

Design considerations for the oil and gas emissions cap

Pembina Institute comments and
recommendations

Submitted to Environment and
Climate Change Canada

Regarding: Oil and Gas Sector Greenhouse Gas Emissions Cap
Regulations

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January 2025

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Recommendation summary

The objective of the proposed cap on oil and gas sector greenhouse gas emissions is to begin to align the upstream oil and gas industry with Canada's commitment to reducing emissions by 40–45% below 2005 levels by 2030.

The proposed regulation seeks to achieve an estimated emissions reduction of 22% below 2005 levels, though the inclusion of an effective legal upper bound and compliance flexibilities to meet that upper bound allows for an outcome where actual emissions from the oil and gas sector are, at a minimum, reduced by 5%. It should therefore be noted at the outset that the level of ambition for the cap is well below what other sectors are already achieving.

Nevertheless, the Pembina Institute regards this proposed regulation as an important step through which emissions from Canada's highest-emitting sector would be fully regulated for the first time. This would be congruent with broader efforts to build a thriving clean economy in the 2030s and beyond.

In support of reducing emissions from Canada's upstream oil and gas sector, in this submission we provide recommendations on the design principles of the draft regulations, including:

- Provide guidance for the cap level's trajectory post-2032 to give greater certainty to the industry. Within this, we suggest aligning the cap with net-zero by 2050.
- Review the emissions cap in the year before the start of each new compliance period.
- Phase out compliance flexibilities over time, beginning with the decarbonization fund.
- Only high-quality offsets purchased through the Canada Greenhouse Gas Offset System or recognized provincial protocols should be accepted for compliance purposes.
- Increase the number of provincially recognized offset protocols.
- Reduce the timeline for compliance remittance by one year for operators of new large facilities.
- Do not accept internationally traded mitigation outcomes as a means of compliance flexibility.
- Review the potential impacts on provincial pricing systems before finalizing the draft regulations.
- Move to a measurement-informed inventory for quantifying methane emissions.

Context

The Pembina Institute welcomes the opportunity to provide input on regulating emissions from the upstream oil and gas sector. Canada's oil and gas industry, which includes both conventional and oilsands production, is the country's highest-emitting sector, responsible for almost one-third of Canadian emissions annually.

Although existing policies, such as industrial pricing systems and decarbonization funding supports (e.g., the federal Carbon Capture, Utilization and Storage [CCUS] Investment Tax Credit and the Alberta Carbon Capture Incentive Program) are intended to address this issue, the sector's emissions are not yet declining. Since 2005, oil and gas emissions have increased by 11% (compared with a fall across the whole of Canada's emissions of seven per cent during the same period). This rise has been driven by the oilsands subsector, where emissions have risen by 142% since 2005 — coinciding with an increase in oilsands production of about 211%, with only modest progress made on reducing oilsands emissions per barrel (known as emissions intensity).

All other oil and gas subsectors (conventional oil, downstream oil and gas, and natural gas production and processing) have begun to achieve reductions in their emissions since 2005. This is likely in large part due to the introduction of federal and provincial methane regulations over the last several years, which have a greater impact on emissions from the conventional sector due to the way methane is associated with conventional methods of oil and gas

production. Methane regulations clearly demonstrate how policies can be developed and implemented to achieve real emissions reductions from this complex, high-emitting sector. Also of note is that as conventional producers continue to adhere to methane regulations, any emissions reductions they achieve will count towards meeting the proposed emissions cap.

It is also clear, then, that additional regulation is needed to ensure that the whole oil and gas sector, including the oilsands, begins to meaningfully decarbonize. If it fails to do so, other sectors in the economy will be under greater pressure to reduce emissions faster and further. Investing in decarbonization will also futureproof the sector's operations so that it can continue to make an important contribution to Canada's future economy, including in the production of lower-carbon fuels and lower-carbon feedstocks for petrochemicals and other manufacturing.

The proposed level of the cap is not prohibitive

Canada has committed to reducing national emissions by 40–45% below 2005 levels by 2030 and to net-zero by 2050, through the Canada Net-Zero Accountability Act. The objective of this emissions cap regulation is to begin to align the oil and gas industry with that commitment.

We calculated that, based on forecasted emissions to 2026, the proposed regulation is likely to impose an emissions cap that would result in an estimated 22% reduction in emissions from 2005 levels. However, the inclusion of compliance flexibility mechanisms (including the decarbonization fund, which companies can pay into in lieu of reducing actual emissions, and offset credits, which companies can purchase) creates an effective legal upper bound that would represent a minimum actual emissions reduction of 5% below 2005 levels.

Compared with Canada's economy-wide target, this effective legal upper bound would represent a low contribution from the oil and gas sector. Nevertheless, the creation of this regulation — with the potential to increase stringency over time (as we recommend below) — is an important step to fully regulate oil and gas emissions and alter their trajectory in a way that can be both meaningful to Canadians and feasible for the industry.

Discussion and recommendations

Setting the cap level

We support bridging the data gap in emissions reporting by requiring designated facilities to report the quantity of production by specific industrial activity and the quantity of greenhouse gases attributed to the facility. Using reported data to set the cap based on the future production output of the sector in 2026 ensures that the cap is quantified accurately and represents the sector's emissions. **We recommend providing some level of guidance for the cap**

trajectory post-2032 to provide additional certainty and encourage alignment with net-zero by 2050.

The emissions cap should undergo regular reviews after 2030, similar to federal and provincial pricing systems. **We recommend that regular reviews are conducted in the year before a new compliance period starts.** This would allow allocations and compliance flexibilities to be adjusted in the next compliance period and allow for the level of the cap to reflect investments in decarbonization and impacts on provincial pricing systems. For instance, as projects with longer lead times like CCUS or large electrification projects come closer to final investment decisions, elements of the cap (amount of compliance flexibility, amount of free allowances) could be revised in the next compliance period to account for expected emissions reductions from those projects and ensure the allowance market is relatively predictable. Additionally, regular and frequent reviews would also facilitate an earlier transition towards auctioning.

Besides regular reviews when setting the cap for the next compliance period, we also recommend the triggering of additional reviews of the cap if the marginal price signal in existing carbon pricing systems is significantly weakened due to unforeseen policy interactions. The marginal price signal in existing industrial carbon pricing systems must be maintained, especially since those systems are meant to incentivize decarbonization across sectors.

Policy coverage

We support an annual production threshold of 365,000 barrels of oil equivalent, which covers around 99% of emissions. We also support allowing operators to choose the most efficient and cost-effective decarbonization solutions for their unique production profile to achieve compliance. Together, the production threshold and this operator approach increase emissions coverage and, crucially, fill a gap in oil and gas sector data at the federal level by requiring reporting from smaller operators.

Compliance periods

Retaining multiyear compliance periods will encourage investment in long-lead decarbonization projects such as CCUS, and most cap-and-trade systems use multiyear compliance periods to provide flexibility to industry. This flexibility ensures that operators can deploy the most cost-effective mitigation measures, irrespective of the facility, and bring new facilities into production. As such, we support the proposal for three-year compliance periods, with interim requirements to submit at least 30% of remittance obligations in years 1 and 2 of attributed greenhouse gases.

We support the proposal that banking of purchased credits should be limited to two compliance period (six years at most). Allowing companies to hold credits from periods of lower mitigation costs and use them when costs rise will help them handle market fluctuations from production variability or technological advancements, among other drivers. However, **we recommend the banking of credits be reviewed periodically** to ensure excessive banking of credits doesn't lead to an effective cap level lower than what is proposed.

Treatment of emissions from electricity generation

We recommend that the treatment of indirect electricity emissions under the emissions cap be aligned with the forthcoming Clean Electricity Regulations, as well as with provincial carbon pricing systems. As we noted in our feedback to those draft regulations, electricity emissions should be fully priced by 2035; electricity generation should not be considered “emissions intensive,” as low or non-emitting generation options exist and are now cost-competitive with (if not cheaper than) fossil fuels.

Compliance units

We support the proposed use of facility-level emissions reductions for compliance obligations under both provincial or federal pricing systems and the proposed regulation. Furthermore, we support counting permanent emissions reductions from CCUS, including enhanced oil recovery, in both a provincial carbon pricing system and the emissions cap.

We recommend that the proposed regulation be aligned with the Technology Innovation and Emissions Reduction CCUS process to the extent possible.

We recommended in our response to the 2023 Regulatory Framework that a combination of free allocation and auctioning be used, with both overall allowances and the number of free allocations declining over time to align the sector with net-zero by 2050. If, as proposed in the draft regulation, 100% of allowances are distributed through free allocation when the system is initially implemented, then **a gradual transition to auctioning should be considered after the first compliance period.**

Compliance flexibility

We maintain our recommendation in our submission to the regulatory framework that **only offsets purchased through the Canada Greenhouse Gas Offset System or recognized provincial protocols should be accepted for compliance purposes.** We also support the proposal to limit an operator's use of the decarbonization fund to 10% of their emissions for the initial compliance period.

We recommend that compliance flexibilities should be phased out over time, beginning with the decarbonization fund, and aligning with net-zero by 2050 and considering the anticipated decrease in oil and gas demand. We emphasize that compliance through the decarbonization fund does not result in one-for-one emissions reductions (unlike, for instance, on-site decarbonization projects or high-quality offsets that reduce or remove emissions elsewhere). We acknowledge that the decarbonization fund provides certainty for compliance flexibility at the onset of the regulation, which addresses potential uncertainty around access to offset credits. However, given the price signals in existing carbon pricing systems and options to decarbonize on-site, purchasing compliance units through the decarbonization fund should be minimized under the oil and gas emissions cap.

Use of offsets

We support the cross-recognition of Canadian offset credits under both provincial or federal pricing systems and the proposed regulation if the condition of double claiming is prevented. **We encourage the federal government to expand the number of provincially recognized protocols** to specifically include more protocols for reducing emissions that are supported by oil and gas industry expertise and infrastructure. For instance, no recognized protocol exists for CCUS. This technology will be key for the oilsands, in particular, to meet the cap. The expertise of the oil and gas workforce can also be drawn on to deploy CCUS at scale in other industries.

Without the ability to use offsets generated by CCUS bilaterally in both provincial industrial carbon pricing systems and the emissions cap, these offsets become less valuable, potentially reducing investment. Increasing flexibility in the use of CCUS credits could boost investment in this technology, enhancing opportunities for hub-and-spoke operators, like those announced in Alberta, to secure innovative commercial agreements. This, in turn, would drive further CCUS investment and create more jobs.

Distribution rates

We support differentiating distribution rates by industrial activity, and by comparing facilities against their cohort of peers to encourage leaders. Such an approach would hold facilities to the same emissions intensity limit within their designated activity, based on the product and technology (e.g., barrel of bitumen produced in situ, barrel of bitumen produced mining, amount of gas processed). Producers within each subsector would be treated equally and first-movers rewarded, and all facilities would have the same financial incentive to reduce emissions.

In this draft regulation, distribution rates are tentatively set at a 45% reduction in emissions intensity below 2019 levels and distributed evenly across subsectors. It is important that

distribution rates are set at the level needed to match the cap based on the 2026 data collection. **We recommend a review of distribution rates once the cap level is known in 2026**, to ensure that emissions reductions made before 2026 are taken into account.

Several production methods exist for recovering bitumen in situ, including cyclic steam stimulation and steam-assisted gravity drainage. Differentiating the distribution rate by these methods may be beneficial.

Modern treaty obligations and Indigenous engagement and consultation

While outside the bounds of this regulation, we expect that during impact assessment and approval processes, comprehensive engagement and consultation will occur on the effects that large-scale emissions reduction technology, particularly CCUS, may have on Indigenous communities.

New facilities

In our response to the 2023 Regulatory Framework, we recommended that new entrants and production variability reserve be apportioned from the existing proposed allowances. While the draft regulations do not follow this course of action, we support what is being proposed.

However, we recommend reducing the timeline for compliance remittance by one year for operators of new large facilities. They would need to report the first three calendar years of their operation instead of four and remit compliance unit obligations equal to emissions in the fourth calendar year of operations. This approach ensures that new facilities have a minimum of three years reported data to accurately distribute compliance units before remittance obligations are required, while also mitigating preferential treatment for new facilities not initially subject to compliance obligations.

Internationally transferred mitigation outcomes (ITMOS)

We continue to recommend that ITMOs not be accepted for compliance flexibility in the emissions cap. ITMOs under Article 6 of the Paris Agreement are still in the early stages of development, with persistent issues around emissions accounting to ensure that emissions reductions are additional and verifiable.

Competitiveness and carbon leakage

While there are legitimate concerns about the impacts of this proposed regulation on competitiveness and carbon leakage, in our view the cap is set at a level that requires action

from the sector but will not significantly impact global competitiveness or lead to substantial carbon leakage.

As global oil and gas demand declines, demand for Canadian oil and gas will as well; and the worst-performing facilities from an emissions perspective will become uneconomic due to high emissions intensity and high costs. To remain competitive in a shrinking market that may increasingly incorporate climate change action and emissions reduction into business and policy decisions, the Canadian oil and gas sector needs to prioritize decarbonization.

For instance, while no premium or preference currently exists for low-carbon oil, the European Union has regulations for methane intensity of natural gas imports, a matter that until recently Canada's largest trading partner, the United States, was exploring.¹ Although the U.S. is not likely to take this path in the near term, planning for more regulations like those in the EU is reasonable. **We recommend that the federal government consult internationally with export partners to align Canada's emission standards**, which may be enhanced by this regulation, so that Canadian exports of oil and gas are favoured globally as less emissions intense products.

Impact to output-based pricing systems

Regular review of the emissions cap is essential to assess the performance of the policy and the state of the allowance market, to ensure that the marginal price signal in existing carbon pricing systems is maintained, and to align the sector with net-zero by 2050.

Cordoning off the oil and gas sector does increase the risk of volatility in the carbon market due to the small number of firms in the system when compared to larger cross-industry pricing systems. Global oil prices or a potential influx of emissions reductions (such as those that would arise from CCUS projects) risks over- or under-supplying the market, leading to a much higher or lower carbon price than in other sectors. Many emissions trading schemes have instituted price ceilings and floors to address this volatility. However, we acknowledge that applying these measures in a sector-specific pricing system may be difficult given the smaller number of participants compared to economy-wide pricing systems.

Maintaining and increasing the effectiveness of carbon markets in Canada will be crucial to enabling emissions reductions across all economic sectors and should be appropriately addressed through the regular review of both the oil and gas emissions cap and output-based

¹ Corey Paul, "Biden officials seek to align regulations on US LNG with European methane rules," S&P Global November 14, 2024. <https://www.spglobal.com/commodity-insights/en/news-research/latest-news/lng/111424-biden-officials-seek-to-align-regulations-on-us-lng-with-european-methane-rules>

pricing systems. **We recommend that a review on the potential impacts to provincial systems be conducted, and released, before finalization of the draft regulations.**

Quantification methods for methane emissions

In a cap-and-trade system that assigns monetary value to emissions reductions and exceedances, the integrity of the system requires greenhouse gas emissions to be quantified accurately. This is particularly important with methane, given that it tends to follow an extreme leak distribution² and that upstream emissions are underestimated and underreported, typically by a factor of 1.5–2 times.^{3,4,5} Direct measurement of methane is therefore essential.

We recommend that Environment and Climate Change Canada move as soon as possible to a measurement-informed inventory for the oil and gas sector, in line with the Level 5 requirements of the international reporting framework OGMP 2.0.⁶

To quantify methane accurately, bottom-up data must be reconciled with top-down, facility-level measurement. Below, we provide several examples of methodologies for creating measurement-informed inventories that integrate facility-level measurement, as well as an alternative policy pathway based on Colorado’s approach.

The principles of a good measurement-informed inventory include:

- integration of source-resolved, multiscale data (including satellite data)
- inclusion of independent oversight and verification
- transparent public access

The draft Regulations Amending the Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector) do little to bring Canada’s measurement, monitoring, reporting and verification in line with leading

² Adam Brandt, Garvin Heath, and Daniel Cooley, “Methane Leaks from Natural Gas Systems Follow Extreme Distributions,” *Environmental Science & Technology* 50, no. 22 (2016): 12512–20. <https://doi.org/10.1021/acs.est.6b04303>

³ Katlyn MacKay, Martin Lavoie, Evelise Bourlon, Emmaline Atherton, Elizabeth O’Connell, Jennifer Baillie, Chelsea Fougère, and David Risk, “Methane Emissions from Upstream Oil and Gas Production in Canada Are Underestimated,” *Scientific Reports* 11, no. 1 (2021), 8041. <https://doi.org/10.1038/s41598-021-87610-3>

⁴ Bradley Conrad, David Tyner, Hugh Li, Donglai Xie, and Matthew Johnson, “A Measurement-Based Upstream Oil and Gas Methane Inventory for Alberta, Canada Reveals Higher Emissions and Different Sources than Official Estimates,” *Communications Earth & Environment* 4, no. 1 (2023), 1–10. <https://doi.org/10.1038/s43247-023-01081-0>

⁵ Scott Seymour, Hugh Li, Katlyn MacKay, Mary Kang, and Donglai Xie, “Saskatchewan’s Oil and Gas Methane: How have underestimated emissions in Canada impacted progress toward 2025 climate goals?,” *Environmental Research Letters* 18, no. 8 (2023), 084004. <https://doi.org/10.1088/1748-9326/ace271>

⁶ “Oil and Gas Methane Partnership 2.0.” <https://ogmpartnership.com/>

jurisdictions like the U.S. and EU,⁷ both of which have updated reporting requirements to include more empirical data.^{8,9} Introducing requirements for direct, facility-level measurement into the emissions cap regulation would remedy this missed opportunity. While we recognize that such a change in reporting and measurement requirements may not be possible before this regulation is finalized, we recommend that Environment and Climate Change Canada establish a pathway to introduce such requirements as early as possible and signal to industry that these changes are on the horizon.

Environment and Climate Change Canada should harmonize reporting requirements and official emissions accounting to the greatest extent possible. This could be accomplished via a parallel update to the Greenhouse Gas Reporting Program.

The reported data from measurement activities should:

- feed into and further improve the national inventory, building on the modelling improvements described in the *National Inventory Report 1990-2022*¹⁰
- include any mandatory measurements under the emissions cap regulation, as well as any measurements from annual third-party audits and continuous monitoring under the methane regulations

The following papers describe a few of the methodologies for creating measurement-informed inventories that integrate facility-level measurement:

- Jenna Brown, Matthew Harrison, Tecele Rufael, Selina Roman-White, Gregory Ross, Fiji George, and Daniel Zimmerle, “Informing Methane Emissions Inventories Using Facility Aerial Measurements at Midstream Natural Gas Facilities,” *Environmental Science & Technology* 57, no. 39 (2023). <https://doi.org/10.1021/acs.est.3c01321>

⁷ *Comments on Amending the Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds* (Canadian Association of Physicians for the Environment, Canadian Lung Association, David Suzuki Foundation, Pembina Institute, Clean Air Task Force, Environmental Defense Fund, 2024). <https://www.pembina.org/pub/comments-amending-regulations-respecting-reduction-release-methane-certain-volatile-organic>

⁸ U.S. Environmental Protection Agency, *Mandatory Greenhouse Gas Reporting, Subpart W*. <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98#subpart-W>

⁹ European Union, *Regulation (EU) 2024/1787 of the European Parliament and of the Council of 13 June 2024 on the reduction of methane emissions in the energy sector and amending Regulation (EU) 2019/942*. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401787

¹⁰ Environment and Climate Change Canada, *National Inventory Report 1990-2022: Greenhouse gas sources and sinks in Canada* (2024), Part 2, 73. https://publications.gc.ca/collections/collection_2024/eccc/En81-4-2022-2-eng.pdf

- William Daniels, Jiayang Lyra Wang, Arvind Ravikumar, Matthew Harrison, Selina Roman-White, Fiji George, and Dorit Hammerling, “Toward Multiscale Measurement-Informed Methane Inventories: Reconciling Bottom-Up Site-Level Inventories with Top-Down Measurements Using Continuous Monitoring Systems,” *Environmental Science & Technology* 57, no. 32 (2023). <https://doi.org/10.1021/acs.est.3c01121>
- Elton Chan, Felix Vogel, Steve Smyth, Owen Barrigar, Misa Ishizawa, Jinwoong Kim, Michael Neish, Douglas Chan, and Douglas Worthy, “Hybrid Bottom-up and Top-down Framework Resolves Discrepancies in Canada’s Oil and Gas Methane Inventories,” *Communications Earth & Environment* 5, no. 1 (2024). <https://doi.org/10.1038/s43247-024-01728-6>
- Jiayang Wang, William Daniels, Dorit Hammerling, Matthew Harrison, Kaylyn Burmaster, Fiji George, and Arvind Ravikumar, “Multi-Scale Methane Measurements at Oil and Gas Facilities Reveal Necessary Framework for Improved Emissions Accounting,” *ChemRxiv* (2022). <http://doi.org/10.26434/chemrxiv-2022-9zh2v-v2>
- Matthew Johnson, Bradley Conrad, and David Tyner, “Creating Measurement-Based Oil and Gas Sector Methane Inventories Using Source-Resolved Aerial Surveys,” *Communications Earth & Environment* 4, no. 1 (2023). <https://doi.org/10.1038/s43247-023-00769-7>

We recommend that Environment and Climate Change Canada review these methodologies, as well as consult leading measurement scientists such as Chris Hugenholtz, Matthew Johnson, and David Risk, to determine the appropriate measurement methodology.

An alternative policy option would be to adopt Colorado’s approach to quantifying methane.¹¹ Colorado is creating a state-wide, measurement-informed inventory, which includes developing its own measurement-based emissions factors. Operators will then have the option of using the state’s emissions factors or developing their own. Operator-specific emissions factors must be supported by direct measurement. Since operators often believe that they outperform the average, many will likely prefer to use their own emissions factors. This approach is therefore likely to result in significant measurement. Canada could implement Colorado’s approach by developing emissions factors based on aerial measurement data, while allowing companies to use operator-specific emissions factors supported by direct measurement.

¹¹ Colorado Air Pollution Control Division, *Oil and Natural Gas Methane Intensity Verification Protocol* (2024). Available at <https://cdphe.colorado.gov/oil-and-gas-greenhouse-gas-intensity-program>

In summary, the proposed cap-and-trade system should be supported by comprehensive methane measurement. Policy options include the following:

- Integrating facility-level measurement requirements into the quantification methodology for the emissions cap, building on existing methods for measurement-informed inventories.
- Adding such requirements to the Greenhouse Gas Reporting Program.
- Creating measurement-based emissions factors, while giving operators the option to develop their own factors based on measurement.

Conclusion

In closing, we would like to express our support for the work that has been done to create feasible regulations for oil and gas emissions, and our thanks for the opportunity to provide written comments. We look forward to participating in any further engagement on this specific regulation—and on the issue of oil and gas emissions more broadly, including policy pathways to ensure Canada's sector remains competitive in a low-carbon economy.