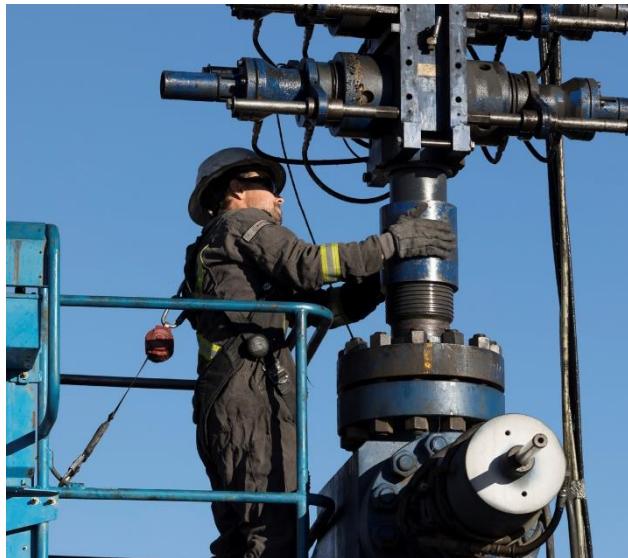


NATURAL GAS SUPPLY COLLABORATIVE

Summary of Methane Performance Indicators

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MJB & A
an ERM Group Company

Natural Gas
Supply Collaborative

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Summary of Methane Performance Indicators

The methane performance indicators discussed in this paper are a product of the Natural Gas Supply Collaborative (NGSC). NGSC is a voluntary collaborative of natural gas purchasers promoting safe and responsible practices for natural gas supply. Combined, NGSC participants deliver enough natural gas to meet the needs of more than 46 million U.S. households and, as part of a portfolio of resources, enough electricity from natural gas to power over 20 million households.

In addition to the methane performance indicators, discussed below, NGSC participants have identified key environmental and social performance indicators associated with water, chemical use, and community and safety. These non-financial performance indicators respond to stakeholder questions and highlight leading practices producers use to protect the environment and local communities. A complete list of the environmental and social performance indicators identified by NGSC are summarized in the table on page four and are discussed in detail in [Environmental and Social Performance Indicators for Natural Gas Production](#).

NGSC participants are committed to engaging natural gas producers and other stakeholders to support more robust voluntary reporting. Broader information sharing supports a virtuous cycle where companies highlight their approaches to managing natural gas development, companies and stakeholders benefit from having more information on leading practices, and stakeholders and the public gain greater insights into how companies are protecting the environment and local communities.

To learn more, please visit: www.mjbradley.com/NGSC



Quantitative Indicator: Methane Emissions

Performance Indicators

What are the total methane emissions of your operations?

What is the methane emissions intensity of your operations?

Reporting Guidance

- Report total methane emissions (i.e., metric tons of methane) from drilling, completion, and natural gas production operations (e.g., process and fugitive emissions) for each calendar year.
- Report total volume of methane emitted per volume of natural production (methane released to the atmosphere as a percentage of total natural gas produced) for each calendar year, including the emissions (i.e., volume of methane emitted from drilling, completion, and production) and natural gas production (i.e., total volume of natural gas produced) figures used to calculate intensity.
- Provide a breakdown of emissions intensity by area of operations in addition to a company-wide figure.
- The Greenhouse Gas Reporting Program (GHGRP) maintained by EPA provides a standardized approach to reporting greenhouse gas emissions. Methane emissions reported to the GHGRP could provide the basis for estimates of methane emitted during natural gas drilling, completion, and production. To the extent a company follows a different approach, it should explain its methodology.

Methane is a greenhouse gas (GHG) emitted during development of natural gas resources, and must be reported annually to EPA, along with carbon dioxide (emitted through combustion of fossil fuels) and nitrous oxide. Methane emissions can occur during any natural gas development phase (drilling, completions and production). Two ways to estimate a natural gas producer's contribution atmospheric methane levels are by estimating "total methane emissions" and by calculating "methane emissions intensity". Total methane is an estimate of all the methane emitting, either intentionally or unintentionally, across operations. Methane emissions intensity is calculated as the sum of all emissions divided by the amount of natural gas produced.

Stakeholders are particularly interested in understanding where producers are reporting emissions using direct measurement techniques and where they use emission factors. Increasingly, stakeholders also want producers to report companywide methane emissions intensity, provided that it is clear how intensity is calculated, as well as annual methane emissions. These emission reporting delineations are important because they provide stakeholders with information to understand the degree to which a producer's methane emissions are or could be managed over time. They also offer producers an opportunity to elaborate on varying practices and operational requirements that affect methane emission levels, including methodologies and assumptions they used to estimate emissions.

Examples of Leading Practices

Many leading natural gas producers report their total methane emissions and methane emissions intensity for each calendar year on their websites or in their annual sustainability reports. NGSC has engaged with the Natural Gas Sustainability Initiative (NGSI) organized by the Edison Electric Institute and American Gas Association and plans to align this performance indicator with the NGSI protocol in 2020.

Management Strategy: Overall Methane Strategy



Performance Indicators

What is your strategy for limiting methane emissions?

Reporting Guidance

There are a number of strategies that natural gas producers can implement to address methane emissions. These range from high-level company policies to specific technologies and work practices. The toolkits of leading producers include both. At a high level, a company could report its overall approach to understanding and addressing methane emissions, which, ideally, would include methane-related goals. Reporting of specific practices could include leading management practices and innovative strategies deployed in the field to reduce emissions. The most useful information provided by companies includes broader policy positions and targets in addition to specific examples of how those policies are pursued and implemented.

Information on both broad methane policies and specific practices is key to understanding a company's overall commitment to and effectiveness in reducing methane emissions. An area of ongoing focus is the degree to which a small number of methane emission sources are responsible for a disproportionately high percentage of total methane emissions, such as when a hatch on a storage vessel is unintentionally left open.

Over the past several years, studies highlighting the emissions impact of these disproportionate, and often unintended, sources have led to increased stakeholder interest that, in turn, has driven methane detection and measurement technology advancements and increased regulatory scrutiny. Leak detection and repair (LDAR) has emerged as the primary strategy for identifying and addressing these leaks. Industry, academic, state, and federal efforts are all helping to advance innovative technologies designed locate and measure methane emissions associated with natural gas production more quickly, cost-effectively and accurately. Enhanced detection and measurement capabilities are beginning to provide an opportunity for companies throughout the natural gas value chain to reduce fugitive methane emissions at a lower cost.

Examples of Leading Practices

Most existing voluntary report frameworks request producers to provide information on both broad and specific methane strategies. Example policies and work practices include but are not limited to:

- Developing an LDAR protocol that includes information on the frequency, methodology, and scope of LDAR programs for all potential sources;
- Developing methane reduction goals and tracking progress toward meeting the goals; conserving gas rather than flaring or venting, with exceptions for safety;
- Undertaking efforts to characterize and address emissions from episodic, high-emitting, sources; and
- Participating in voluntary methane reduction programs.

Environmental and Social Performance Indicators for Natural Gas Production

Topic Area	Performance Indicators	
	Quantitative	Management Strategy
01	Methane and Air Emissions What are the total methane emissions of your operations, and what is the methane emissions intensity of your operations?	What is your strategy for limiting methane emissions?
02	Water What are the sources of water for completions (hydraulic fracturing) at your operations by volume and percentage of total volume? For freshwater, what is the intensity of use? Do you conduct pre- and post-drill groundwater testing? What is the frequency and location? What were the number and volume of hydrocarbon and non-hydrocarbon spills to soil and water from your operations?	What is your strategy for managing freshwater use? What is your approach to well planning and strategy for maintaining well integrity? What is your strategy for managing water onsite and wastewater?
03	Chemical Use How do you measure progress on stewardship activities for hydraulic fracturing chemicals? Provide quantitative data.	What is your strategy for managing chemicals?
04	Community and Safety How do you measure progress on improving engagement with the communities that you operate in? Provide quantitative data. What were your recordable injury rate, fatality rate, and near miss frequency rate for employees and contractors?	What is your strategy for protecting and engaging with communities? What is your strategy for ensuring contractor health, safety, and environmental performance?