

Policy Briefing: Achieving methane reductions through carbon pricing in Alberta

by Jan Gorski and Duncan Kenyon | December 13, 2018

Issue

The Government of Alberta (GoA) expects that its carbon levy and Carbon Competitiveness Incentives Regulation (CCIR) will drive methane emissions reductions. There are, however, significant uncertainties and gaps in the regulations that affect the stringency, efficacy and transparency of the carbon levy and CCIR at driving methane emission reductions.

Summary

To ensure Alberta's methane emissions will be reduced through the provincial carbon pricing system, the following elements must be changed and strengthened:

1. improve measurement and reporting requirements
2. improve signals to reduce emissions by fully pricing vented methane in the carbon levy
3. provide certainty of opt-in
4. provide clarity regarding benchmark setting.

Background

Alberta's carbon levy and the Carbon Competitiveness Incentive Regulation (CCIR) both contain mechanisms for regulating methane emissions.

Alberta carbon levy

- The majority of methane emissions in Alberta occur during production of natural gas, light/medium oil, and conventional heavy oil (known as cold heavy oil production with sand or CHOPS) at smaller facilities.
- The provincial carbon levy will apply to these small conventional oil and gas facilities beginning in 2023; these facilities receive an exemption from the carbon levy until that date.

- Vented methane (intentional leaked gas) is heavily discounted under the carbon levy, because it is priced at the same rate as combusted gas, despite having a global warming potential that is 25 times higher on a 100-year time scale. This means under the carbon levy, producers effectively only pay \$2 per tonne of carbon dioxide equivalent (tonnes CO₂e) for methane emissions, instead of the full \$50/tonne CO₂e.
- Not all methane emissions are priced under the carbon levy:
 - Fugitive emissions (inadvertently leaked) are not priced under the carbon levy.
 - It will not be clear whether venting from pneumatic devices is included until the guidelines for measurement and reporting of venting emissions are released.

Carbon Competitiveness Incentive Regulation

- Large facilities emitting over 100,000 tonnes CO₂e fall under the Carbon Competitiveness Incentive Regulation (CCIR).
- Currently, less than 10% of Alberta's oil and gas methane emissions are covered under CCIR. These emissions are primarily from gas plants, gas pipelines and oilsands facilities.
- There is a provision that allows small facilities not covered under the Alberta carbon levy to opt in, if they compete directly against a facility regulated under CCIR, or if the facility emits more than 50,000 tonnes of CO₂e annually and belongs to an emissions-intensive trade-exposed (EITE) sector.
- After the carbon levy exemptions for oil and gas facilities expire in 2023, the GoA is expecting the majority of conventional oil and gas facilities to opt into CCIR, because of reduced compliance costs. This would improve the coverage of methane emissions and is expected to be the main driver in achieving methane reductions through carbon pricing.
- There are significant uncertainties and gaps regarding how and why conventional oil and gas facilities would opt into CCIR. Each layer of uncertainty reduces the odds of success.
- The GoA can improve the odds of success by providing clarity on opt-in, improving incentives for opt-in, and strengthening measurement and reporting standards. These issues are explained in this briefing.

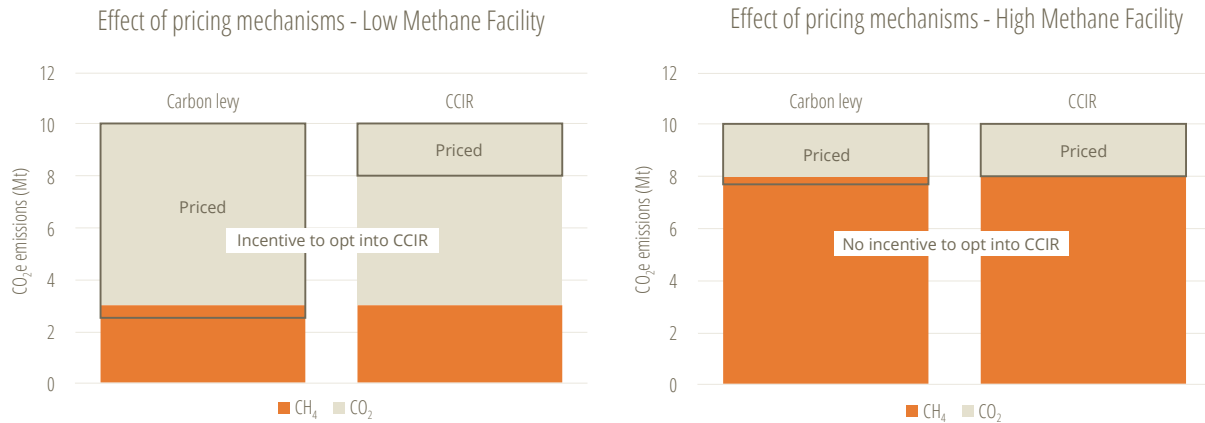
Considerations

Incentives

- The majority of greenhouse gas (GHG) emissions from conventional oil and gas facilities are from methane. However, methane is not fully priced under the carbon levy, because it is priced at the global warming potential of carbon dioxide, which is 25 times weaker

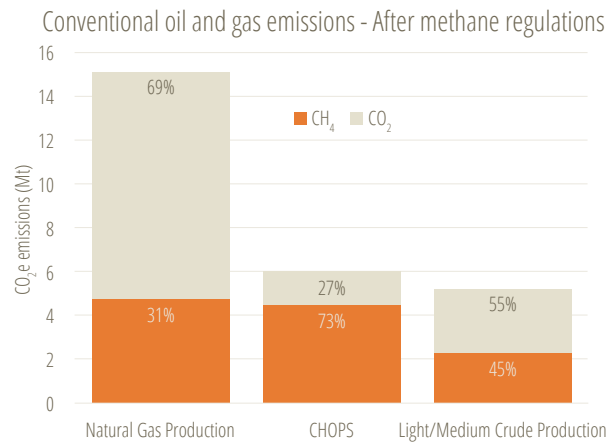
than methane. As a result these facilities effectively don't have to pay a price for their methane emissions, which account for the majority of GHG emissions at many sites.

- Facilities would opt into CCIR if the compliance costs were lower than under the carbon levy. Under CCIR, facilities that opt in would be assigned an individual intensity benchmark, which would provide free allocations for at least 80 per cent of their emissions.
- The lack of full pricing on methane under the carbon levy has a large impact on the incentives that companies have to opt into CCIR. The figures below illustrate the effect.

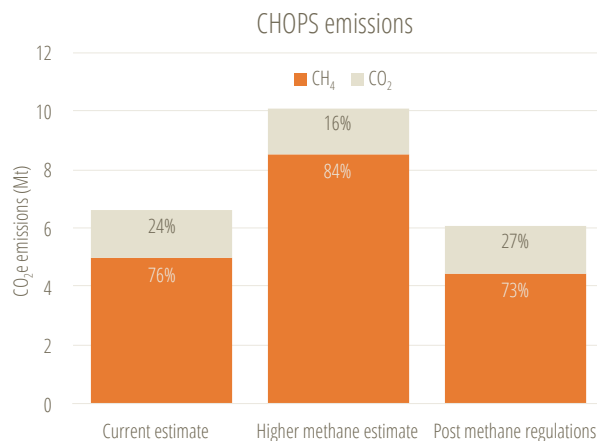


- The left graph shows a facility whose emissions profile is dominated by CO₂. It has incentive to opt in because its compliance costs will decrease
- The right graph shows a facility whose emissions profile is dominated by methane. It has little incentive to opt in because its compliance costs will not decrease. Under CCIR it will pay a price on carbon for an equal or larger portion of its emissions than under the carbon levy. It will also face increased reporting costs.
- As a result of these skewed signals, only facilities emitting more CO₂ than methane will see reductions in compliance costs that are significant enough to provide incentive for opt-in.
- The figure below show an estimate of the average emissions profiles for the three sectors of oil and gas with the largest methane emissions.¹ Data includes reductions that will occur due to the methane regulations and a recent study which found methane emissions from CHOPS facilities to be grossly underestimated (discussed below).

¹ 2010 data based on 2014 Clearstone Engineering inventory of GHG emissions from the upstream oil and gas sector.



- This figure shows that many small conventional oil and gas facilities have emissions profiles that are dominated by methane — especially CHOPS facilities. If only the facilities with CO₂-dominant profiles opt in, a large portion of methane emissions will remain under the carbon levy — effectively unpriced.
- There is an additional effect on the emissions profile, because real methane emissions are higher than the estimates from the national inventory, as shown by recent academic studies.²
- The figure below shows estimates of the emissions profiles of CHOPS facilities: current estimates; revised estimates, where methane emissions were found to be 3.6 times higher than current estimates; and estimated emissions based on the 3.6 times higher estimate and after reductions from methane regulations.



- The true emissions profiles of CHOPS facilities are methane dominant to the extent that even reductions as a result of methane regulations will not substantially shift their emissions profiles enough to create incentive for them to opt in.

² Matthew Johnson et al, “Comparisons of Airborne Measurements and Inventory Estimates of Methane Emissions in the Alberta Upstream Oil and Gas Sector,” *Environmental Science and Technology*, 51, no. 21 (2017), 13008. DOI: 10.1021/acs.est.7b03525

In summary, the lack of full pricing of methane under the provincial carbon levy will provide incentive for opt into CCIR only from facilities whose emissions profiles are dominated by carbon dioxide. The opt-in rate is likely to be lower than anticipated and high methane-emitting facilities are unlikely to opt in. The portion of methane emissions that will be end up priced under CCIR will be significantly lower than desired.

Benchmarking – individual vs. aggregate vs. sector-based

- There is uncertainty regarding how the intensity benchmark will be calculated – whether by individual facility, aggregated facilities, or sector-based.
- Most of the conventional oil and gas facilities responsible for methane emissions are small and don't currently have a sector-based intensity benchmark.
- Under the current regulations, an individual facility benchmark would be assigned to conventional oil and gas facilities that choose to opt in to CCIR.
- If companies are allowed to choose which facilities to include, they will likely only choose facilities with the largest reduction in compliance costs. Based on current pricing of vented methane under the carbon levy, these would be facilities with low methane emissions.
- Allowing companies to combine their operations – aggregating several facilities and opting them in to CCIR together – would be more effective with clear criteria and parameters around on how this occurs. Otherwise, similar to an individual facility opt-in, companies would only aggregate facilities with a low methane emissions fraction, which have the highest reduction in compliance costs.
- If enough facilities opt in, which the GoA is relying on, sector-based benchmarks would make more sense for the three primary methane-emitting oil and gas sectors (natural gas production, light/medium oil production, and conventional heavy oil production)
- However, a sector-based benchmark would provide similarly skewed signals. Facilities with poor performance and the lowest percentage of unpriced emissions are likely to have high methane emissions, but would not have incentive to opt in.
- Benchmarks based on individual facilities or aggregated facilities, rather than a sector-based benchmark, would provide different incentives for facilities to opt in. This uncertainty in benchmark calculation is an additional barrier to facility opt-in.

Benchmark stringency and credits

- The current regulations require the benchmark intensity to be calculated based on the first three years of operation of a facility.
- Reductions in methane emissions due to the incoming regulations would result in lenient benchmarks and create a flood of performance credits.
- It is not clear how the facility benchmark would be adjusted to address this.

- There will also be some credit leakage, because some performance credits generated through methane reductions will be sold to facilities outside of oil and gas. Those reductions will then be counted to other sectors emissions and cannot be counted towards achieving methane reduction targets.

Accuracy of methane measurement and accounting

- Without strong measurement and reporting, uncertainty in the actual quantity of methane reductions that can be achieved at a given facility will create risk for producers and be a barrier to action on methane.
- The lack of full pricing of methane under the provincial carbon levy also creates an inconsistency in carbon accounting. Methane is priced at one rate, but any reductions that occur under the carbon levy will be counted at a different rate, based on the full global warming potential of methane.

Recommendations

We believe the following actions will significantly improve the likelihood of successfully achieving reductions in methane emissions through carbon pricing.

- Implement strong measurement and reporting requirements.
- Price vented methane based on its full global warming potential under the carbon levy in order to improve incentive for producers to opt in to CCIR. This will increase the effective carbon price on methane under the carbon levy from \$2 to \$50/tonne CO₂e. If this is done, opt-in will not be required to achieve reductions — the carbon levy will drive reductions.
- Explicitly include pneumatics in the definition of venting under the carbon levy.
- Provide certainty that most, if not all, facilities will opt in by:
 - forcing opt-in for conventional oil and gas facilities; or
 - requiring producers to opt in with all facilities aggregated; don't allow individual facility opt-in or partial aggregation.
- Provide clarity around how benchmarks will be set — individual, aggregate, or sector-based — and how the benchmark is calculated.
- Provide clarity on the stringency of the intensity benchmark in light of the reductions in methane emissions expected from the methane regulation.