

Policy implications of methane quantification studies

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EDF-catalyzed methane research

Coordinated, Peer-reviewed Studies

Diverse research teams studying emissions across the supply chain, across multiple regions

Multiple Methods

Researches used a variety of aircraft, vehicle and ground-based measurements to quantify methane emitted across the oil and gas supply chain in U.S. and Canada.

Significant Improvement in Data

Nearly 40 articles published thus far in peer reviewed journals



'If we thought it was bad, it's worse: Alberta badly underestimates methane emissions, new research shows

The difference between official estimates and the measured results suggests the province's energy industry could have to double its planned cuts



Drilling & Production



Gathering & Processing



Transmission & Storage



Local Distribution



Regional Research

Lessons learned



Higher Emissions

- In some regions in the U.S. emissions were nearly 2x higher than official estimates
- At gathering stations, emissions were 8x higher than government estimates
- In Canada, emissions were measured to be 15x higher than what is reported to government



Methods Agree

- Top-down and bottom-up methods yield similar results, opening many measurement possibilities.



Super Emitters

- Recurring problem across U.S. and Canada
- Small % of sites account for significant emissions
- Unpredictable
- Not accounted for in official estimates



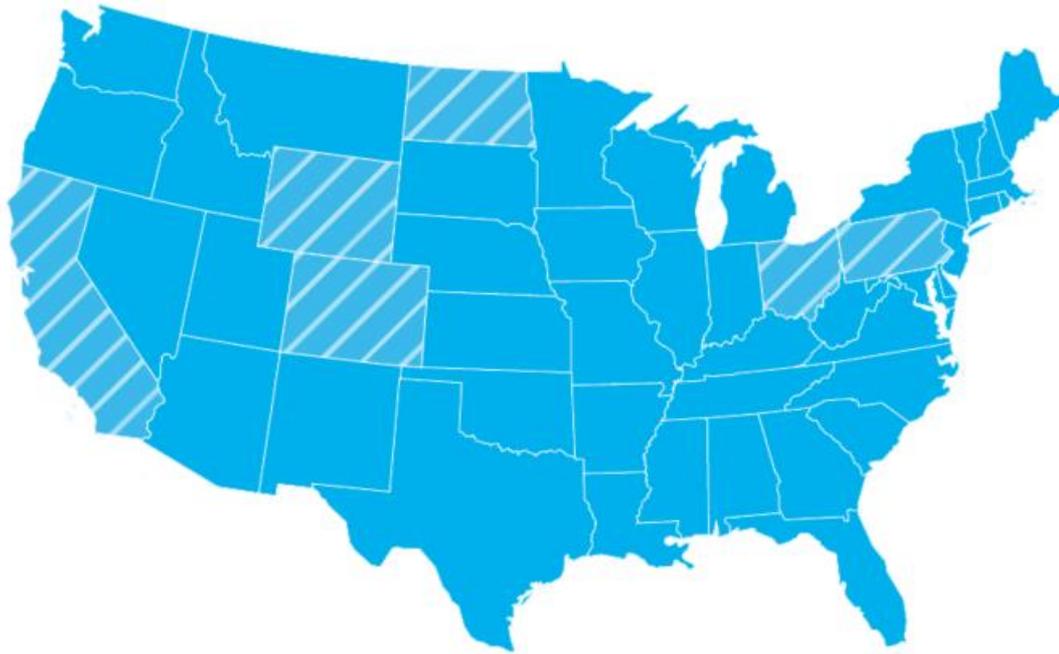
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Policy implications

1. Regulations work
 2. Policies should be designed to capture higher emissions than what is reported.
 3. Regulations drive innovation.
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Policy implication 1: Regulations work



National methane standards



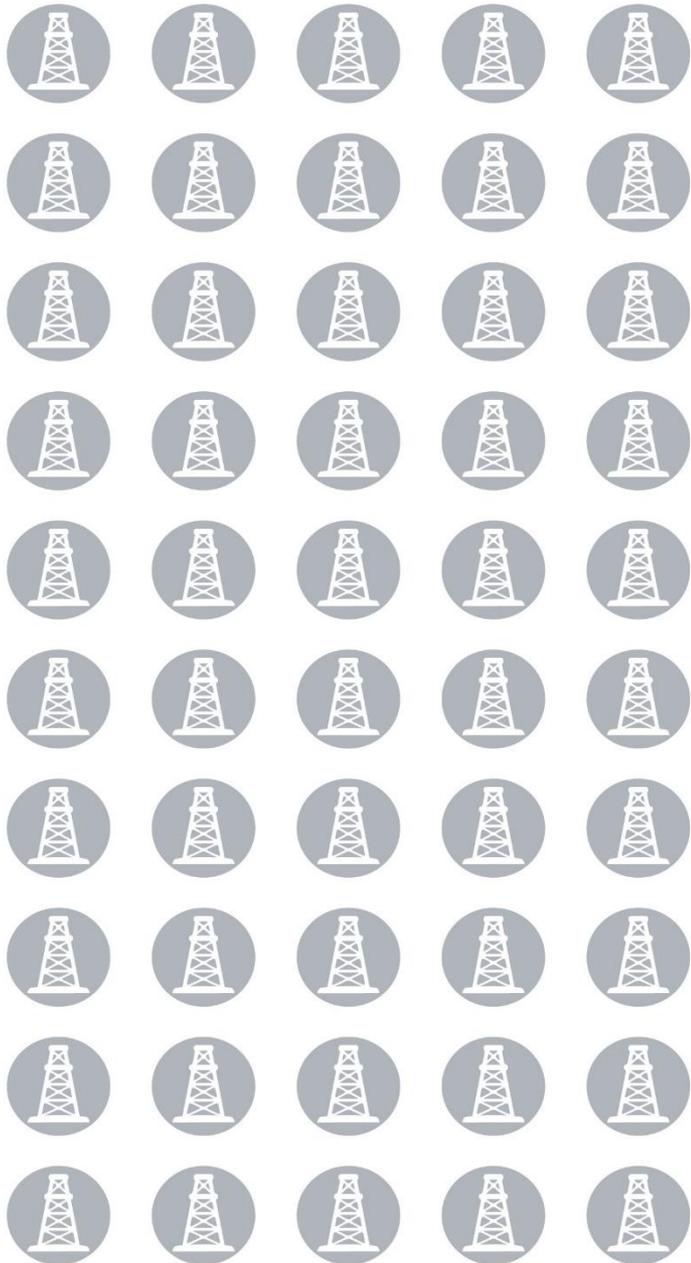
States with additional emissions/flaring standards or permits

- Green Completions help reduce 99% of flowback emissions
- Processing plants subject to LDAR had lower emissions than other sources
- Regulation narrows range of company performance
- LDAR requirements only way to address super emitters

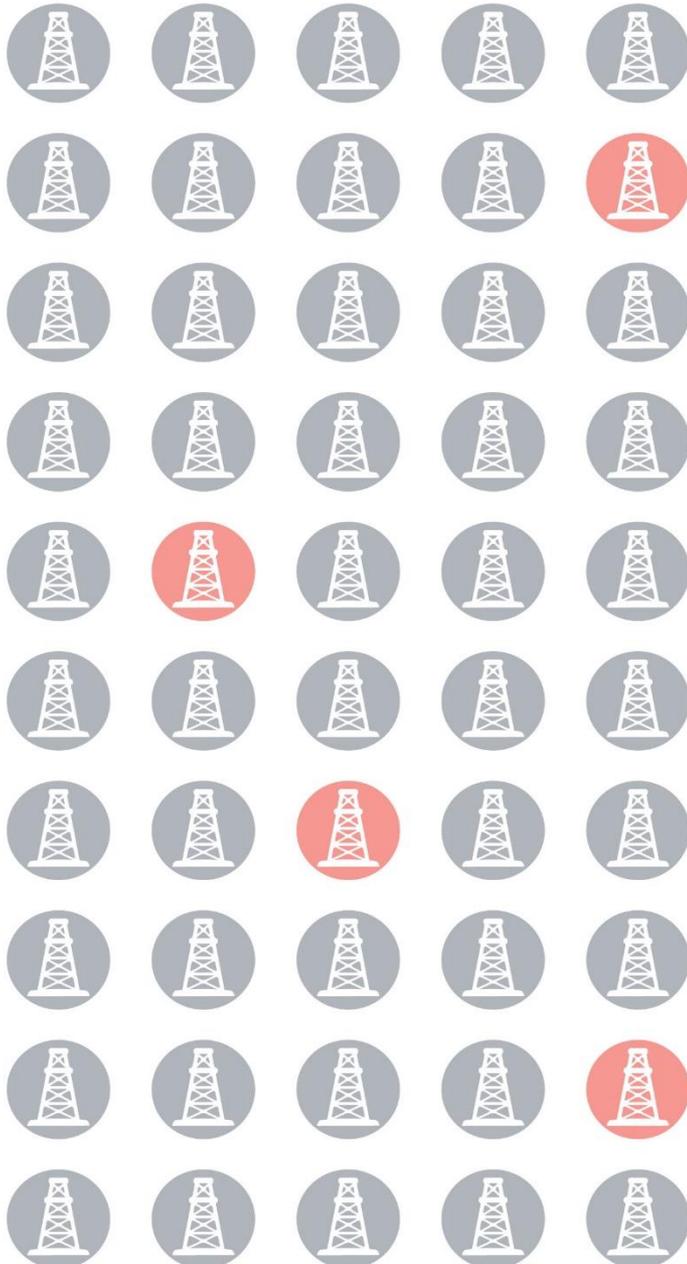
Policy implication 2: Policies should be designed to capture higher emissions

- All regulatory approaches on methane are focused on equipment/sources.
- This approach can capture higher emissions.
- For areas with super-emitters LDAR is key.
- Better measurement, monitoring, reporting, necessary to track progress

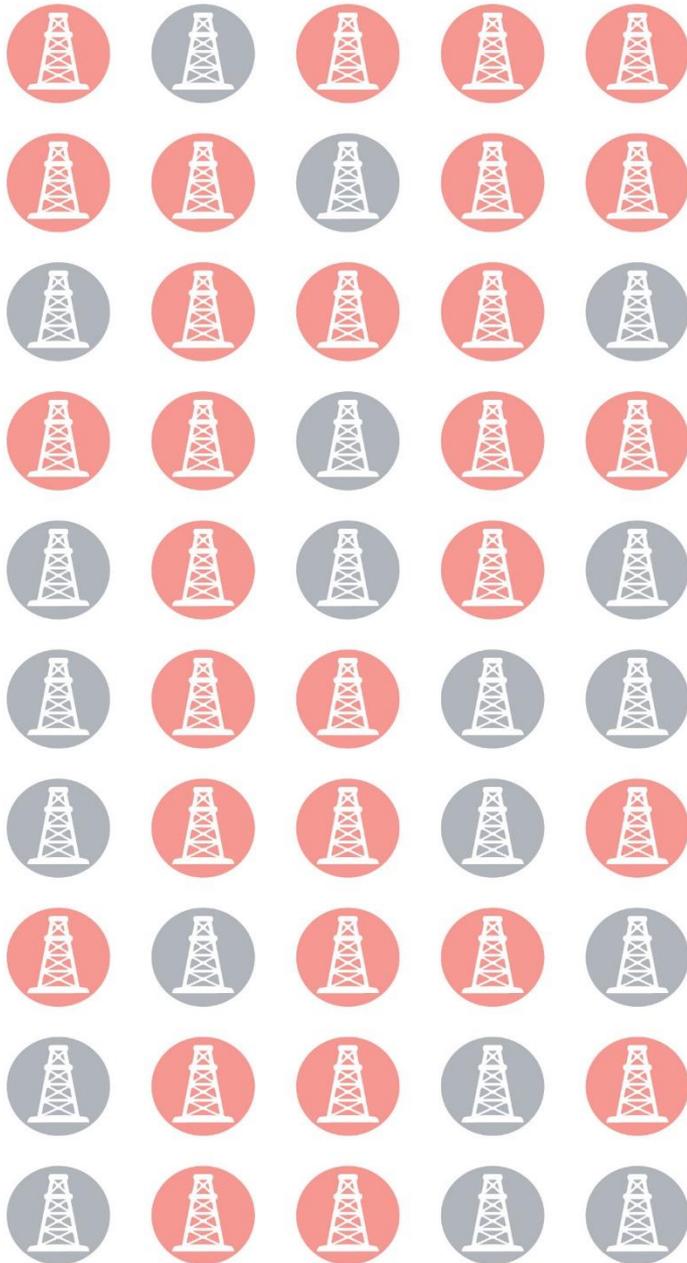




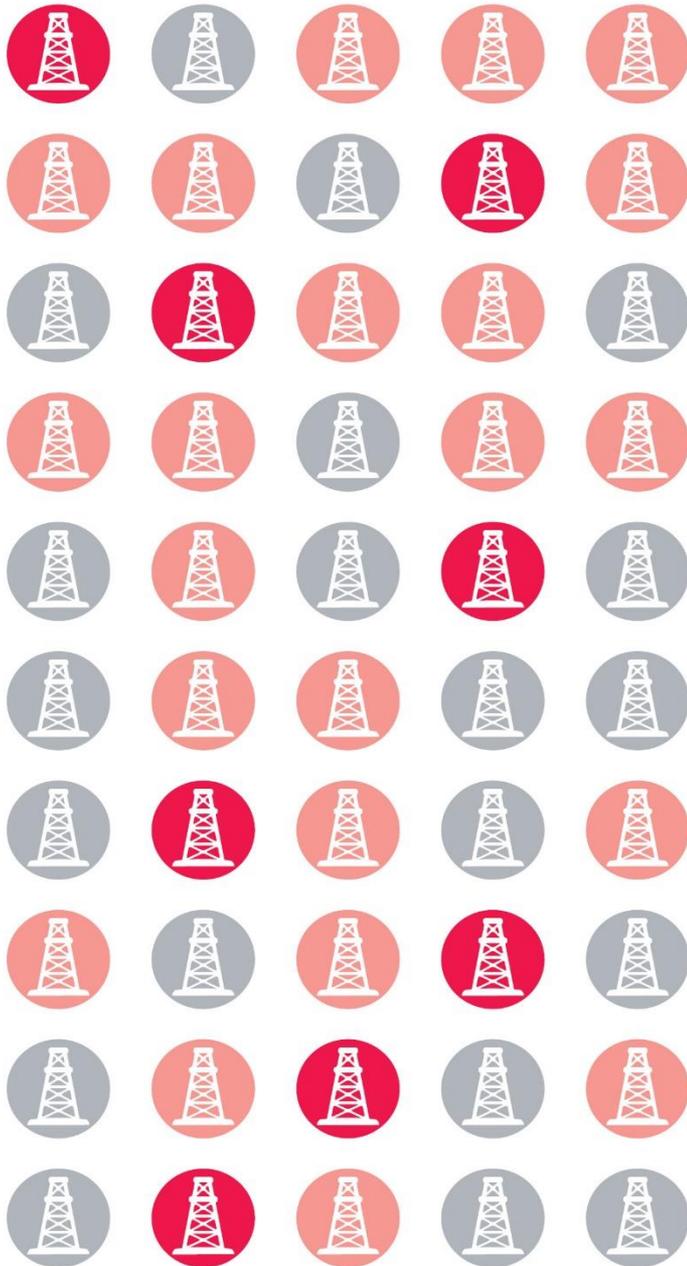
**EDF measured
methane emissions
at 50 Canadian well
sites.**



Industry reporting shows that just 8.5% of those measured sites would be out of compliance with the draft federal limits.



However, peer reviewed measurements from those sites indicate 64% would be out of compliance.



1/3 of these sites are super emitters, which aren't captured in traditional reporting systems. Hence need for strong LDAR.

Policy implication 3: Regulations drive innovation

- Unprecedented time of methane innovation
- Developing technologies and innovations make things cheaper, better faster
 - Methane Detectors Challenge
 - Mobile Methane Monitoring Challenge
 - Methane Satellites

