

Briefing Note

Date: January 24, 2018

Re: Estimate of lost natural gas sales, royalty, and carbon levy from methane releases in the Alberta oil and gas sector

Methane released from oil and gas operations represents lost potential revenue for operators and lost royalty and carbon levy revenues for the government. Here we estimate the total value of this wasted methane based on the total reported releases of methane in Alberta. We further investigate the implications of recent research from Carleton University which identified that Alberta's oil and gas sector may release 25–50% more methane than currently reported.

Summary

- Recent research shows real Alberta methane releases are likely 25–50% higher than currently reported, resulting in actual 2015 methane releases of 38 to 45 million tonnes (CO₂e) from the Alberta oil and gas sector.
- Based on this research, total wasted methane in Alberta represents annual losses of \$213–\$253 million in natural gas sales, \$17–\$21 million in natural gas royalty, and \$1.1–\$2.3 billion in uncollected carbon levy revenues.

Alberta methane underreported

- Methane is the primary component of natural gas and a potent greenhouse gas with a global warming potential 34 times that of carbon dioxide.
- In 2015, Alberta's upstream oil and gas industry reported emitting approximately 30 million tonnes of carbon dioxide equivalent (CO₂e). If all of these releases were captured and sold they could generate roughly \$170 million in revenue for oil and gas operators and \$14 million in royalties for Alberta annually.
- Research undertaken by Carleton University to measure methane releases using aircraft-based instruments has indicated that real Alberta methane releases from oil and gas operations are likely 25–50% higher than currently reported.
- Based on this research, actual releases of methane from oil and gas operators are roughly between 38 and 45 million tonnes of CO₂e annually.
- Wasted methane represents lost value to oil and gas operators due to lost sales of natural gas, and lost value to the government through lost royalty collection.

- Based on the Carleton University research, annual lost sales from all methane releases in the Alberta oil and gas sector are roughly between \$213 million and \$253 million, with lost royalties estimated at between \$17 million and \$21 million.
- The Alberta carbon levy does not apply to these wasted volumes of natural gas. If the carbon levy were applied to these releases, Alberta would collect \$1.1–\$1.4 billion at \$30 per tonne and \$1.9–\$2.3 billion at \$50 per tonne.

Table 1: Estimates of the annual lost natural gas sales, royalty, and carbon levy payments from reported and unreported methane releases in Alberta

	Reported ^a	Reported + Unreported ^b	
		Low	High
Releases (Mt CO ₂ e)	30	38	45
Releases (PJ)	71	89	106
Lost sales (\$ million) ^c	170	213	253
Lost royalty (\$ million) ^d	14	17	21
Lost carbon levy (\$ million) ^e	1,500–900	1,900–1,140	2,250–1,350

Notes:

a. Reported emissions based on 2015 reported releases and 100-yr global warming potential of methane.

b. Unreported gas is estimated based on new research that identified total releases from the Alberta upstream oil and gas sector are likely at least 25-50% greater than current government estimates. Matthew R. 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 (2017). <http://pubs.acs.org/doi/10.1021/acs.est.7b03525>

c. Value of gas conserved by province is calculated based on the average value of all recovered gas in Canada as estimated by Environment and Climate Change Canada. Average value is \$2.39/GJ. Current 2017 natural gas prices are around \$3/GJ, and therefore the values shown are likely low.

d. Royalties are estimated at 8.2% of the value of conserved gas. This value represents weighted average natural gas royalties in Alberta over 2015-2016. http://www.energy.alberta.ca/About_Us/1701.asp

e. Lost carbon levy range is based on carbon price levels between \$50 and \$30 per tonne of CO₂e. There are currently no plans for the Alberta carbon levy to apply to methane releases in the oil and gas sector, and lost carbon taxes represents potential uncollected levy payments on these volumes.