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Methane Emissions Intensity Targets Adopted by Natural Gas Producers

Over the past several months, two natural gas producers, as well as an international oil and gas coalition, have announced methane emissions intensity targets. These entities join the ONE Future Coalition in committing to meet an intensity target. Methane emissions intensity refers to the "leak rate" of gas production, or the ratio of methane emissions to natural gas produced. Organizations set methane emissions intensity targets with a goal of minimizing leaks of methane, a potent greenhouse gas (GHG).

This Issue Brief reviews guidance developed by the Environmental Defense Fund (EDF) for establishing a methane emissions intensity target, summarizes intensity targets established by Shell and BP, and reviews intensity targets agreed to by ONE Future and the Oil and Gas Climate Initiative (OGCI). The targets range from 0.20 percent to 0.36 percent, calculated as methane emitted per unit of natural gas produced or marketed. Net methane emissions from natural gas systems, as reported in the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Emissions Inventory (GHGI), were about 1.30 percent of U.S. natural gas production in 2016.[1]

Methane emissions targets

There are two main methane emissions target types: absolute and intensity. Absolute targets set a limit on total methane emissions, independent of production rates or pipeline throughput. These often take the form of percentage reductions in methane emissions from a set baseline. Absolute targets can guarantee certain environmental outcomes, as it is possible to calculate the exact emissions saved compared to the specified baseline year.

Intensity targets set an emissions rate expressed as a percentage of production or throughput, providing a way to measure how efficient an operator is at preventing methane leakage. This means that the resulting emissions quantity can vary depending on how much natural gas is produced. As a result, there is less certainty in specific total emission reductions. Emissions intensity targets, however, provide natural gas producers with flexibility to accommodate changes in production in response to market forces, divestitures, or acquisitions, while also providing a way to measure the impact of deploying methane minimizing strategies and practices.

The recent announcements summarized in this brief are focused on intensity targets.

EDF perspective on methane emissions intensity targets

In *Taking Aim: Hitting the mark on oil and gas methane targets*, EDF calls on companies to commit to a 75 percent reduction in methane emissions from oil and gas operations on an absolute basis, but it also outlines its perspective on the key elements of intensity targets for the oil and gas sector. It proposes that methane emissions intensity targets be calculated as[2]:

$$\frac{Total\ methane\ emissions\ from\ oil\ and\ gas\ production}{Total\ natural\ gas\ production}$$

[1] Calculated by MJB&A using estimated Natural Gas Systems emissions reported in EPA's 2018 GHGI and gross natural gas production data reported by the Energy Information Administration, this estimate does not include the production of associated gas or emissions from the production of associated gas, which EPA reports as part of Petroleum System emissions.

[2] Environmental Defense Fund, "Taking Aim: Hitting the mark on oil and gas methane targets", April 2018. Available at: https://www.edf.org/sites/default/files/documents/EDF_TakingAim.pdf

EDF proposes that its calculation be used by upstream oil and gas operations. The International Energy Agency (IEA) estimates these sources are responsible for more than three-quarters of the natural gas industry's methane emissions. In its guidance, EDF recommends that emissions from all oil and gas production, including stranded and marketed associated gas, be included in the calculation of an intensity target.

EDF estimates that a 75 percent absolute reduction in methane emissions is feasible with today's technology and practices and proposes a 0.20 percent leakage rate as an emissions intensity target for production that provides similar methane emissions reductions to the 75 percent absolute target.

Companies with individual intensity targets

This year, two companies, Royal Dutch Shell in September and BP in April, announced intensity targets for their oil and gas operations.

Royal Dutch Shell

On September 17, 2018, Shell announced a target to maintain methane emissions intensity below 0.2 percent by 2025.[3] The target applies to all upstream oil and gas assets for which Shell is the operator. Emissions considered in the intensity target include fugitive, venting and incomplete combustion emissions.

The equation Shell uses to calculate intensity is:

$$\frac{Total\ methane\ emissions\ from\ Shell\ operated\ oil\ and\ gas\ assets}{Total\ Shell\ oil\ and\ natural\ gas\ marketed}$$

Shell reports that its current leak rate ranges from 0.01 percent to 0.8 percent across its oil and gas assets, and that its North American shale operations leak rate is less than 0.25 percent methane emitted per volume of natural gas produced. These reported estimates include methane emissions from operated facilities supporting natural gas production. Currently, emissions are calculated using standard emissions factors and actual measurement. By 2025, Shell announced that operated assets will implement more robust quantification methodologies.

BP

In April 2018, BP announced a methane emissions intensity target of 0.2 percent and committed to holding intensity below 0.3 percent.[4] The equation BP is using to calculate intensity is:

$$\frac{Total\ methane\ emissions\ from\ BP\ marketed\ natural\ gas}{Total\ BP\ marketed\ natural\ gas}$$

BP reports that this intensity accounts for more than 90 percent of methane emissions from BP-operated oil and gas assets. Not included in the company's calculation are methane emissions resulting from gas that is only reinjected, recycled or associated with assets where BP does not produce the gas. Emissions from oil production facilities with stranded gas are also not included.[5]

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[3] Royal Dutch Shell, "Shell announces methane emissions intensity target for oil and gas assets", Press Release, September 17, 2018. Available at: https://www.shell.com/media/news-and-media-releases/2018/shell-announces-methane-emissions-intensity-target.html

[4] BP, "Tackling Methane", April 2018. Available at: https://www.bp.com/en/global/corporate/sustainability/climate-change/tackling-methane.html

[5] Ben Ratner (EDF), "Sitting down with BP to discuss its new methane target", EDF Energy Exchange, April 16, 2018. Available at: http://blogs.edf.org/energyexchange/2018/04/16/sitting-down-with-bp-to-discuss-its-new-methane-target/

Coalitions with intensity targets

Earlier this year, OGCI announced participating companies would adopt a collective intensity target, becoming the second industry initiative, after ONE Future, which was formed in 2014, to adopt a collective intensity target for production operations.

Oil and Gas Climate Initiative (OGCI)

OGCI is a voluntary, CEO-led initiative with a goal of lowering the GHG footprint of member companies, including BP, Eni, Equinor, Chevron, CNPC, ExxonMobil, Occidental Petroleum, Pemex, Petrobras, Repsol, Royal Dutch Shell, Saudi Aramco and Total. In September 2018, OGCI announced a target to reduce the collective average methane intensity of its aggregated upstream gas and oil operations to below 0.25 percent by 2025, with ambition of achieving 0.20 percent by the same year.

The OGCI methane emissions intensity target is calculated as[6]:

$$\frac{\sum Total\ methane\ emissions\ from\ all\ OGCI\ companies}{\sum Total\ marketed\ natural\ gas\ from\ all\ OGCI\ companies}$$

OGCI reported that it chose to set an intensity target as opposed to an absolute target because the intensity calculation remains relevant even if there are changes to the OGCI asset make-up.

Intensity is calculated for upstream operations, from wellhead to point of sale, for marketed oil and/or gas where OGCI members have operational control and for which each company has specific reporting routines. Gas liquefaction, production drilling and completions are included in the upstream scope. Refining, shipping, transmission, distribution, and exploration drilling activities are not included. All methane emissions at assets for which OGCI companies have some ownership and are operators are included – there is no division based on equity of entitlement shares. Assets where an OGCI company has an equity interest but does not function as operator are not included.

Based on the assets included in the scope in the given year, OGCI will calculate and track intensity annually leading up to the 2025 target year.

In addition to being part of the OGCI commitment, ExxonMobil and Eni have committed to company-specific emission targets. ExxonMobil's target is an absolute 15 percent decrease in methane emissions and a 25 percent reduction in flaring by 2020, compared to a 2016 baseline. Eni's target is to reduce fugitive upstream methane emissions 80 percent by 2025, compared to a 2014 baseline.

ONE Future

Launched with eight companies in 2014, ONE Future is currently a group of 16 natural gas production, transmission and distribution companies that have agreed to voluntarily reduce methane emissions across the supply chain. Membership includes Antero Resources, Apache, Berkshire Hathaway Pipeline Group, BHP, Dominion Energy, Equinor, EQT, Hess, Kinder Morgan, National Grid, Jonah, Southern Company Gas, Southwestern Energy, Summit Utilities, and TransCanada.

ONE Future has a broader scope than the other announcements and is committed to developing segment-specific methane emissions reduction goals that, when combined, will reduce the average annual rate of methane emissions

[6] Saphina Waters (OGCI), "Methodological Note for OGCI Methane Intensity Target and Ambition", September 24, 2018. Available at: http://info.oilandgasclimateinitiative.com/blog/methodological-note-for-ogci-methane-intensity-target-and-ambition

across collective operations to one percent (or less) of production by 2025. The equation used to calculate intensity is[7]:

$$\frac{Total\ methane\ emissions\ across\ collective\ operations}{Total\ gross\ gas\ production}$$

To achieve this goal, ONE Future developed segment-specific intensity targets from production and gathering, processing, transmission and storage, and distribution. The segment-specific targets in 2025, as a percent of gross production range from 0.11 percent to 0.36 percent as shown in Table 1.

Table 1. ONE Future Intensity Targets by Segment

Segment	2012 Methane Intensity	2020 Intensity Goal	2025 Intensity Goal
Production and Gathering	0.55%	0.46%	0.36%
Processing	0.18%	0.15%	0.11%
Transmission and Storage	0.44%	0.37%	0.30%
Distribution	0.26%	0.24%	0.22%

ONE Future includes emissions from upstream assets producing associated gas, like gas co-produced from well sites primarily producing oil, but apportions emissions from such assets based on the average energy content of the products. ONE Future attributes 33.5 percent of methane emissions from oil wells to the natural gas value chain.

Conclusion

Including natural gas produced by ONE Future members, OGCI members, and Shell, companies responsible for more than 20 percent of U.S. marketed natural gas production in 2017 have committed to individual or collective methane emission intensity targets. The majority of these commitments have been made in 2018, including announcements by BP, Shell, and OGCI, and the addition of companies to ONE Future. Over the next year, companies and organizations are expected to start reporting data demonstrating progress toward meeting the targets. As the information becomes publicly available, it will be important to understand the scope of the included emissions and differences in the methodology for calculating emissions intensity.

[7] ONE Future, "Methane Emissions Estimation Protocol", August 2016. Available at: http://onefuture.us/wp-content/uploads/2018/05/ONE-Future-Methane-Intensity-Protocol-v-1-2016.pdf

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