



METHANE
GUIDING
PRINCIPLES

Methane Guiding Principles Signatory Reporting

PETRONAS

2023





COMPANY: **PETRONAS**

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

SENIOR REPRESENTATIVE:

Charlotte Wolff-Bye, Vice President and Chief Sustainability Officer, PETRONAS

Principle One: Continually reduce methane emissions

- Please state what specific activities or projects your company has undertaken to reduce methane emissions. Please refer to the previous year’s annual MGP reporting where applicable to refer to intended activity. Link to sustainability report where relevant to provide further detail.
- Describe how the reduction was achieved including description of the asset type, technology type, timeframe. What was the end result?
- Provide data to support your description e.g. the actual amount of emissions reduction achieved, or the reduction in methane intensity.

| 2022 completed activity | 2023 intended activity |
|---|--|
| <p>In 2022, PETRONAS has been enhancing our efforts in methane emissions management, which includes among others the enhancement of methane emissions data quality, capability building and targets setting. On 1st November 2022, PETRONAS announced methane targets, which is embedded in the PETRONAS’ Net Zero Carbon Emissions by 2050 pathway:</p> <ul style="list-style-type: none"> • 50% reduction in absolute methane emissions by 2030 for Malaysia Natural Gas Value Chain from 2019 levels, in support of Malaysia’s Global Methane Pledge. • 70% reduction in absolute methane emissions by 2030, with an intermediate target of 50% reduction in absolute methane emission by 2025 for PETRONAS Natural Gas Value Chain Operations from 2019 levels. <p>These targets focus on operations within our immediate control that can affect direct change.</p> <p>PETRONAS continued our vent and flare reduction projects in Upstream. In 2022, flare reduction projects in PETRONAS Upstream facilities contributed to a reduction of 507.5 tonnes of methane emissions from 2021:</p> <ul style="list-style-type: none"> • 351.7 tonnes of methane emissions reduction from Bintulu Integrated Facility (BIF) • 155.8 tonnes of methane emissions reduction from Sabah Oil & Gas Terminal (SOGT) <p>PETRONAS operationalised our internal standard and guidance on Methane Emissions Quantification and Reporting to specify the minimum technical requirements for identifying, detecting, measuring, quantifying, reporting and verifying methane</p> | <p>In 2023, PETRONAS plans to continue with our planned vent and flare reduction projects in Upstream.</p> <p>To further strengthen PETRONAS efforts for methane emissions reduction efforts, PETRONAS plans to improve our quantification methods and reporting in PETRONAS operated facilities, in alignment with our signatory membership to the United Nations Environment Programme (UNEP)’s Oil and Gas Methane Partnership 2.0 (OGMP2.0) Reporting Framework.</p> <p>These activities align with our Net Zero Carbon Emissions by 2050 pathway, which includes methane emissions reduction targets.</p> |

Open

emissions across PETRONAS natural gas value chain. It includes planning and execution of methane emissions measurement and accuracy efforts that encompasses building digital tools to record and analyse methane emissions in PETRONAS facilities. Activities such as trainings, workshops and awareness sessions was conducted for Upstream Malaysia assets from August to September 2022, as part of our efforts to reduce methane emissions continually.

Moreover, on 17th June 2022, PETRONAS was included in the joint media release of the Global Methane Pledge (GMP) Energy Pathway by reaffirming PETRONAS' commitment to the World Bank's Zero Routine Flaring by 2030 (ZRF) Initiative. The GMP Energy Pathway was launched by the US, EU and 11 other countries at the Major Economies Forum on Energy and Climate to strengthen the oil & gas sector's delivery of the GMP. The GMP Energy Pathway aims to encourage all nations to:

- Capture the maximum potential of cost-effective methane mitigation in the oil & gas sector, and
- Eliminate routine flaring as soon as possible, and no later than 2030.

Principle Two:

Advance strong performance across the gas supply chain

Please include answers to the following questions:

1. Did you participate in any methane research or plan to do so?
2. Did you conduct any outreach on methane management?
 - Describe what action you have taken to engage industry players across the value chain to better understand how to achieve robust methane emissions management. Outreach activity could include training sessions, participation in webinars, influencing of NOJV partners, or publication of guidance. Activity could also include commercial incentives or engagement with investors to drive better performance by others.
 - Provide details of any outcomes that resulted from your action.

| 2022 completed activity | 2023 intended activity |
|---|--|
| <p>PETRONAS has conducted engagements through Malaysia Petroleum Management (MPM) with Sea Hibiscus, PTTEP, Vestigo, Sapura Kencana, HESS, ConocoPhillips, Enquest and JX Nippon in May and June of 2022 to advocate methane emissions measurement and quantification in their operations within Malaysia.</p> <p>PETRONAS co-sponsored and participated in the United States Agency for International Development (USAID) Workshop on Innovative Technologies to Identify and Measure Oil and Gas Sector Methane Emissions in Southeast Asia in December 2022.</p> <p>PETRONAS has collaborated with GHGSat in a research study on satellite readings for onshore facilities to enable the reconciliation of methane ground measurements to reduce methane emissions from oil and gas installations through detection and measurement.</p> <p>Through PETRONAS collaboration with MGP, PETRONAS has shared methane emissions management tools with other Joint Venture (JV) and Production Sharing Contract (PSC) partners in Malaysia. This includes sharing the Oil and Gas Sector Toolkit to assist in their efforts to reduce methane emissions from the oil and gas sector. PETRONAS has also provided ICON Methane Calculation Tools to JV and PSC partners in Malaysia to support the methane quantification and reporting.</p> | <p>PETRONAS plans to continue collaboration efforts and implement the identified initiatives/solutions obtained via MGP 2023 work plan.</p> <p>Additionally, PETRONAS plans to continue engagements with non-MGP Upstream operators in Malaysia to advocate for improved methane emissions measurement, quantification and reduction in their operations.</p> <p>PETRONAS plans to engage with the Malaysian government and other industrial sectors in Malaysia to share best practices on methane emissions management. PETRONAS aims to continue organising the ASEAN Methane Roundtable to enable further collaboration within the ASEAN region.</p> <p>PETRONAS plans to leverage existing partnerships between the PSC contractors to enhance knowledge sharing on methane measurement technologies for improved methane emissions management for Malaysia operations.</p> |

Open

Furthermore, PETRONAS conducted five upskilling sessions on methane emissions management for 84 practitioners in PETRONAS. These training sessions aim to strengthen our practitioners' understanding in support of the effective operationalisation of our internal standard and guidance on methane emissions management.

Principle Three: Improve accuracy of methane emissions data

- Describe action taken to improve methane emissions data collection methodologies. This could be application of new technology at an operated site(s), investment and participation in R&D initiatives, development of monitoring/modelling software, or support to research that improves the accuracy of the quantification of methane emissions.
- Where new technology /software has been piloted or adopted, it is helpful to describe how it works, the reasons it was selected, and how it was deployed. Any data that can be shared to demonstrate improvements is useful.
- How these new methods/technologies has been adopted into your accounting process if at all.

| 2022 completed activity | 2023 intended activity |
|---|--|
| <p>PETRONAS has established a digital reporting platform for methane emissions for all 11 common methane emissions sources, which are rolled up into the overall GHG emissions data for the company. The methane data can be analysed by sources to pinpoint opportunities for reduction.</p> <p>PETRONAS operationalised methane emissions internal standard and guideline and established quantification of ground level methane emissions measurements.</p> <p>As part of our efforts for top-down measurement, PETRONAS established a pilot study using satellite technologies to measure methane emissions from onshore facilities.</p> <p>We also explored drone technologies for our onshore and nearshore facilities as a means for top-down measurement to help us further refine our approach to finding the optimal technology for PETRONAS.</p> <p>As part of our effort to improve the accuracy of our methane measurements, PETRONAS has completed the first step of detailed methane quantification for selected sample of our operated facilities. Mainly for major sources (flaring and venting), we had reached Level 4 whereas for minor sources, we had reached a combination of Level 3 and Level 4. PETRONAS is also conducting Level 3 methane quantification for sampled non-operated Upstream facilities in Malaysia (Level 1 to Level 3).</p> | <p>As part of the operationalisation of PETRONAS' methane emissions internal standard and guideline and our continued efforts to improve methane measurement accuracy, PETRONAS will explore several other measurement technologies in 2023, which includes Light Detection and Ranging (LiDAR), Quantitative Optical Gas Image (QOGI) and Systematic Observations of Facility Intermittent Emissions (SOOFIE).</p> <p>PETRONAS plans to continue implementing enhancement of methane emissions quantification for our operated and non-operated facilities in Malaysia.</p> |



Furthermore, on 4th November 2022, PETRONAS joined UNEP's OGMP2.0 Reporting Framework. OGMP2.0 is a multi-stakeholder initiative launched by UNEP and the Climate and Clean Air Coalition. It provides comprehensive, measurement-based reporting framework that improves accuracy and transparency of methane emissions reporting in the oil and gas sector. Our membership demonstrates contribution to climate mitigation and delivering against our methane emissions reduction targets. This was announced at the UN Climate Change Conference COP27 in Sharm El Sheikh, Egypt.

Principle Four:

Advocate sound policy and regulations on methane emissions

Advocacy consists of active participation in legal consultation processes, external policy statements, and direct engagement with government

- Consider providing details on the region or regulation involved, how you undertook your advocacy, others involved, and the outcome.

| 2022 completed activity | 2023 intended activity |
|---|---|
| <p>PETRONAS through Malaysia Petroleum Management (MPM), rolled out PETRONAS Exploration and Production Minimum Environmental Specification (MES) that outlines the minimum requirements on the approach of methane emissions measurements, quantifications, and reporting by all PSCs operating in Malaysia. It will ensure the reported numbers for methane emissions by Upstream Malaysia operations are of similar level of accuracy, which will inform further methane emissions reduction efforts.</p> <p>PETRONAS continues to lead methane advocacy in Malaysia as the designated regulator for Upstream operation and led collaboration efforts on methane advocacy and engagement in the ASEAN region.</p> <p>PETRONAS hosted the virtual ASEAN Energy Sector Methane Roundtable 2022, the second in the series on 19 May 2022 supported by Thailand’s PTT Public Company Limited (PTT) and Indonesia’s PERTAMINA. The session was attended by participants from ASEAN national oil companies, other oil and gas companies, as well as international, multilateral and non-governmental organisations such as the International Energy Agency (IEA), the World Bank, the UN Environment Programme (UNEP) and the Environment Defense Fund (EDF). The strong presence and network of energy companies and international organisations at the event set the foundation for promoting capability building and technical knowledge sharing, improved methane emissions management practices and transparency in performance reporting, aligned with internationally recognised frameworks and standards, ultimately accelerating efforts to reduce methane emissions. The third roundtable took place through USAID Workshop on Innovative Technologies to Identify and</p> | <p>PETRONAS plans to continue hosting the ASEAN Energy Sector Methane Roundtable in 2023 to promote capacity building and technical knowledge sharing for improved performance and transparency in reporting, aligned with internationally recognised frameworks and standards. Consideration will be given to invite a broader cross section of government agencies.</p> |

Open



Measure Oil and Gas Sector Methane Emissions in Southeast Asia held in Bangkok on 7-8 December, 2022. The workshop was in collaboration with USAID Smart Power Program (SPP), ASEAN Centre for Energy (ACE), PETRONAS, PTT Exploration & Production (PTTEP) and Asia Natural Gas & Energy Association. It was attended by participants from ASEAN oil and gas operators, EDF, United States Environmental Protection Agency (EPA) and methane emissions management technology providers.

Furthermore, throughout 2022, PETRONAS advocates for strengthened methane emissions management globally through our speaking engagements in CERAWEEK in Houston, ADIPEC in Abu Dhabi, Conference of Parties 27 (COP27) in Sharm El Sheikh and International Green Tech and Eco-Products Exhibition and Conference (IGEM) in Kuala Lumpur.

Principle Five: Increase transparency

Please include answers to the following question:

1. Are you participating in OGMP 2.0 or do you intend to do so? If you are participating in OGMP 2.0 you may provide a link to the website.
 - Describe what activity you have carried out e.g. providing information in relevant external reports on methane emissions data, methodologies, and progress and challenges in methane emissions management.
 - If you have contributed towards the standardisation of comparable external methane reporting describe the activity you have taken.

| 2022 completed activity | 2023 intended activity |
|---|---|
| <p>Since November 2022, PETRONAS is a signatory member to the OGMP2.0 reporting framework. This demonstrates PETRONAS' progressive efforts in increasing transparency and advancing strong performance in the natural gas value chain in line with the expectations of the MGP.</p> <p>PETRONAS disclosed its methane emissions and reduction efforts in our PETRONAS Integrated Report (PIR) 2021.</p> | <p>In 2023, PETRONAS plans to publish methane emissions and reduction efforts in our PETRONAS PIR 2022.</p> <p>PETRONAS plans to commence our disclosure in accordance with the OGMP2.0 reporting framework requirements, which includes baseline methane emissions data (based on 2022 data) and an implementation plan towards Gold Standard.</p> |

Methane Emissions

| | |
|--|---|
| <p>Do you report absolute methane emissions within your sustainability report?</p> <p><i>If so provide link.</i></p> | <p>Yes / No</p> <p>PETRONAS Integrated Report and Financial Report 2021</p> <p>PETRONAS Integrated Report 2022 will be published in 2023.</p> |
| <p>Do you report a methane intensity within your sustainability report?</p> <p><i>If so provide link.</i></p> | <p>Yes / No</p> |
| <p>What are your organisation's total absolute methane emissions?</p> <p>Provide a figure in tonnes.</p> <p>Provide latest data publicly available.</p> | <p>0.23 million tonnes of methane emission in 2021.</p> <p>PETRONAS Integrated Report and Financial Report 2021 (page 177)</p> <p>PETRONAS Integrated Report 2022 will be published in 2023.</p> |
| <p>State your methodology.</p> | <p>2021 methane emissions are based on reported numbers from flaring, venting and combustion sources, which are mostly measured using flowmeters (Level 4 measurement accuracy according to OGMP2.0).</p> <p>For 2022 methane emissions data, which will be published in 2023, the methane emissions are based on reported numbers from flaring, venting, and combustion sources, primarily measured using flowmeters (Level 4 measurement accuracy according to OGMP2.0). The other eight (8) sources will be based on engineering calculations (Level 3 measurement accuracy according to OGMP2.0).</p> |
| <p>State your reporting boundary.</p> | <p>2021 methane emissions represents PETRONAS' Natural Gas Value chain (under operational control in Malaysia and International).</p> <p>2022 methane emissions data, scheduled to be published in 2023, will also be based on the above reporting boundary.</p> |
| <p>What are your organisation's methane intensity?</p> <p>Provide latest data publicly available.</p> | <p>Currently not disclosed</p> |
| <p>State your methodology.</p> | <p>Currently not disclosed</p> |
| <p>State your reporting boundary.</p> | <p>Currently not disclosed</p> |

Open



| | |
|--|---|
| <p>Do you have a methane emission target?</p> <p>If yes, please state what it is, including the boundaries and methodology.</p> <p>If no, are you developing such a target? Please state your intended timeline.</p> | <p>Yes.</p> <p>The methane emissions reduction targets are as follows:</p> <ul style="list-style-type: none">• 50% reduction in absolute methane emissions by 2030 for Malaysia's Natural Gas Value Chain from 2019 levels in support of Malaysia's Global Methane Pledge;• 70% reduction in absolute methane emissions by 2030, with an intermediate target of 50% reduction in absolute methane emission by 2025 for PETRONAS Natural Gas Value Chain Operations from 2019 levels. <p>The targets are based on operational control approach in accordance with GHG Protocol.</p> |
|--|---|

