



HOW CANADA REDUCED UPSTREAM OIL AND GAS METHANE EMISSIONS BY MORE THAN 50%

November 2025



PTAC

PETROLEUM TECHNOLOGY
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Agenda



History and Policy Evolution

Methane Emissions Reduction Ecosystem

- What it is
- Key Canadian Organizations, including PTAC

Innovation as a key solutions pathway

- What we have achieved
- Case studies

Where we go from here



Fieldwork Conducted for the Methane Slip Project

Early Awareness and Research Initiatives



Recognition of Methane Impact

- Early 2000s saw growing awareness of methane's environmental effects in the oil and gas sector.

Initial Emission Studies

- Studies focused on inventorying emissions and identifying major methane sources like pneumatic devices, venting, and fugitive emissions.
- Industry-Government Collaboration: Pilot projects and best practices developed through joint efforts.
- Ongoing Evolution: Continuous updates to regulations and best practices.

Foundation for Future Initiatives

- These efforts laid the groundwork for structured and large-scale methane mitigation initiatives.

Canadian Government Policy Milestones



YEAR	EVENT
2000–2015	Limited federal action on methane; focus on CO ₂
2016	Canada pledges 40–45% methane reduction compared to 2014 by 2025
2018	Federal CEPA regulations published
2020	Regulations come into force
2021	Canada joins Global Methane Pledge
2022	Canada's Methane Strategy launched
2023–2025	Draft amendments released; satellite data confirms reductions

Provincial methane policy highlights

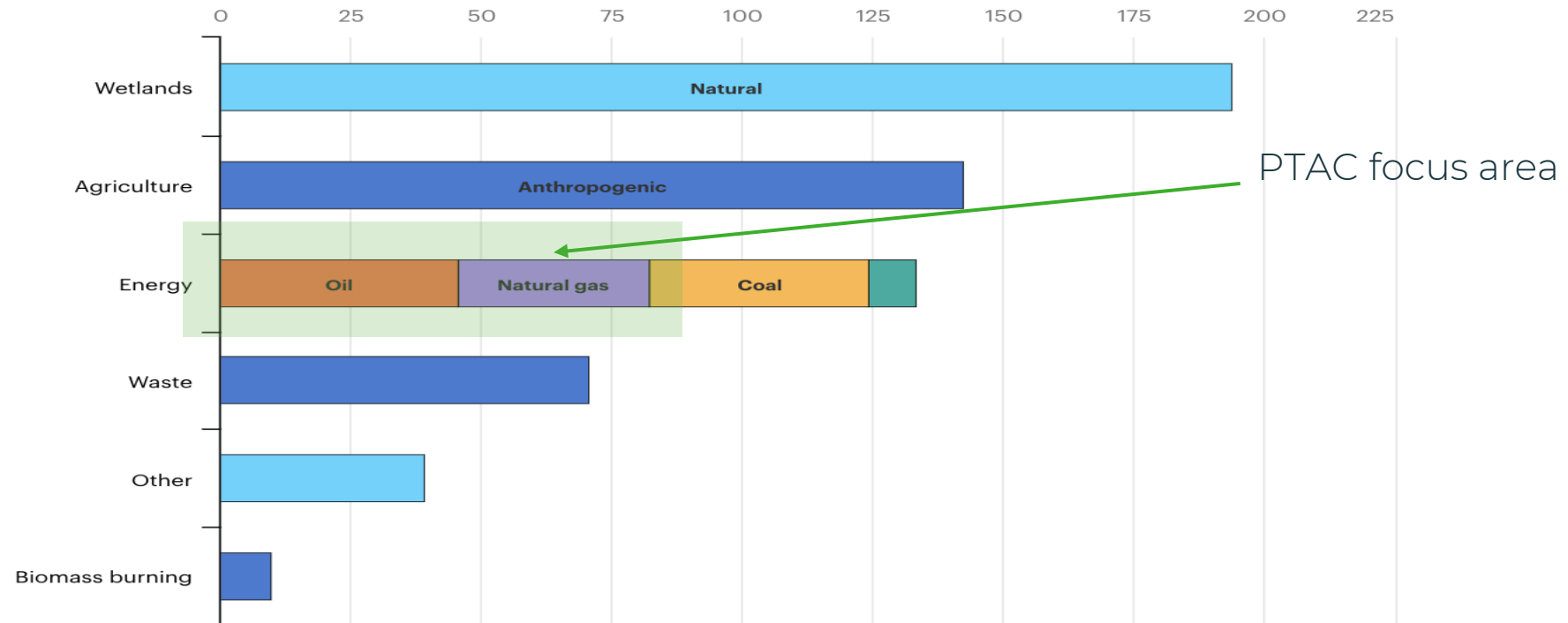


PROVINCE	REDUCTION TARGET	KEY REGULATIONS	EQUIVALENCY STATUS	MONITORING APPROACH
Alberta	45% by 2025	Directive 060, 017, MERR	Yes (2020–2030)	Satellite + Alt-FEMP
British Columbia	45% by 2025, 75% by 2030	CleanBC Methane Regs	Yes (2025)	Aerial + Continuous
Saskatchewan	45% by 2025	OGEMR, MAP	Yes (2025)	LDAR + Pneumatics
Ontario & Quebec	50% by 2030 (landfills)	Federal landfill regs, Quebec offset credits	N/A	Surface + Point-source

Sources of Methane



Mt methane

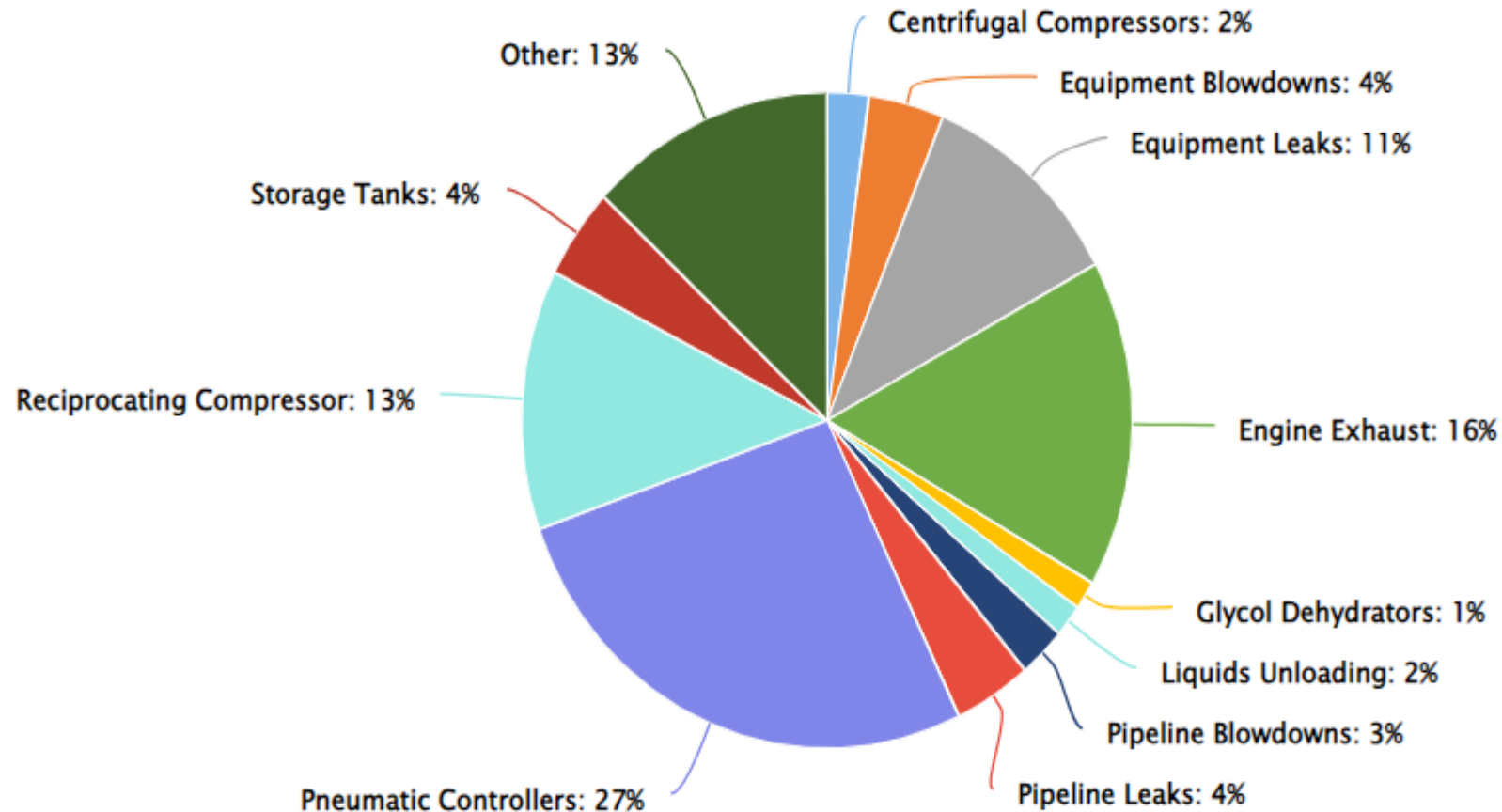


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Oil and Gas Industry Sources of Methane



Percent of Total Oil and Gas Methane Emissions by Emission Source (Year 2021)



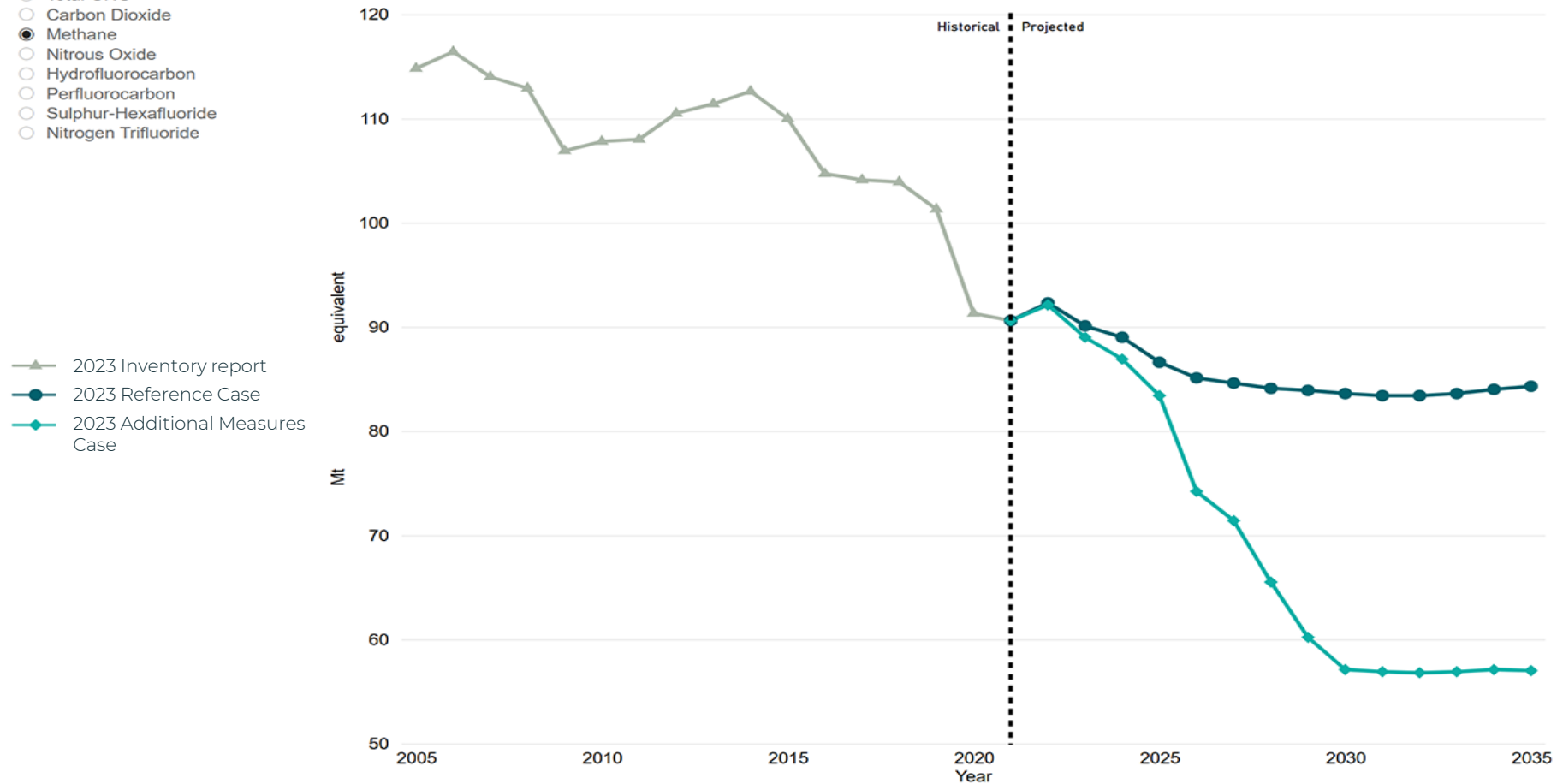


CANADIAN METHANE EMISSIONS

Pollutant

- Total GHG
- Carbon Dioxide
- Methane
- Nitrous Oxide
- Hydrofluorocarbon
- Perfluorocarbon
- Sulphur-Hexafluoride
- Nitrogen Trifluoride

Greenhouse Gas Emissions Projections by Pollutant

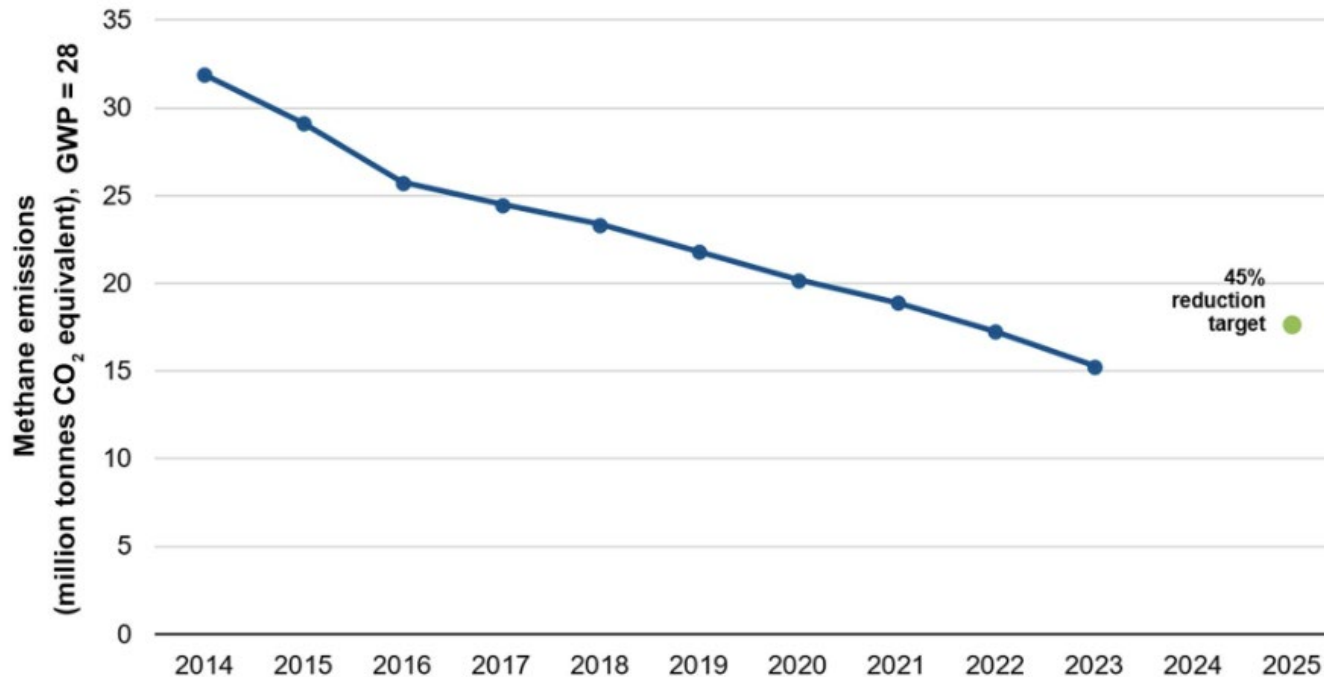


Source: Environment and Climate Change Canada, 2024



PROVINCIAL PERFORMANCE

Alberta Oil and Gas Methane Emissions



- **British Columbia:** in 2023, achieved a **51%** reduction from 2014.
- **Alberta:** in 2023, achieved a **52%** reduction from 2014.
- **Saskatchewan:** in 2024, achieved a **71%** from 2015.

Source: Environment and Climate Change Canada, 2024

Technology Innovation is a Key Solutions Pathway



Development of Methane Sensors

- On-site is useful for the mitigation of emissions from specific pieces of equipment
- Vehicle-mounted is used for the mitigation of emissions for a specific site
- Drones and Aircraft are useful for the identification of emission sources in a localized area, limited usefulness for the assessment of mitigation solutions
- Satellites are useful for regional and global emissions identification, have limited usefulness for quantification, not useful for assessment of mitigation solutions



Development of Methane Mitigation Solutions

- Leak Detection and Repair the cheapest and easiest solutions – basic maintenance
- Pneumatics low-cost solutions – low bleed or no bleed
- Storage Tanks limited solutions due to poor operational characteristics
- Engines and Compressors complex solutions requiring expensive replacements and retrofits

PTAC Methane Programs



Research & Innovation

- To develop technologies, processes and databases to improve methane mitigation

Technology Development

- To derisk methane emissions and reduction technologies through field trials, thereby accelerating adoption

Commercial Implementation

- To deploy methane emissions reduction technologies at well sites

International Collaborations

- To expand access and options for methane reduction technologies globally



Development of Best Mitigation Practices



Methane Emission Protocols

- Protocols target key methane sources including well cement integrity and leak detection methods. These protocols improve emission monitoring accuracy.

Operational Compliance Steps

- BMPs provide practical steps for operators to enhance compliance and operational efficiency in managing emissions.

Emission Reduction Impact

- Adopting BMPs has led to measurable methane emission reductions and improved environmental outcomes sector-wide.

Project Highlights



Management Practices for Methane Emissions in Stationary Engines

- Project assessed 110 stationary engines (mainly Caterpillar and Wakausha) for their emissions parameters in field conditions. Best management practices and design changes were developed, as well as adjustments to a Canadian equipment database used by Environment and Climate Change Canada (ECCC).



New Technology to Reduce Methane Emissions from Stationary Engines

- Successfully tested an Oxiperator technology designed to eliminate uncombusted methane emissions in stationary engines.



Alberta Methane Field Challenge

- Collaborative field trials to assess real-world performance of new methane sensing technologies to speed up adoption by the regulator.

Additional Project Highlights



Decommissioning Barrier Materials

- Testing six barrier materials for well plugging and decommissioning, showing a need for better tools and procedures to reduce the number of interventions required to stop surface casing vent flows



Replacement of Class G Cement

- Testing alternative Portland cement mixes to replace Class G cement in Canadian oil and gas wells, following its discontinuation by a major supplier due to its higher emissions during manufacturing



Decommissioning Strategies for Oil & Gas Wells

- Will evaluate sealing cement methods to eliminate surface casing vent flows and guide producers on effective treatment options



Technology Development

Canadian Emission Reduction Innovation Consortium (**CanERIC**)

Funding
Leverage
Ratio

2:1

PURPOSE

- To de-risk methane emissions detection and reduction technologies through field trials

CanERIC 1.0

- Addressing real-life technology issues related to costs, installation, and maintenance
- 3 years, 31 subprojects, 53 sites from 27 participants

CanERIC 2024

- Focusing on tanks and lower cost pneumatics solutions
- One-year installment, 5 producers, 7 technologies, deployed at 22 sites

OUTCOMES AND LEARNINGS

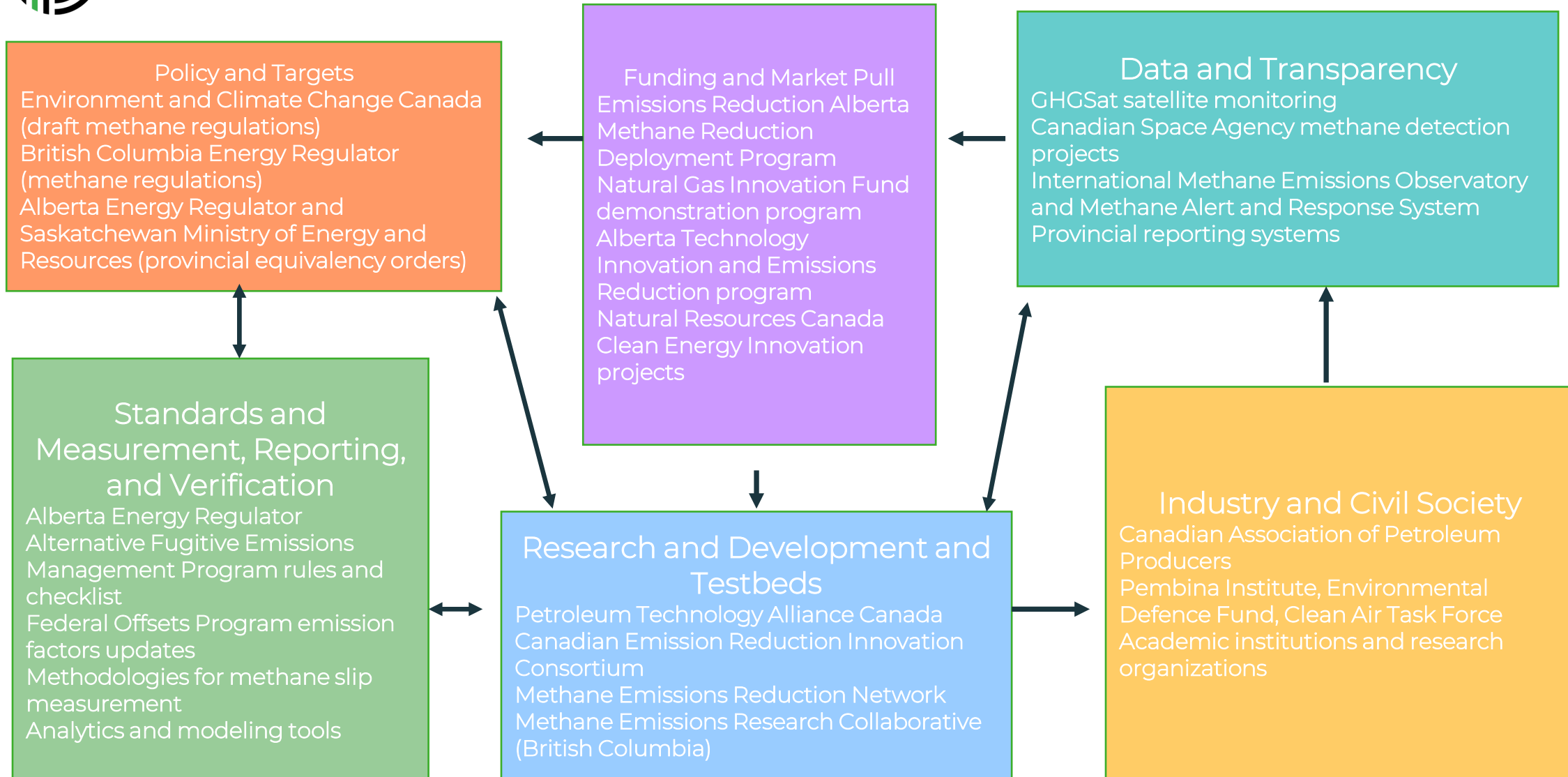
- Acceleration of technology adoption by producers
- Helping vendors make improvements to better meet end-users' needs
- Contributed to the ~52% methane emissions reduction achieved by industry

Committee Participants





Canada's Methane Emissions Reduction Technology Development Ecosystem Map



Lessons Learned (so far)



Regulations:

- Federal requirements + provincial equivalency agreements drove early success; 40–45% reduction exceeded ahead of 2025 targets.

Technology:

- Leak Detection and Repair (LDAR), pneumatic device replacements, and vapour recovery units widely adopted; cost-effective and production-friendly.

Economic Opportunity:

- Over 130 Canadian firms in the methane tech sector; job creation and global leadership potential.

Collaboration:

- Federal-provincial agreements and engagement with industry are essential for continuous reductions.

Collaboration with like-minded organizations



Industry Challenges and Opportunities for Methane Reduction

- Sharing PTAC's learnings of the key focus areas for oil and gas producers and how methane emissions reduction technology solutions and business process improvements are considered.

Technologies Available

- Sharing PTAC's assessments of various technologies for deployment in oil and gas upstream operations
- <https://ptac.org/wp-content/uploads/2024/04/Advancing-to-Net-zero-Report.pdf>

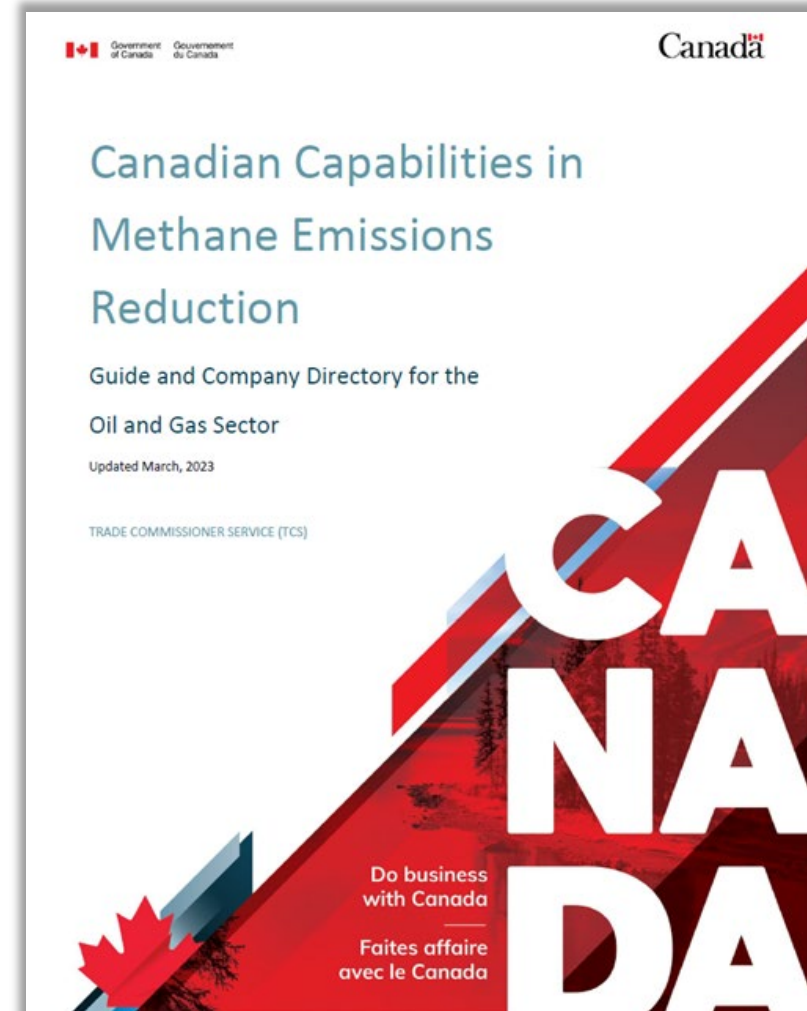
Industry Connections

- Assisting APERC with connections in the upstream oil and gas sector to facilitate information gathering, policy and regulatory understanding, and changes in the sector



METHANE MONITORING, QUANTIFICATION, and ABATEMENT

- Featuring 60 Canadian energy cleantech companies.
- Full PDF available here:





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THANK YOU!

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Canada's success demonstrates scalable methane reduction strategies for the oil and gas sectors globally.

Proven technologies (LDAR, pneumatics, vapour recovery) offer cost-effective solutions for international adoption.

Collaborative frameworks between government and industry can accelerate global methane mitigation efforts.

