

# Moving Forward on Methane

How Alberta can demonstrate renewed leadership on oil and gas methane emissions



March  
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**PEMBINA**  
Institute

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These acknowledgements are part of the start of a journey of several generations. We share them in the spirit of truth, justice and reconciliation, and to contribute to a more equitable and inclusive future for all.

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# Executive summary

This document provides a plain language summary of a new technical analysis by the Pembina Institute that identifies data and regulatory gaps relating to Alberta's oil and gas methane emissions and provides recommendations. The objective is to demonstrate how Alberta's regulations, reporting data, and emissions estimates can be strengthened to better track progress, evaluate compliance, and support deeper reductions.

We reviewed independent measurement studies, provincial and federal estimates, and industry-reported data, including from surveys done under the Alternative Fugitive Emissions Management Program. Our detailed findings and methodology can be found in the supplementary technical backgrounder.

## Key findings

Our analysis revealed four critical gaps that must be closed if Alberta is to regain its status as a leader on methane emissions:

- 1. Emissions data:** Alberta is underestimating emissions. The federal greenhouse gas inventory, which incorporates independent measurements, estimates that Alberta's oil and gas methane emissions are almost twice the amount indicated by Alberta's methane model, which is based primarily on industry self-reporting. This means that the province's claim to have met its target of reducing methane emissions 45% (from 2014 levels) by 2023, three years ahead of schedule, is not credible.
- 2. Venting:** A significant amount of venting is occurring above the province's limit on vent volumes at oil and gas sites. Most facilities vent methane at volumes below the threshold above which metering is required, allowing them to estimate their vent volumes using flawed methods. This partly explains why measurement-informed estimates of vent volumes are five times higher than reported vent volumes.
- 3. Separator buildings:** Pneumatic controllers and pumps are a significant and under-regulated source of methane emissions in separator buildings, and the quality of reported data is poor.
- 4. Solution gas flaring:** Solution gas flaring has more than doubled in Alberta since 2019, and the removal of Alberta's solution gas flaring limit in 2025 means policy is lacking to prevent further increases. Since a good deal of solution gas flaring is routine flaring, the elimination of the limit also puts Alberta out of step with international best practices that ban routine flaring and threatens the health of local communities.

## Main recommendations

To close these gaps and regain its leadership status, we recommend Alberta do the following:

- Improve the province's ability to credibly track and demonstrate reductions by basing estimates of oil and gas methane emissions on measurement data.
- Require top-down methods to measure methane emissions from oil and gas facilities (vehicle-based systems, aircraft, drones, or continuous monitors), in addition to the close-range methods commonly used in leak detection and repair programs, and integrate the resulting data into reporting.
- Eliminate routine venting by 2030.
- Phase out emitting pneumatics by 2030 or sooner.
- Engage diverse interest holders, including academic experts, to co-develop and improve measurement and reporting frameworks and requirements to enhance the quality and accuracy of reported data.
- Eliminate routine flaring.

# Introduction

Alberta was an early mover in developing strong oil and gas methane regulations. The province took a strong stance on flaring in the 1990s.<sup>1</sup> It was the first Canadian province to formally adopt a 45% reduction target (from 2014 levels by 2025).<sup>2</sup> It also developed an innovative alternative fugitive emissions management program (alt-FEMP) that gave companies the flexibility to use a wide array of measurement and monitoring technologies to meet leak detection and repair requirements.<sup>3</sup> This strong regulatory environment cultivated world-leading industry expertise through research initiatives such as emissions testing centres,<sup>4</sup> alongside a robust technology and service industry.<sup>5</sup>

Alberta, however, began to fall behind as other jurisdictions strengthened targets, regulations, and emissions measurement. Despite having pledged to explore ways to reduce methane emissions 75–80% (from 2014 levels by 2030),<sup>6</sup> the province never formally adopted the target. Then in November 2025, the federal and Alberta governments signed a memorandum of understanding that included a reduction target of 75% by 2035.<sup>7</sup>

This new target extends the deadline by five years compared to the target previously considered by Alberta, as well as Canada’s national target of a 75% reduction by 2030 (from 2012 levels).<sup>8</sup> Unless most of Alberta’s reductions are achieved by 2030 (in line with the newly amended

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<sup>1</sup> Tom Marr-Laing and Chris Severson-Baker, *Beyond Eco-terrorism: The deeper issues affecting Alberta’s oilpatch* (Pembina Institute, 1999), 3. <https://www.pembina.org/reports/beyond-ecoterrorism.pdf>

<sup>2</sup> Government of Alberta, “Alberta’s Environmental Leadership: Enabling emissions reductions.” <https://www.alberta.ca/enabling-emissions-reductions>

<sup>3</sup> Alberta Methane Emissions Program, “Alt-FEMPs Now Complete.” <https://amep.ca/alt-femp-applications/>

<sup>4</sup> Carbon Management Canada, “About CMC.” <https://cmcghg.com/about-us/>

NGIF, “Field Testing.” <https://etc.ngif.ca/field-testing/>

<sup>5</sup> Marcy Lowe, *Canada’s Methane Opportunity: Innovation, exports, jobs* (Datu Research, 2025). <https://www.pembina.org/pub/canadas-methane-opportunity-innovation-exports-jobs>

<sup>6</sup> Government of Alberta, “Emissions Reduction and Energy Development Plan.” <https://www.alberta.ca/emissions-reduction-and-energy-development-plan>

<sup>7</sup> Government of Canada, “Canada-Alberta Memorandum of Understanding,” *Prime Minister of Canada*, backgrounder, November 27, 2025. <https://www.pm.gc.ca/en/news/backgrounders/2025/11/27/canada-alberta-memorandum-understanding>

<sup>8</sup> Government of Canada, “Reducing Methane Emissions.” <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reducing-methane-emissions.html>

federal oil and gas methane regulations), this delayed goal will hold Alberta to a lower standard than other provinces and lead to additional cumulative emissions.<sup>9</sup>

Alberta is also lagging in other areas.

The province is relying on a traditional inventory methodology — using industry-reported data, emissions factors (emissions per unit or activity), engineering estimates, and activity factors (counts of units or activities) — to track methane emissions. By contrast, to improve accuracy, the federal government has updated the methodology for its national greenhouse gas inventory report to incorporate scientific measurement data.<sup>10</sup> The province has not adopted a similar approach. Consequently, its claim of achieving a 45% reduction from 2014 levels three years ahead of the 2025 deadline lacks credibility.

The province is the only major oil- and gas-producing jurisdiction in Canada yet to regulate a phase-out of gas-driven pneumatic devices.<sup>11</sup> These devices automate processes and can be powered by non-emitting alternatives such as instrument air and nitrogen.

This policy stagnation is now translating into stalled emissions reductions. After nearly a decade of reported methane emissions steadily declining, the Alberta Energy Regulator’s annual report on upstream petroleum industry emissions (ST60B) showed a slight 1% increase in emissions in 2024 compared to the previous year.<sup>12</sup> The problem is likely worse than the official data suggests. Independent, measurement-based studies have found that the province’s reporting standards and quantification methods underestimate the true magnitude of emissions.<sup>13</sup>

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<sup>9</sup> Government of Canada, *Regulations Amending the Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)*, *Canada Gazette*, Part II, 159, no. 27 (2025).

Amanda Bryant, “No, the Ottawa-Alberta MoU is not a win on methane,” *Pembina Institute*, December 5, 2025. <https://www.pembina.org/blog/no-ottawa-alberta-mou-not-win-methane>

<sup>10</sup> Environment and Climate Change Canada (ECCC), *National Inventory Report 1990–2022: Greenhouse Gas Sources and Sinks in Canada* (2024), Part 2, section A3.2.2.1.5. [https://publications.gc.ca/collections/collection\\_2024/eccc/En81-4-2022-2-eng.pdf](https://publications.gc.ca/collections/collection_2024/eccc/En81-4-2022-2-eng.pdf)

<sup>11</sup> Amanda Bryant, *Meeting the Moment: Why finalized methane regulations will be key to Canada’s climate competitiveness* (Pembina Institute, 2025), 14. <https://www.pembina.org/pub/meeting-moment>

<sup>12</sup> Alberta Energy Regulator, *ST60B-2025: Upstream Petroleum Industry Emissions Report: Industry performance for year ending December 31, 2024* (2025), 24. <https://static.aer.ca/prd/documents/sts/ST60-B-2025.pdf>

<sup>13</sup> Bradley Conrad et al., “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). <https://doi.org/10.1038/s43247-023-01081-0>

Hugh Li et al., “Direct Measurements of Methane Emissions from Key Facilities in Alberta’s Oil and Gas Supply Chain,” *Science of The Total Environment* 912 (2024). <https://doi.org/10.1016/j.scitotenv.2023.169645>

Matthew Johnson et al., “Comparisons of Airborne Measurements and Inventory Estimates of Methane Emissions in the Alberta Upstream Oil and Gas Sector,” *Environmental Science & Technology* 51, no. 21 (2017). <https://doi.org/10.1021/acs.est.7b03525>

The Government of Alberta has long touted its leadership in reducing oil and gas methane emissions. While the province showed leadership in the past (reducing emissions 35% from 2014 levels by 2023, per federal data), Alberta can no longer credibly claim that role.<sup>14</sup>

This report summarizes the results of a technical analysis we did to assess data and regulatory gaps and devise recommendations. We drew on independent measurement studies, provincial and federal estimates, and industry-reported data, including from alt-FEMP follow-up surveys.<sup>15</sup> For analysis details and methodology, see the accompanying technical background.

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Simon Festa-Bianchet et al., “Methane Venting from Uncontrolled Production Storage Tanks at Conventional Oil Wells—Temporal Variability, Root Causes, and Implications for Measurement,” *Elementa: Science of the Anthropocene* 11, no. 1 (2023). <https://doi.org/10.1525/elementa.2023.00053>

<sup>14</sup> ECCC, *National Inventory Report 1990–2023* (2025), Part 3, Annex 9: Canada’s Greenhouse Gas Emission Tables by IPCC Sector, 1990–2023, Table A11-19. Report: Available at <https://data-donnees.az.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/>. Data: Available at ECCC Data Catalogue, “Canada’s Official Greenhouse Gas Inventory.” <https://data-donnees.az.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/>

Government of Alberta, “Reducing Methane Emissions.” <https://www.alberta.ca/climate-methane-emissions>

<sup>15</sup> Alberta Energy Regulator, “Alternative Fugitive Emission Management Program (alt-FEMP) Approvals.” <https://www.aer.ca/data-and-performance-reports/industry-performance/methane-performance/alternative-fugitive-emission-management-program-alt-femp-approvals>

Alberta Energy Regulator, *ST60B-2022: Upstream Petroleum Industry Emissions Report: Industry performance for year ending December 31, 2021* (2023), 21. [https://static.aer.ca/prd/documents/sts/ST60B\\_2022.pdf](https://static.aer.ca/prd/documents/sts/ST60B_2022.pdf)

Conrad, “A Measurement-Based Upstream Oil and Gas Methane Inventory for Alberta.”

Petrinex, “Conventional Volumetric Data Download (2024),” spreadsheet, January 8, 2026. <https://www.petrinex.ca/PD/Pages/APD.aspx>

# Findings and recommendations

## Emissions data

Alberta, through the AER, has developed its own methane emissions model to track the province's progress in reducing oil and gas methane emissions. The model uses a combination of industry-reported data, emissions factors, and activity factors to estimate emissions.<sup>16</sup>

Emissions factors are formulas that are supposed to capture average emission rates from different types of equipment and activity. Activity factors quantify the scale of equipment or activities by counting, for example, number of pneumatic devices. We refer to these methods as “bottom-up” estimation methods.

These methods have been proven to dramatically underestimate methane emissions for two main reasons.<sup>17</sup> Self-reported data has data quality issues (such as missing flow rates),<sup>18</sup> and emissions factors tend to miss abnormal emissions and large intermittent sources.<sup>19</sup> Bottom-up methods are therefore now considered flawed and outdated compared with newer approaches that integrate actual measurement data.

As a result of its outdated methodology, Alberta's methane model tells a dramatically different story than inventories that integrate measurement data, such as Canada's National Inventory Report (NIR). The federal inventory integrates independent aerial measurements,<sup>20</sup> which makes it more comprehensive and credible. Two peer-reviewed studies have validated the federal methodology by showing that its results more closely agree with what researchers observe in the field.<sup>21</sup> Figure 1 shows the vast difference between Alberta's methane emissions estimate and the federal estimate.

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<sup>16</sup> *ST60B*.

<sup>17</sup> Conrad et al., “A Measurement-Based Upstream Oil and Gas Methane Inventory for Alberta.”

<sup>18</sup> Amanda Bryant, *Unfinished Business: Addressing the emissions and environmental risks of Canada's non-producing oil and gas wells* (Pembina Institute, 2025). [pembina.org/sites/default/files/2025-08/Unfinished\\_Business.pdf](https://pembina.org/sites/default/files/2025-08/Unfinished_Business.pdf)

Scott Seymour, Donglai Xie, and Mary Kang, “Highly Uncertain Methane Leakage from Oil and Gas Wells in Canada Despite Measurement and Reporting,” *Energy & Fuels* 38, no. 14 (2024). <https://doi.org/10.1021/acs.energyfuels.4c00908>

<sup>19</sup> Mark Omara et al., “Constructing a Measurement-Based Spatially Explicit Inventory of US Oil and Gas Methane Emissions (2021).” *Earth System Science Data* 16, no. 9 (2024). <https://doi.org/10.5194/essd-16-3973-2024>

<sup>20</sup> *National Inventory Report 1990–2022*, section A3.2.2.1.5.

<sup>21</sup> Katlyn MacKay et al., “A Comprehensive Integration and Synthesis of Methane Emissions from Canada's Oil And Gas Value Chain,” *Environmental Science & Technology*, 1 (2024). <https://doi.org/10.1021/acs.est.4c03651>

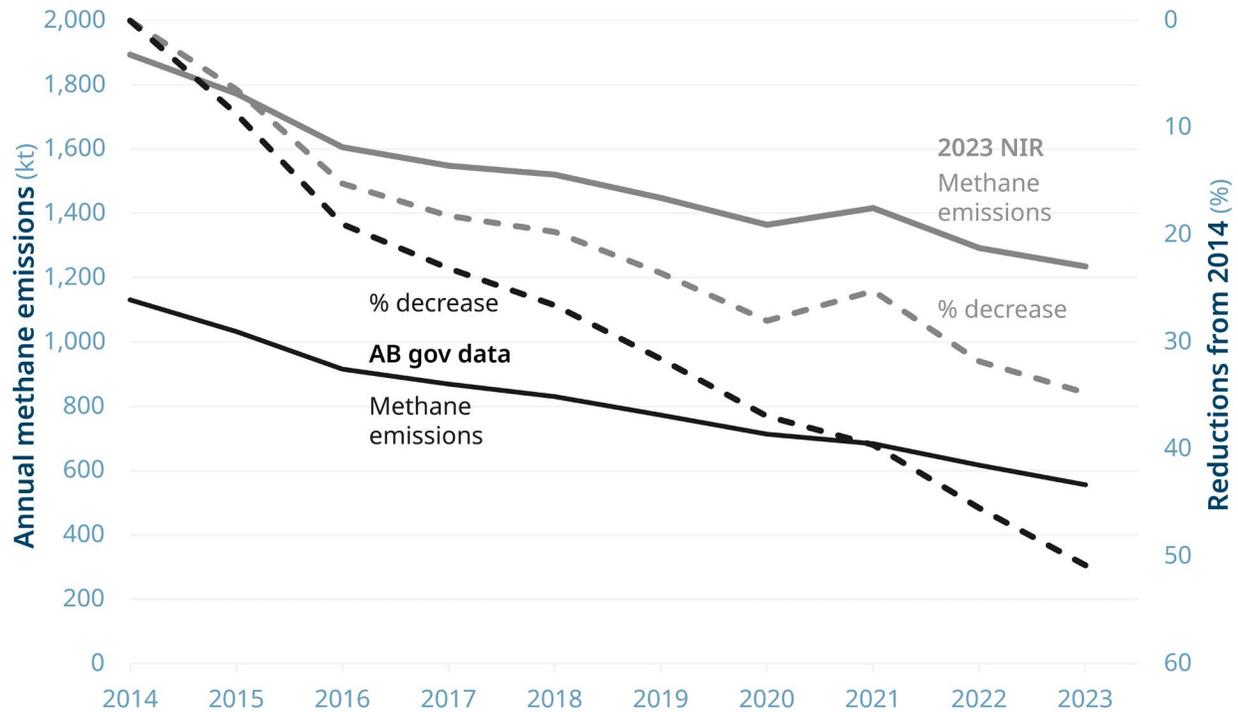


Figure 1. Federal versus Alberta estimates of Alberta’s absolute and relative oil and gas methane emissions reductions

Data sources: Government of Alberta, Environment and Climate Change Canada<sup>22</sup>

On average, federal estimates are 1.9 times higher than Alberta’s estimates of emissions from 2014 to 2023. Importantly, while the Government of Alberta claims to have reduced emissions over 50%, surpassing its 45% target,<sup>23</sup> the most recent federal data estimates that the reductions in 2023 were 35%.

**We recommend that Alberta build defensible estimates of oil and gas methane emissions using modern measurement data and methods, including vehicle-based systems, aircraft and satellites.**

These improvements would better align Alberta’s inventory with independent studies and Canada’s NIR, thereby enabling the province to more accurately track progress — and by extension, to credibly tell success stories. The methods and estimates should also be publicly

Elton Chan et al., “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>

<sup>22</sup> “Reducing Methane Emissions.”

*National Inventory Report 1990–2023*, Table A11-19. <https://data-donnees.az.ec.gc.ca/data/substances/monitor/canada-s-official-greenhouse-gas-inventory/>

<sup>23</sup> Government of Alberta, “Alberta hits methane reduction target three years early,” news release, November 28, 2023. <https://www.alberta.ca/release.cfm?xID=89370E8084D20-DE6B-19C9-F36522142C6795F9>

available, with the assumptions and data sources clearly stated. This would permit independent scrutiny and comparison with other emissions modelling approaches.

## Venting

Venting is the release of unwanted methane gas straight into the atmosphere. It is sometimes necessary for safety reasons, but the practice of “routine” venting (venting during normal operations) is unnecessary, wasteful, and highly polluting.

Alberta has regulatory limits on venting, including a monthly limit on vent volumes at oil and gas sites, which is called the overall vent gas limit.<sup>24</sup> Our analysis of industry-reported data found that 180 facilities were non-compliant with that limit in 2024, and combined vented 28.4 kilotonnes of methane above the legal limit. That’s equivalent to the greenhouse gas emissions from 1.8 million barrels of oil consumed, 395 million kilograms of coal burned, or nearly 183,000 gas-powered passenger cars driven for one year.<sup>25</sup> Nearly 20% of reported venting in 2024 was non-compliant venting.

These numbers almost certainly do not reflect the full scope of the problem. Just as bottom-up methods underestimate overall methane emissions, they also underestimate venting. Measurement research shows that vent emissions in Alberta are approximately 5.5 times higher on average than reported.<sup>26</sup> Likewise, Canada’s NIR estimate of Alberta’s vented emissions is about 5 times higher than the reported data.<sup>27</sup> This means that actual vent emissions are much higher than reported and that Alberta’s vent limits have only been partially effective at reducing emissions. Taken alone, the reported data has extremely limited value for evaluating compliance, tracking progress, assessing regulatory efficacy, or accelerating emissions reductions.

These discrepancies may be partly due to the widespread use of estimation over metering in Alberta. According to the province’s regulations, only “flared and vented volumes at all oil or gas production or processing facilities (including thermal in situ facilities...) where annual average total flared and vented volumes per facility exceed [500] m<sup>3</sup>/d (excluding pilot, purge, or

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<sup>24</sup> Alberta Energy Regulator, *Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting*, section 8.3. <https://static.aer.ca/prd/documents/directives/Directive060.pdf>

<sup>25</sup> United States Environmental Protection Agency, “Greenhouse Gas Equivalencies Calculator.” <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

<sup>26</sup> Conrad et al., “A Measurement-Based Upstream Oil and Gas Methane Inventory for Alberta.”

<sup>27</sup> *National Inventory Report 1990–2023*, Table A11-19.

dilution gas) must be metered.”<sup>28</sup> Flare and vent volumes below that threshold may be estimated. We found that nearly 94% of facilities fall under that threshold. This means that most facilities estimate their vent volumes, and underestimation of venting could be widespread across Alberta.

**We recommend that Alberta require top-down methods to measure methane emissions from oil and gas facilities (vehicle-based systems, aircraft, drones, or continuous monitors), in addition to the close-range methods commonly used in leak detection and repair programs, and integrate the resulting data into reporting.**

This would likely require shifting focus away from the traditional distinction between unintentional leaks and intentional venting to total emissions at the site level or emissions intensities. The data should, however, continue to be made publicly available.

**We likewise recommend strengthening venting restrictions. Site-level vent limits should be reduced gradually to zero, culminating in the prohibition of routine venting by 2030.**

This regulatory approach is feasible because the elimination of routine venting is a best practice both in policy<sup>29</sup> and in voluntary industry initiatives,<sup>30</sup> and proven solutions to capture and conserve gas are available.<sup>31</sup> Actively monitoring for compliance and penalizing non-compliance is key to the success of these measures.

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<sup>28</sup> Alberta Energy Regulator, *Directive 017: Measurement Requirements for Oil and Gas Operations*, section 1.7.2(vi). <https://www.aer.ca/regulations-and-compliance-enforcement/rules-and-regulations/directives/directive-017>

<sup>29</sup> *Meeting the Moment*, 14–15.

<sup>30</sup> Oil and Gas Climate Initiative, “Methane Emissions.” <https://www.ogci.com/methane-emissions/> COP28 UAE, *Oil and Gas Decarbonization Charter*. <https://www.ogdc.org/wp-content/uploads/2024/03/COP28-OG-Decarbonization-Charter.pdf>

<sup>31</sup> International Association of Oil and Gas Producers, *Guidelines for Venting Minimization and Vent Recovery Systems* (2024). <https://www.iogp.org/bookstore/product/guidelines-for-venting-minimization-and-vent-recovery-systems/>

## Separator buildings

Academic measurement studies have attributed a significant proportion of methane emissions to separator buildings. One such study in Alberta found that methane from separator buildings was responsible for 20% of the total measurement-based inventory.<sup>32</sup>

Separation is the process of separating the gas and liquid components of produced oil or gas. Separator buildings are not a distinct source of emissions. Rather, they are a collection of sources (including pneumatic controllers, pressure relief valves, fuel gas regulators, vent lines, and catalytic heaters) that aerial measurement methods cannot distinguish between. It is therefore important to drill down into available data from ground-level surveys to identify the most prominent emissions sources within this broad category.

We analyzed alt-FEMP survey data from several operators and found that methane emissions from separator buildings were responsible for between 9% and 42% of total measured emissions, depending on the operator. Our results mirrored findings in B.C., which showed that pneumatic controllers and pumps contributed a significant proportion of these methane emissions.<sup>33</sup> These pieces of equipment have historically been gas-driven and designed to vent either continuously or intermittently. In our analysis, they were responsible for roughly 30–60% of separator emissions.

We also discovered in our review of the alt-FEMP data that data quality and standardization issues were common, particularly for vented sources, including deviations from and inconsistent application of the AER reporting framework and definitions. These issues created ambiguity about the emitting sources and made comparisons challenging.

As mentioned above, replacing existing emitting pneumatic devices with non-emitting ones is a best practice. Alberta has yet to make this a requirement. Currently, it requires existing pneumatics be low-emitting and provides carbon credits under its Technology Innovation and Emissions Reduction (TIER) Regulation for switching to zero-emitting devices.<sup>34</sup>

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<sup>32</sup> Conrad et al., “A Measurement-Based Upstream Oil and Gas Methane Inventory for Alberta.”

<sup>33</sup> Matthew Johnson, David Tyner, and Bradley Conrad, “Origins of Oil and Gas Sector Methane Emissions: On-Site Investigations of Aerial Measured Sources,” *Environmental Science & Technology* 57, no. 6 (2023). <https://doi.org/10.1021/acs.est.2c07318>

<sup>34</sup> *Directive 060*, section 8.6.1(4).

Government of Alberta, *Quantification Protocol for Greenhouse Gas Emission Reductions from Pneumatic Devices*, version 3.0. <https://open.alberta.ca/dataset/92ead189-ebbe-412d-8b3f-9155d792ac8f/resource/b6d32b7b-7339-49eb-9ce0-1150923a9d7e/download/epa-quantification-protocol-greenhouse-gas-emission-reductions-pneumatic-devices-version-3.0.pdf>

**We recommend that Alberta immediately introduce regulations to phase out emitting pneumatics by 2030, if not sooner.**

The TIER credit for switching to zero-emitting pneumatics will need to be eliminated, since credit can only be given for emissions reductions that result from actions over and above regulatory requirements. This would help mitigate Alberta’s overly permissive and oversupplied credit market.<sup>35</sup>

**We likewise recommend that the AER engage diverse interest holders, including academic experts, to co-develop and improve measurement and reporting frameworks and requirements to enhance the quality and accuracy of reported data.**

## Flaring

Solution gas flaring is the open combustion of unwanted waste gas that comes to the surface during oil production. For our analysis, we used the AER’s definitions of solution gas and solution gas flaring: solution gas is “all gas that is separated from condensate, oil, or bitumen production.”<sup>36</sup> Accordingly, solution gas flaring is “the combustion of excess natural gas (including methane) associated with oil and bitumen production,”<sup>37</sup> which is annually summarized in ST60B.

Solution gas remains dissolved in oil deep underground. When the oil is brought to the surface and the pressure drops, the gas is released. Since regulations are in place to limit routine venting, most operators choose to flare the gas.

Flaring is a wasteful practice because it destroys an energy product that could be used or sold, resulting in lost royalties and revenues.<sup>38</sup> It also emits black carbon and volatile organic compounds such as benzene, degrading air quality and harming the health of humans and

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<sup>35</sup> Pembina Institute, “Alberta’s Continued Weakening of Industrial Carbon Pricing Makes Canada Less Climate Competitive,” media release, September 18, 2025. <https://www.pembina.org/media-release/albertas-continued-weakening-industrial-carbon-pricing-makes-canada-less-climate>

<sup>36</sup> *Directive 060*, 95.

<sup>37</sup> *ST60B-2025*, 21.

<sup>38</sup> Aaron Wolfe and Scott Seymour, “Wasted Gas, Wasted Royalties – How Common-Sense Climate Policy Can Put Money Back in People’s Pockets,” *EDF Blogs*, February 13, 2024. <https://blogs.edf.org/energyexchange/2024/02/13/wasted-gas-wasted-royalties-how-common-sense-climate-policy-can-put-money-back-in-peoples-pockets/>

livestock living nearby.<sup>39</sup> Health risks can include respiratory illness, adverse pregnancy outcomes, and leukemia.<sup>40</sup>

Alberta introduced an industry-wide limit on solution gas flaring in the early 2000s due to landowner concerns. After the limit was breached two years in a row (in 2023 and 2024),<sup>41</sup> the AER eliminated the limit in 2025 at the direction of the Government of Alberta.<sup>42</sup> Yet eliminating the rule doesn't solve the underlying problem. Since solution gas flaring includes many cases of routine flaring, this policy backsliding takes Alberta out of step with international best practice, which is to prohibit routine flaring outright (with exemptions for emergency situations and other exceptional circumstances).<sup>43</sup> Likewise, it does not align with Canada's commitment to the World Bank's Zero Routine Flaring by 2030 initiative.<sup>44</sup>

Numerous alternatives exist to routine flaring for managing what has historically been regarded as waste gas. These include capturing and conserving the gas and routing it to processes or to sales, where feasible. When sites are not connected to gas pipeline infrastructure, opportunities might be available to build gas collection hubs. Failing that, there are modular options such as on-site power generation. Otherwise, enclosed combustors and incinerators can be used, which are more efficient, more reliable options for destroying gas that mitigates some of the air quality concerns with open flaring.<sup>45</sup>

<sup>39</sup> Chen Chen, David McCabe, Lesley Fleischman, and Daniel Cohan, "Black Carbon Emissions and Associated Health Impacts of Gas Flaring in the United States," *Atmosphere* 13, no. 3 (2022). <https://doi.org/10.3390/atmos13030385>

Huy Tran et al., "Air Quality and Health Impacts of Onshore Oil and Gas Flaring and Venting Activities Estimated Using Refined Satellite-Based Emissions," *GeoHealth* 8, no. 3 (2024). <https://doi.org/10.1029/2023GH000938>

Olusegun Fawole, Xiaoming Cai, and Rob MacKenzie, "Gas Flaring and Resultant Air Pollution: A Review Focusing on Black Carbon," *Environmental Pollution* 216 (2016). <https://doi.org/10.1016/j.envpol.2016.05.075>

<sup>40</sup> Jordy Motte et al., "Quantification of the Global and Regional Impacts of Gas Flaring on Human Health via Spatial Differentiation," *Environmental Pollution* 291, no. 118213 (2021). <https://doi.org/10.1016/j.envpol.2021.118213>

Wesley Blundell and Anatolii Kokoza, "Natural Gas Flaring, Respiratory Health, and Distributional Effects," *Journal of Public Economics* 208, no. 104601 (2022). <https://doi.org/10.1016/j.jpubeco.2022.104601>

Onome Oghenetega et al., "Oil Spills, Gas Flaring and Adverse Pregnancy Outcomes: A Systematic Review," *Open Journal of Obstetrics and Gynecology* 10, no. 1 (2019). <https://doi.org/10.4236/ojog.2020.1010016>

<sup>41</sup> Amanda Stephenson, "Exclusive: Alberta Blew Past Gas Flaring Ceiling in 2024 as Province Eliminates Limit," *Reuters*, June 24, 2025. <https://www.reuters.com/sustainability/climate-energy/alberta-blew-past-gas-flaring-ceiling-2024-province-eliminates-limit-2025-06-23/>

<sup>42</sup> Amanda Stephenson, "Alberta Energy Regulator stopped enforcing gas flaring limits after government pressure, documents show," *CBC News*, December 1, 2025. <https://www.cbc.ca/news/canada/calgary/alberta-energy-regulator-stopped-enforcing-gas-flaring-limits-after-government-pressure-documents-show-9.6998787>

<sup>43</sup> *Meeting the Moment*, 14–15.

<sup>44</sup> World Bank Group, *Zero Routine Flaring by 2030 (ZRF) Initiative* (2025). <https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030/about>

<sup>45</sup> Huilong Gai et al., "Clean combustion and flare minimization to reduce emissions from process industry," *Current Opinion in Green and Sustainable Chemistry* 23 (2020), 38. [https://www.lamar.edu/midstreamcenter/\\_files/documents/clean-combustion-published-paper.pdf](https://www.lamar.edu/midstreamcenter/_files/documents/clean-combustion-published-paper.pdf)

The AER’s ST60B report shows that solution gas flaring increased 18.9% between 2023 and 2024, and in 2024 was 36.5% higher than the limit that was still in effect.<sup>46</sup> Overall, reported solution gas flaring in Alberta has more than doubled since 2019. This trend is likely to continue if left unchecked by enforceable regulation.

Unlike with venting, little research has been done on whether industry-reported flare volumes are underestimated.

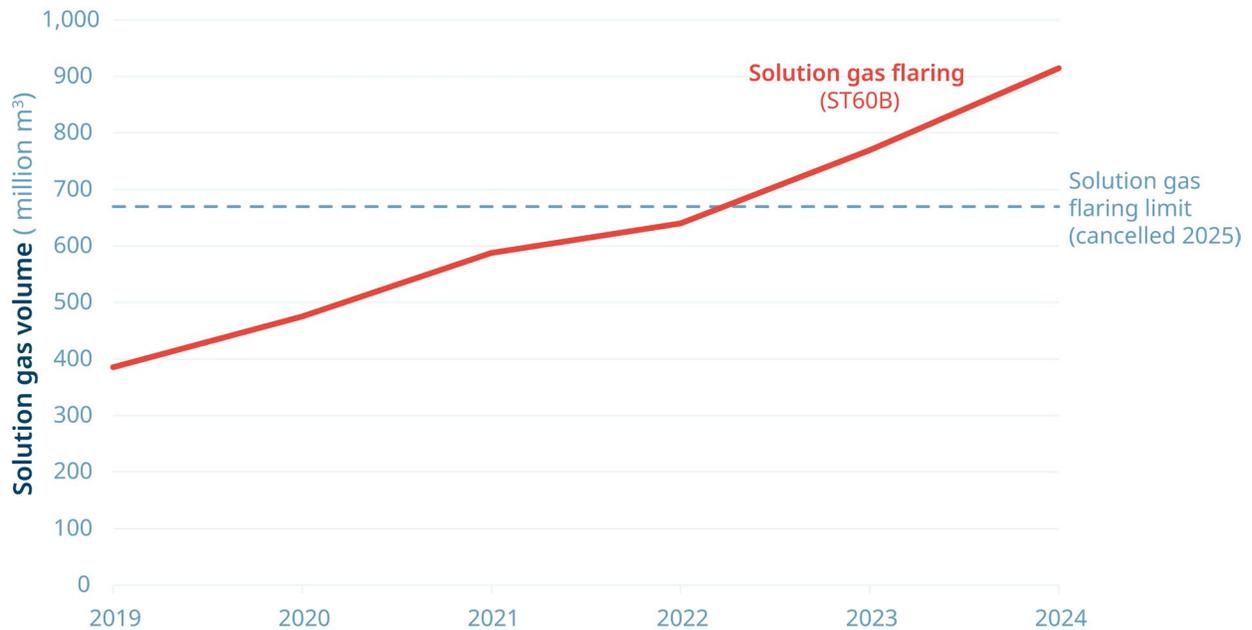


Figure 2. Solution gas flaring in Alberta

Data source: Alberta Energy Regulator<sup>47</sup>

We modelled the methane emissions that could be attributed to unlit and underperforming flares. In total, we estimate that methane emissions from solution gas flaring above the limit were between 8.2 and 14 kilotonnes in 2024. While this is low compared with other upstream sources of methane emissions, the value of the gas that was flared above the limit was \$9.1 million in 2024 and \$9.9 million in 2023.<sup>48</sup> Based on projected natural gas prices for 2026 to 2034, the value of the gas sent to flare will continue to rise — especially if flaring continues to grow unabated.

Abel Clemente-Reyes et al., “A comparative assessment of open flame flares and enclosed ground flares for cleaner and safer hydrocarbon production in Mexico,” *Cleaner Engineering and Technology* 16, no. 100671 (2023), 10. <https://doi.org/10.1016/j.clet.2023.100671>

<sup>46</sup> ST60B-2025, 21.

<sup>47</sup> ST60B-2025.

<sup>48</sup> Alberta Energy Regulator, *AECO-C Price* (2025). <https://www.aer.ca/data-and-performance-reports/statistical-reports/alberta-energy-outlook-st98/prices-and-capital-expenditure/natural-gas-prices/aeco-c-price>

**We recommend that Alberta implement enforceable regulations to reduce and ultimately eliminate routine flaring.**

These regulations should ensure that companies deploy known alternatives, such as tying into gas gathering infrastructure, using the gas on-site as fuel, or implementing enclosed combustors or incinerators instead of open flares. For necessary (i.e., non-routine) flaring activity, regulations requiring failed pilots and ignitors on flare stacks to be repaired within 24 hours should be better enforced to address unlit flares.<sup>49</sup> Finally, more work should be done to understand whether flare gas volumes reported to Petrinex are accurate.

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<sup>49</sup> *Directive 060*, section 8.10.4(1)(b).

# Conclusion

Alberta's early action in regulating methane emissions from oil and gas production has fostered deep expertise, innovative solutions, and well-established best practices. Alberta's oil and gas industry has made significant strides in piloting and deploying technologies, solving problems creatively, driving down emissions, and improving operational efficiency. These are real successes.

However, the provincial government's stagnation on policy has left it clearly falling behind more consistent leaders such as British Columbia, which has integrated measurement data into its inventory and regulatory development.<sup>50</sup> We've argued before that real leadership on methane requires continual progress — an openness to evidence, to assessing and re-assessing progress, and to identifying gaps and deploying solutions to close them.<sup>51</sup> It's not about appearing the best; it's about credibly tracking progress, committing to doing better, and actually following through by implementing known solutions. That's the form of leadership on methane that Alberta needs now.

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<sup>50</sup> Pembina Institute, "B.C. meets its methane emissions target two years early, while still growing oil and gas production," media release, May 22, 2025. <https://www.pembina.org/media-release/bc-meets-its-methane-emissions-target-two-years-early-while-still-growing-oil-gas>

<sup>51</sup> Amanda Bryant, *Raising the Bar: How targets and measurement are crucial to leadership on oil and gas methane* (Pembina Institute, 2025). <https://www.pembina.org/pub/raising-bar>



Photo: Roberta Franchuk, Pembina Institute

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