

MANAGING METHANE EMISSIONS FOR OIL AND NATURAL GAS DEVELOPMENT

Canada's oil and natural gas industry recognizes that climate change is one of the great challenges facing the world. Methane emissions contribute to greenhouse gas emissions (GHGs). That's why reducing methane emissions from all sources is an important way to tackle the climate change challenge. Canada's upstream oil and natural gas industry strives to improve performance as technology and innovation evolve by continuously working with regulators, government and stakeholders.

SOURCES OF METHANE EMISSIONS

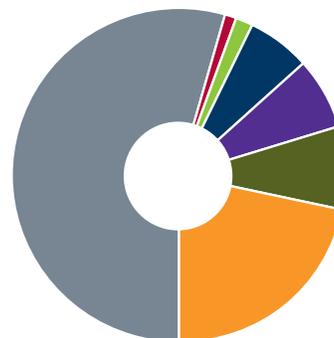
Methane is emitted from a number of human and natural sources, not just from the energy sector including:

- Fuel combustion from transportation
- Extraction industries such as oil and natural gas development and coal mining
- Industrial processes such as aluminum production
- Electricity generation
- Biomass burning from wildfires and burning crop waste
- Agriculture from livestock farming
- Landfills and waste from the treatment and disposal of liquid and solid wastes
- Wetlands where microorganisms that are not absorbed are released into the atmosphere
- Oceans produce methane from micro-organisms living in the ocean
- Termites emit methane from their digestive systems

METHANE EMISSIONS FROM OIL AND NATURAL GAS

Emissions from oil and natural gas operations come from small leaks from valves and other equipment used in drilling and production and are unintended, invisible and don't smell. These leaks can come from pump seals, pressure relief valves, and control valves. Venting is the controlled release of gases including methane, sulphur dioxide (SO₂) and hydrogen sulfide (H₂S), and other hydrocarbons into the air as part of natural gas processing. Regulations and industry best practices provide guidance to avoid venting when possible. Methane can also be emitted from the electricity used to operate oil and natural gas facilities.

GLOBAL METHANE EMISSIONS



● Canada	1.2%
● Mexico	1.5%
● United States	6.2%
● Russia	6.8%
● India	8.0%
● China	21.9%
● Other	54.3%

Source: World Bank, 2012

MANAGING METHANE EMISSIONS

Canada's regulatory and voluntary measures for methane emissions reduction serve as models for other jurisdictions worldwide in terms of implementation timelines, scope and targets. Specifically, British Columbia, Alberta and Saskatchewan have regulations for flaring, venting and incinerating from upstream facilities, which serve as models for other jurisdictions.

In Alberta, the Alberta Energy Regulator (AER) uses Directive 60 to regulate flaring, venting and incinerating at oil and natural gas operations. Alberta's environmental regulations have reduced the amount of methane emissions reducing GHG emissions by more than eight million tonnes.

In British Columbia, the Oil and Gas Commission (BCOGC) also has Flaring and Venting Reduction Guidelines that provide regulatory requirements for flaring, venting and incinerating at any well site or production facility. In 2016, B.C. eliminated routine flaring. Since 2006, industry in B.C. has achieved a 23 per cent reduction in annual flare volumes according to the BCOGC.

And, Directive S-10 in Saskatchewan enforces regulations for reducing flaring, incinerating, or venting from oil and natural gas operations.

In addition to following government regulations, industry follows best management practices, including operator checks for malfunctioning equipment. It is in the industry's best interest to replace malfunctioning equipment for worker safety, facility integrity and to manage costs.

COMMITTED TO REDUCING METHANE EMISSIONS

Canada's oil and natural gas industry recognizes the opportunity for better performance on methane emissions. The oil and natural gas industry has committed to reduce methane emissions by 45 per cent by 2025. Industry believes through its relationships with regulators, government, and stakeholders it can deliver action on climate change while realizing the economic benefits the oil and natural gas sector bring to the national economy.

TECHNOLOGY IS KEY

Technology is critical to reducing methane emissions from oil and natural gas development. This includes using solar panels to power pumps which eliminates venting of emissions from traditional sources of power and capturing vented gas at natural gas facilities, and redirecting the gas to help fuel compressor engines. Advancing technology is co-ordinated through various organizations such as Natural Resources Canada, Emissions Reduction Alberta, and universities with the goal to develop a robust ground, aerial, and satellite-based detection network through 2020. The oil and natural gas industry is also partnering with the Petroleum Technology Alliance of Canada (PTAC) on a number of initiatives including:

- Area methane detection using work trucks to allow screening and triage of emission sources so that operators and regulators can focus on early emissions reduction gains.
- Advanced methane detection, analytics and mitigation to test technologies on major methane sources.
- Methane abatement tool that aggregates data and generates emissions reduction offsets in Western Canada.

Conducting Canadian-specific research is critical as the geology and climate in Canada differs extensively compared to studies completed in the United States.

Alberta and British Columbia are committed to **REDUCING METHANE EMISSIONS BY 45%** by 2025.



Natural gas flaring in Alberta was reduced 80 per cent from 1996 to 2010, reducing GHG emissions by more than eight million tonnes.