Canada must keep up on methane

[This is a draft. The published version is available here.]

Canada is experiencing its worst-ever wildfire season. Greenhouse gasses (GHGs) emitted from oil and gas (O&G) activity directly cause wildfires. The fires are a sobering reminder of the urgent need for effective climate policy.

Reducing methane — a GHG with roughly 80x the warming power of carbon dioxide in a 20 year timespan — should be a top priority. About 40% of Canada's human-caused methane emissions come from O&G.

Canada is expected to release strengthened regulations for O&G methane this summer. The framework risks being watered down due to relentless industry lobbying and weak provincial equivalency agreements.

But even if its spirit is preserved, strong US policy on methane shows how much more Canada (and other nations) could be doing.

From introducing a strategically designed methane waste charge, to allowing third party emissions monitoring, to improving quantification and data collection, the US is moving faster on methane. Canada must keep up if it truly wants to go "faster and further" on methane.

Canada is falling behind

The United States' Inflation Reduction Act (IRA) takes a bold step forward by introducing a charge on excess O&G methane emissions. The charge applies to heavy emitters that exceed thresholds for emissions and emission intensity.

Starting in 2025, the charge will be $900 USD ($1225 CAD) per metric ton of excess methane reported for 2024, rising to $1200 USD ($1634 CAD) for 2025 and $1500 USD ($2043 CAD) for 2026 and beyond.

IRA allows for an exemption to the fee if the EPA's methane regulations are in effect in all states and "will result in equivalent or greater emissions reductions as would be achieved" by the EPA's November 2021 proposed rule.

This exemption will motivate rapid state adoption of EPA rules and discourage future administrations from rolling them back and thereby triggering the fee for previously exempt companies.

IRA's methane fee is therefore a game-changing tool to reduce methane emissions and emissions intensity, encourage regulatory uptake, and create greater policy certainty.

It remains to be seen how it will be administered, including how methane emissions and emissions intensity will be determined. Since methane emissions are vastly underestimated, verification measurements should play an important role.

Canada has no methane waste charge. A Canadian study shows that, at the upper end of the average cost range, it becomes cheaper to mitigate methane than to pay for excess emissions at around $63/ton of methane ($2.51/ton CO_2 equivalent). This means that Canada could incentivize mitigation by charging even a fraction of the US methane fee.

While carbon taxes are unpopular among certain Canadian demographics — particularly older, rural demographics in the West — industrial carbon taxes and fees are an effective ingredient of climate policy. And a smartly designed exemption could be used to encourage the provinces to match federal regulation in key areas like venting, flaring, and leak detection and repair (LDAR).

The EPA's supplemental methane regulations also propose an innovative Super-Emitter Response Program. The program allows approved third parties using approved technologies to report super-emitting events — leaks of at least 100kg per hour (last year's methane plume over Lloydminster emitted at about 100x that rate). Operators would have to respond to credible reports by performing a root-cause analysis within 5 days and correcting the problem within 10.

Canada has no comparable mechanism for third-party monitoring and reporting.

The US government has also formed a Greenhouse Gas Monitoring and Measurement Interagency Working Group designed to promote the integration of diverse quantification methods, enhance access to high-quality empirical data, and diminish reliance on inaccurate estimation of methane and other GHG emissions.

Meanwhile, in November 2022, Canada promised a Global Centre of Excellence on methane detection and elimination. However, the federal government's 2023 budget directed no funds to it, nor have plans for its creation been published.

Federal financing

IRA dedicates $1.55 billion USD ($2.09 billion CAD) to the Methane Emissions Reduction Program (MERP) to reduce methane emissions from the petroleum and natural gas sector, $1 billion of which will be provided by a partnership between the EPA and U.S. Department of Energy.

Canada has directed $750 million to methane through its Emissions Reduction Fund, which supports the reduction of O&G methane (not including the $1.7 billion directed to its Site Rehabilitation Program, which aims to reduce GHG emissions broadly).

While IRA's spending on O&G methane mitigation may appear to outstrip Canadian spending, Canada's methane spending is about 5x higher in proportion to average federal expenditures.

At the same time, Canada has a proportionally bigger methane problem, in that its methane emissions constitute about twice as big a chunk of its national emissions profile. Even still, Canada's federal methane spending outpaces that of IRA.

Whether that's a win or a loss is open to debate, since government spending on O&G methane could be viewed either as an urgently needed use of public funds or as an industry handout that unfairly passes the buck to taxpayers.

What Canada is doing right

Proposed Canadian and American regulations both require zero-emitting pneumatic devices (controllers and pumps historically powered by natural gas) and permit the use of cutting-edge leak detection technologies.

Both countries appear to be moving away from unreliable estimation. At MERP's direction, the EPA recently proposed updates to Greenhouse Gas Reporting Program that would integrate more measurement and empirical data as well as improve reporting, while Canada's methane strategy and proposed regulatory framework emphasize the importance of measurement.

What's more, Canada's proposed methane framework is *ahead* of the United States' in that it prohibits routine venting and flaring, which is a big win for climate, air quality, and human health.

Canada's forthcoming LDAR regulation is also poised to be stricter than its American counterpart. Requirements vary by facility size and type, but US regulations require major production facilities to inspect for leaks using audial-visual-olfactory (AVO) inspection bi-monthly and optical gas imaging (OGI) quarterly. For leaks detected using OGI, a first attempt at repair must be made within 30 days.

Canada's proposed regulations mandate monthly inspection and repair within 15 days. It remains to be seen which inspection method will be required. So long as the regulations require instrument-based methods such as OGI rather than ineffective AVO, Canada's LDAR requirements will be more rigorous.

Table: *Canadian and US Methane Contexts and Policies*

	Canada	**USA**

Active wells (approx.)	225,000	1,000,000
Crude oil produced (2021)	69.2 million cubic meters	653 million cubic meters
Natural gas produced (2021)	172,300 million cubic meters	934,200 million cubic meters
O&G revenue (2021)	$174 billion CAD	$266 billion CAD
% of GDP (2021)	10.5%	0.9%
Estimated methane emitted from O&G production (2021)*	30.67 megatons CO_2e	143 megatons CO_2e
% total GHG emissions	5.2%	2.3%
Federal funds to reduce O&G methane	$750 million CAD	$2,090 million CAD
% of federal expenditures (5 year average):	0.15%	0.03%
Waste emissions charge	None	Starting at $1225 CAD / ton for 2024 emissions
Measurement & monitoring	• No 3rd party monitoring • Promised Methane Center of Excellence (no funds to date)	• Super-Emitter Response Program • Interagency Working Group
Routine venting and flaring	Prohibited by proposed rules	Limited by proposed rules
LDAR Requirements	• Monthly inspection at all facilities (method TBA) • 15 days for repair	• Quarterly OGI at major facilities • 30 days for 1st repair attempt

*Note that emissions are underestimated by a factor of 1.5 in Canada and 1.5-2 in the US. For relevant sources and calculations, see table appendix.

Lessons for Canada

Since Canadian and American contexts differ in important ways, we should not copy every aspect of US policy. But we should recognize good ideas when we see them. Canada should take 3 key lessons from American methane policy:

1. A conditional **methane waste charge is a reasonable and effective measure** to maintain internationally accepted intensity standards and drive down emissions, and a well-designed exemption could **ensure key aspects of federal regulation are preserved** in provincial regulations.
2. We need not rely on industry self-reporting; **third party monitoring can enhance accountability**.
3. **Now is the time to develop and fund coordinated research strategies, bodies, and centres** that advance cutting-edge monitoring and quantification methods and enable the collection, verification, integration, and widespread availability of high-quality, empirical emissions data.

As international regulations and best practices advance, falling behind on methane policy will make Canada *less* internationally competitive, not more. So, as the world literally burns, Canada has both a moral and a rational imperative to match the methane policy pace of its international counterparts.

TABLE APPENDIX [Note to editor: the appendix could be linked to rather than included with the main article]

Canada

Active wells (approx.):

Number of active wells by region, based on S&P Global data:

11,174 in BC
153,078 in Alberta
51,215 in Saskatchewan
5,879 in Manitoba
5 in Quebec
47 in Newfoundland and Labrador
16 in Nova Scotia
3 in New Brunswick
229 in Northwest Territories

2 in Yukon

+ 3505 in Ontario (Source)

= 225,153 active oil and gas wells in Canada

Crude oil produced (2021): Source

Natural gas produced (2021): Source

O&G revenue (2021): Source

% of GDP (2021):

Canada's GDP for 2021: $1,660.33 billion CAD (source)
$174 billion / $1,660.33 billion CAD = 10.5%

Estimated methane emitted from O&G production (2021): Source

% of total GHG emissions:

Methane comprises 13% of Canada's total GHG emissions, and the oil and gas sector accounts for about 40% of Canada's methane emissions. Source

Federal funds to reduce O&G methane: Source

% of federal expenditures (5 year average):

$362.9 billion (2019-20) + $634.9 billion (2020-21) + $493.3 billion (2021-22) + $470.4 billion (2022-23) + $490.5 billion (2023-24) (source, source)
= $2452 billion
/ 5 = $490.4 billion

$750 million / $490,400 million = 0.1529%

Waste emissions charge: No such charge exists, so no relevant source.

Measurement & monitoring: Source

Routine venting and flaring: Source

LDAR Requirements: Source

United States

Active wells (approx.): Source

Crude oil produced (2021):

4,107,584,999 barrels (source)
= 653,053,828 cubic meters

Natural gas produced (2021): Source

O&G revenue (2021): Source

Converted to CAD using Bank of Canada average exchange rate for 2021 (1.2535)

% of GDP (2021):

US GDP for 2021: $23,315 billion USD (source)
X 1.2535
= $29,225 billion CAD
$266 billion / $29,225 billion = 0.9%

Estimated methane emitted from O&G production (2021):

Petroleum production was responsible for 48.9 Mt CO_2e of methane and natural gas production for 94.1 Mt Co_2e (source — see pp. 3-77 and 3-95).
=143 Mt Co_2e

% total GHG emissions:

Total GHG emissions were 6,340.2 Mt CO_2e (source)
143 CO_2e / 6,340.2 CO_2e = 2.3%

Federal funds to reduce O&G methane: Source

% of federal expenditures (5 year average):

$4448 billion USD (2019) + $4790 billion USD (2020) + $6822 billion USD (2021) + $5852 billion USD (2022) + $5,792 billion USD (2023) (source, source)
= $27,704 billion USD
/5 = $5540.8 billion USD

1.55 billion USD / 5540.8 billion USD = 0.0297%

Waste emissions charge: Source

Exchange rate used: 1.3616 (May 26th, 2023)

Measurement & monitoring: Source, source

Routine venting and flaring: Source, source

LDAR Requirements: Source