans to continue increasing Canada's oil production to 2030 and maintain high levels of production to 2040 and 2050.

His writings have included submissions to Environment Canada in June 2016 critiquing the draft report *Review of Greenhouse Gas Emissions Estimates* for the Trans Mountain Pipeline (TMX) and written and oral submissions to the *Ministerial Panel for the Trans Mountain Pipeline* in August 2016. More recently, in March 2022, he was invited to testify before the Parliamentary Standing Committee on Environment and Sustainable Development regarding government subsidies to support CCUS deployment in the oil sands industry: his brief to the Parliamentary Committee is found at <https://www.ourcommons.ca/Content/Committee/441/ENVI/Brief/BR11670245/br-external/GooderhamDavid-e.pdf>

In 2018, he actively participated in public action to contest the construction of the Trans Mountain pipeline expansion (TMX). He was arrested on August 21, 2018, after peacefully disobeying an injunction relating to the construction of the TMX Project, and charged with criminal contempt of court. Together with co-accused science educator Jennifer Nathan, he raised the common law Defence of Necessity in a lengthy legal challenge that extended over two years. That court challenge was ultimately dismissed by three judges of the B.C. Court of Appeal in September 2020, following which he served 18 days in jail. He has written about the Defence of Necessity in Canadian law: see Gooderham, David (2020) "The Defence of Necessity and Addressing Climate Change: A Canadian Case", *Public Law and Resources Review*, Vol. 42, Article 9: <https://scholarworks.umt.edu/plrr/vol42/iss1/9/>

His recent Working Paper, *Canada's Oil Future: Reliance on Carbon Capture and Carbon Removal Technology is a Dangerous Trap*, published in November 2024 by the Centre for Law and the Environment, Allard School of Law UBC, critically examines the Government of Canada's claims that large-scale deployment of CCS technology and envisioned future Carbon Dioxide Removal (CDR) technologies can safely offset increasing levels of greenhouse gas emissions from Canada's still expanding oil and gas production: see <https://allard.ubc.ca/sites/default/files/2024-11/2024%2001%20Gooderham%20Canadas%20Oil%20Future.pdf>