

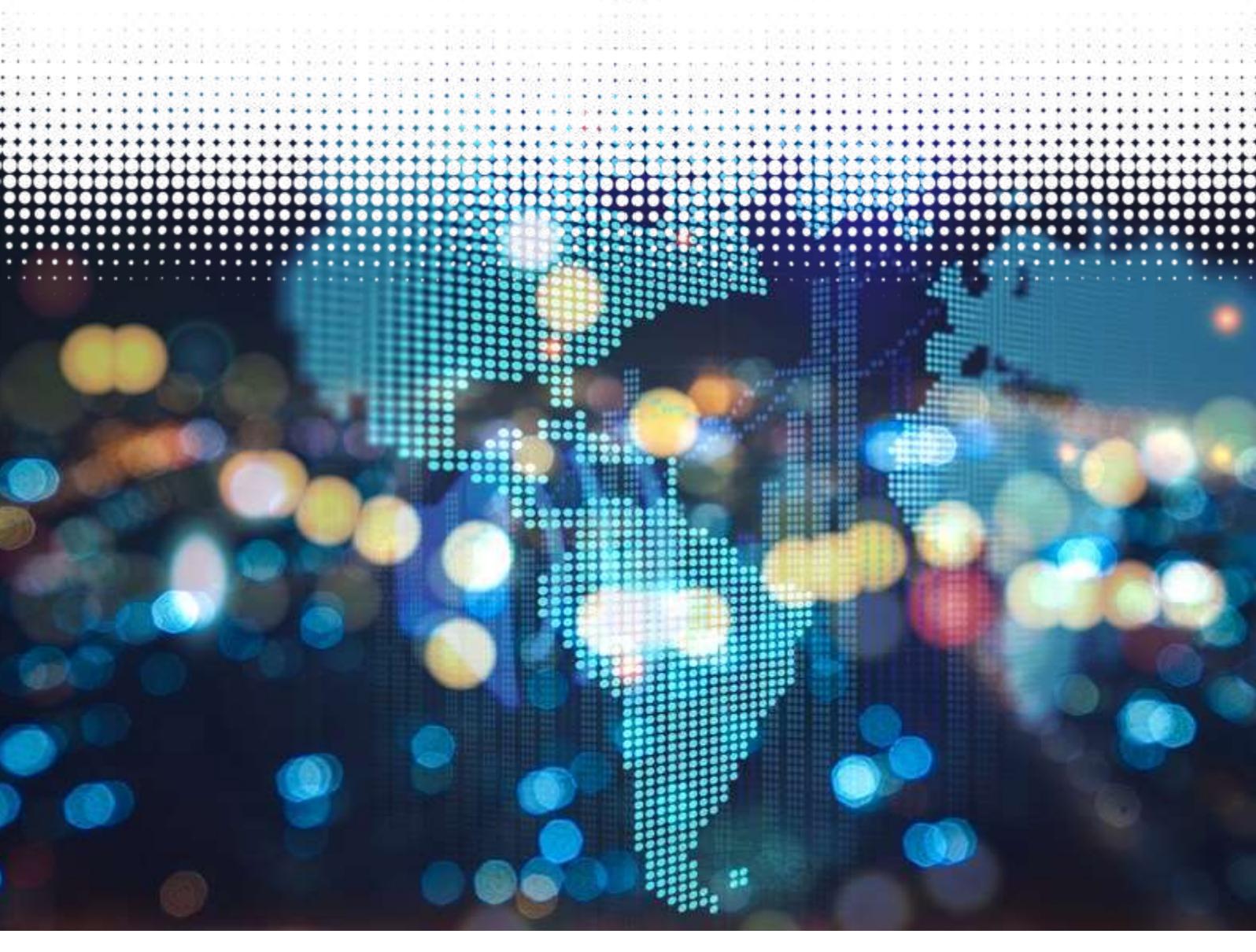


METHANE
GUIDING
PRINCIPLES

Methane Guiding Principles Signatory Reporting

Baker Hughes

January 2022





COMPANY: **Baker Hughes**

YEAR OF JOINING METHANE GUIDING PRINCIPLES: **2020**

SENIOR REPRESENTATIVE: **Ben Linke, VP for Emissions Management**



Principle One:
Continually reduce methane emissions

2021 completed activity	2022 intended activity
<p><u>With customers/partners:</u></p> <ul style="list-style-type: none"> • Baker Hughes offers a range of products and services to help our customers manage and reduce methane emissions, from advanced methane monitoring and detection, to flare optimization, compressors’ upgrades, and flare gas processing solutions, ‘zero-bleed’ valves to control fugitives and leakage. • We are actively engaged in helping our customers (from the oil & gas industry, waste, and biogas sectors) meet their carbon and methane emissions reduction goals by raising awareness of the benefits of various technologies. <p><u>How we aim to reduce our own emissions:</u></p> <ul style="list-style-type: none"> • In 2019, Baker Hughes made a commitment to achieve net-zero Scope 1 and 2 emissions from our operations by 2050. During 2020, we reduced our Scope 1 and 2 GHG emissions by 15% compared to the prior year. • Our Corporate Sustainability Report is available here. 	<p><u>With customers/partners:</u></p> <ul style="list-style-type: none"> • We will continue our engagement with current and potential customers (from the oil & gas industry, waste and biogas sectors, mining) across the world to help them reduce emissions in a cost-efficient way. Our vision is to accelerate decarbonization through innovative emissions management solutions. • In 2022, we will participate in the MGP workstream “Methane Source Tool” which will support identification of all relevant methane sources, the configuration of those sources, calculation/ reporting options ranging from simple estimates through to engineering calculations and measurements, and mitigation by source. • We cooperate with a number of partners to develop technologies to increase energy efficiency and reduce greenhouse gas emissions. <p><u>How we aim to reduce our own emissions:</u></p> <ul style="list-style-type: none"> • Baker Hughes is committed to reducing our emissions by 50% by 2030 and net-zero by 2050. • Baker Hughes will continue collaborating with external stakeholders to meet our emissions reduction goals. We also continue to expand our reporting to include new categories of both upstream and downstream emissions that are the core of our business.



Principle Two:

Advance strong performance across the gas supply chain

2021 completed activity	2022 intended activity
<p>During its Annual Meeting 2021, Baker Hughes organized a panel discussion focusing on flaring and methane emissions.</p> <p>In the course of 2021, Baker Hughes showcased its thought leadership on methane emissions through a number of channels, such as an article in corporate newsletter (Policy flare: innovating to make methane commitments stick) and webinars on technologies tackling methane emissions (e.g., Webinar on flare.IQ). Baker Hughes also contributed to the EDF report on jobs in the U.S. methane emissions mitigation industry.</p> <p>Baker Hughes has focused on the technological development of emissions management solutions.</p>	<p>Baker Hughes is an energy technology company and we plan to further engage with our customers on the importance of reducing methane emissions. We continue investing in the improvement of our own technologies that quantify emissions, for which a technology project was launched to study for relevant solutions.</p> <p>Baker Hughes will continue to:</p> <ul style="list-style-type: none"> • Raise awareness throughout the supply chain and help to reduce carbon footprints; • Collaborate with our external partners (academia, research institutions) to drive research and development on methane emissions reduction technologies. <p>We are planning to organize several webinars explaining the application of our technologies aimed at quantification and mitigation of methane emissions. Additionally, several publications are planned: e.g., explaining how our technologies can help companies achieve the OGMP 2.0 different levels; articles on mitigation options, e.g., by making upgrades to the existing kits.</p> <p>In February 2022, Baker Hughes signed a Memorandum of Understanding (MoU) with the Egyptian General Petroleum Corporation (EGPC) to establish and drive a flare recovery initiative to support emissions recovery and reductions across Egypt’s upstream and downstream oil and gas operations. This MoU will be followed by the implementation plan. We also joined a coalition of energy transition leaders - Bechtel, Enppi, Petrojet, GE, HSBC, and the National Bank of Egypt – signed an MoU under the auspices of Tarek El Molla, Egyptian Minister of Petroleum and Mineral Resources, this week in Cairo. The coalition will provide execution, technology, and financing expertise for a new initiative to support decarbonization of select downstream facilities in Egypt, aligning plans with the country’s leadership of the COP27, UN Climate Change Conference 2022.</p> <p>We will also assess possibilities to participate in the MGP workgroup on NOJV and continue with other associations that cover methane emissions along the oil & gas value chain, such as IOGP, IPIECA, and IGU.</p>

Principle Three: Improve accuracy of methane emissions data

2021 completed activity	2022 intended activity
<p>Baker Hughes offers a range of products and services to help operators manage and reduce methane emissions, from advanced methane monitoring and detection, to flare optimization and flare gas processing solutions, to ‘zero-bleed’ valves to control fugitives and leakage.</p> <p>Our technology flare.IQ provides real-time monitoring of flare combustion efficiency and automatic control of flare operation for assisted flares and has been used to reduce methane emissions in a number of upstream and downstream sites. This combustion efficiency (CE) tracking method based on flare process conditions provides accurate emission monitoring, thus reducing methane slip from flaring. Case study with bp described here; video here. Flare.IQ was launched in 2017 with an emphasis on the North American market and regulatory compliance with the EPA Refinery Sector Rule 63.670. It has been adopted by flare operators around the globe for improving flaring efficiency.</p> <p>Our LUMEN offering provides fidelity on methane emissions data required to be reported to comply with regulatory and voluntary initiatives. LUMEN is also in compliance with OGMP 2.0 reporting framework’s requirements to achieve the “Gold standard,” providing capabilities to perform source-level and site-level measurements.</p> <p>Another technology within our offering, is LUMEN which covers:</p> <ul style="list-style-type: none"> • LUMEN Sky is an aerial drone-based platform fitted with an optical gas imaging camera to detect and pinpoint the location of an emission source. Sky utilizes computer vision-based analytics to estimate the flow rate of an emission source. Thanks to the Lumen Sky solution, Shell has been provided with a valuable source of insights on methane emissions. More information here. • LUMEN Terrain is a ground-based IIOT (industrial internet of things) system that uses concentration data collected by a network of point sensors and local environmental conditions to continuously monitor the emissions at a site and alert operators to any anomalies caused by leaks or abnormal operations. Example: LUMEN TERRAIN is used to help achieve independent certification of natural gas production under the MiQ methane standard. <p>We concluded an agreement with Iraq’s state-owned South Gas Co. to develop a 200 MMcf/d gas recovery project to process associated gas</p>	<p>New projects with other customers will come on stream.</p> <p>Baker Hughes will continue R&D initiatives, collaborating internally and externally, to further improve our existing offering and develop new technologies to reduce methane emissions.</p> <p>We will continue supporting the MGP work streams on flaring. Accurate and reliable data on flare flow and flare combustion efficiency are critical in methane emission management. For this reason, Baker Hughes is working on solutions that improve flare flow measurement and flare combustion efficiency monitoring. Accurate 24/7/365 combustion efficiency is key for flare emission calculations.</p> <p>To further improve our own analytics and broaden the portfolio of technologies aimed at the measurement of methane emissions, we intend to test and study several technologies. We will continue investing in innovative technologies and R&D programs.</p> <p>Once available, we will assess the OGMP Technical Guidance Documents for Levels 3-5 and explain to our partners how our technologies facilitate their achievement.</p>

from Nasiriyah and al-Gharraf fields in the southern province of Dhi Qar.

As an MGP Flaring workstream member, we developed a factsheet on flare.IQ.

For the emissions sources identified, we also offer an array of abatement solutions to support operators across its portfolio of assets, allowing upgrades and revamps of operating assets. We also offer innovative technologies that prevent future emissions and decarbonize operations. This array of solutions provides more certainty of the strong emissions management performance that will be reported to multiple stakeholders and that can also be third-party validated.

In 2021, Baker Hughes has strengthened its focus on R&D initiatives to develop innovative technologies: a) to reduce methane emissions such as Ventilation Air Methane (VAM) emissions from underground coal mining via oxidation coupled with a Direct Air Capture (DAC) to remove the produced CO₂; b) a technology to reduce methane and highly reactive VOC emissions from a wide range of industrial flares. Baker Hughes also deploys edge computing devices for methane emission management by controlling the open/shut-in conditions of the well and monitor production, pressure, and well status.

Principle Four:

Advocate sound policy and regulations on methane emissions

2021 completed activity	2022 intended activity
<p>Baker Hughes developed a policy statement on methane emissions.</p> <p>We co-signed the MGP policy recommendations on the upcoming EU legislation on methane emissions.</p> <p>We participated in the LNGnet project led by the Florence School of Regulation.</p> <p>We submitted our comments to the European Commission (EC)'s consultation on the EU legislation on methane emissions and spoke at the EC workshop on flaring.</p>	<p>Baker Hughes will contribute to the MGP working group "Oil & Gas Toolkit for Global Methane Pledge".</p> <p>We submitted comments supporting the U.S. Environmental Protection Agency's proposed rule to reduce methane emissions from the oil and gas sector, and will engage with policymakers.</p> <p>We intend to submit comments to the EU consultation on the recent legislation on methane emissions.</p> <p>We will continue to engage in the activities of associations, that we are members of, to promote sound policy and regulations on methane emissions.</p> <p>We are also engaged in two MoUs in Egypt to: 1) establish and drive a flare recovery initiative to support emissions recovery and reductions across Egypt's upstream and downstream oil and gas operations; 2) to support decarbonization of select downstream facilities in Egypt.</p> <p>Additionally, we will continue to contribute to discussions on developing GHG regulations at national levels where we have activities and engage with policymakers as appropriate.</p>



Principle Five:
Increase transparency

2021 completed activity	2022 intended activity
<p>Baker Hughes provides technologies that enable OGMP 2.0 signatories to achieve the gold standard. We were not aware of the possibility of joining the OGMP 2.0 working groups to share our knowledge and experience as a service provider.</p> <p>Baker Hughes contributed to the IOGP task force on methane recommended practices.</p> <p>We shared our views on the MiQ standards.</p>	<p>Baker Hughes intends to release several publications focusing on Emissions Management technologies – including in collaboration with strategic partners – and to develop a guidance document explaining how our technologies help achieve the OGMP 2.0 standard (various levels). We will support our customers in achieving their OGMP 2.0 goals and ensure regulatory compliance across the world.</p> <p>In the R&D space, we are planning articles with our partner universities in peer-reviewed journals on science and engineering. Additionally, we will continue working on the improvement of our advanced analytics that will contribute to further increase transparency on methane emissions.</p> <p>Baker Hughes will continue its participation in the IOGP task force on methane recommended practices as well as in various work streams under Methane Guiding Principles such as on flaring and Methane Source Tool.</p> <p>In 2022, Baker Hughes will continue to report information within the CDP framework.</p>



Methane Emissions

<p>Do you report absolute methane emissions within your sustainability report? <i>If so provide link.</i></p>	<p>Yes No Please see page 79 of Our Corporate Sustainability Report (dated 2021) available here.</p>
<p>Do you report a methane intensity within your sustainability report? <i>If so provide link.</i></p>	<p>Yes/ No Baker Hughes doesn't produce oil or natural gas.</p>
<p>What are your organisation's total absolute methane emissions? Provide a figure in tonnes. Provide latest data publicly available.</p>	<p>2020 Data: Scope 1: 268t; Our Corporate Sustainability Report available here.</p>
<p>State your methodology.</p>	-
<p>State your reporting boundary.</p>	-
<p>What are your organisation's methane intensity? Provide latest data publicly available.</p>	<p>N/A Baker Hughes doesn't produce oil or gas.</p>
<p>State your methodology.</p>	N/A
<p>State your reporting boundary.</p>	N/A
<p>Do you have a methane emission target? If yes, please state what it is, including the boundaries and methodology. If no, are you developing such a target? Please state your intended timeline.</p>	<p>In 2019, Baker Hughes made a commitment to achieve net-zero Scope 1 and 2 emissions from our operations by 2050. During 2020, we reduced our Scope 1 and 2 GHG emissions by 15% compared to the prior year. Our Corporate Sustainability Report is available here.</p>

Commentary:

Baker Hughes is an energy technology company providing solutions for energy and industrial customers worldwide. We design, manufacture, and service transformative technologies to help take energy forward – making it safer, cleaner, and more efficient for the people and the planet.

We offer a range of products and services to help our customers manage and reduce methane emissions, from advanced methane monitoring and detection, to flare optimization and flare gas processing solutions, to 'zero-bleed' valves to control fugitives and leakage.

Our goal is to ensure a role for natural gas in a sustainable energy future by helping customers address methane emissions associated with exploration, production, and transportation.