



METHANE
GUIDING
PRINCIPLES

Methane Guiding Principles Signatory Reporting

PETRONAS

2022





COMPANY: **PETRONAS**

DATE: **September 2022**

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

SENIOR REPRESENTATIVE:

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

Principle One: Continually reduce methane emissions

2021 completed activity	2022 intended activity
<p>PETRONAS' methane emissions reduction focuses on efforts to reduce hydrocarbon venting and flaring in Upstream operations. This is part of our ongoing activity in adhering to PETRONAS Carbon Commitment introduced in 2012. We have established an internal target to end continuous venting of hydrocarbon by 2024. Our internal measures are in support of external initiatives that we directly support or engage in. In 2021, PETRONAS endorsed the World Bank's Zero Routine Flaring by 2030 Initiative. We have introduced an internal standard and guidance, which are aligned to the Oil and Gas Methane Partnership (OGMP) 2.0 Framework to improve the accuracy and transparency in methane emissions measurement, quantification, and reporting practices by PETRONAS. This will inform the enhancements to the planning of methane emissions reduction in PETRONAS.</p> <p>In 2021, vent and flare reduction projects in PETRONAS Upstream facilities contributed to a reduction of 134,393 tonnes of methane emissions from 2020. Eight projects were completed in Upstream offshore facilities:</p> <ul style="list-style-type: none"> • Vent to flare – Baronia, reducing 5,454 tonnes of methane • Vent reduction – Betty, Bokor, Samarang, Dulang and Tukau, reducing 127,937 tonnes of methane • Flare reduction – Tukau Timur and Bintulu Integrated Facilities, reducing 1,002 tonnes of methane <p>In addition to the above, Leak Detection and Repair (LDAR) program is in place to detect and rectify unplanned leaks and fugitive emissions in PETRONAS Upstream facilities, Gas processing & transmission facilities and Liquefied Natural Gas (LNG) facilities. However, the LDAR program is currently limited to detection and repair, it does not include accurate quantification for fugitive methane emissions.</p>	<p>In 2022, PETRONAS plans to continue with its planned vent and flare reduction projects in Upstream.</p> <p>PETRONAS plans to operationalise our internal methane emissions standard and guidance to improve the accuracy and transparency of methane emissions reduction, which includes trainings, workshops, and awareness sessions. This includes planning and execution of methane emissions measurement and accuracy efforts that encompasses building digital tools to record and analysing methane emissions in PETRONAS operated facilities.</p> <p>These activities are in line with our Net Zero Carbon Emissions aspiration by 2050.</p>

Principle Two:

Advance strong performance across the gas supply chain

2021 completed activity	2022 intended activity
<p>Current research centres on GHG emissions reduction technologies to increase efficiency of methane and CO₂ separation i.e., on membrane (PN2) and cryomin technologies.</p> <p>PETRONAS has been advocating methane emissions management to our joint venture (JV) companies through our regulatory arm i.e., Malaysia Petroleum Management where a series of sessions on methane capability development was conducted, attended by oil and gas operators in Malaysia, known as Petroleum Arrangement Contractors (PACs), to increase awareness on the importance of managing methane emissions.</p> <p>As a result, the awareness towards the importance of methane emissions management has increased. Since 2019, Malaysia Petroleum Management has made the requirement to all Upstream operators operating in Malaysia through Malaysia Petroleum Management’s Minimum Environmental Standards (MES) to measure, quantify, report, and reduce methane emissions from oil and gas operations. Moreover, continuous engagements with the PACs have led to buy in from the PACs to act on methane emissions via an established roadmap by Malaysia Petroleum Management.</p> <p>PETRONAS held the inaugural ASEAN Energy Sector Methane Roundtable with key ASEAN energy players to discuss opportunities to intensify collaboration on methane emissions management in the region by leveraging collective capabilities, global best practices, and insights. The roundtable, hosted by PETRONAS and supported by Thailand’s PTT Public Company Limited (PTT) on 26 October 2021 was part of an effort to raise awareness and champion the climate change agenda in the region, ahead of the United Nations (UN) Climate Change Conference (COP26). It was attended by participants from PETRONAS, PTT, PERTAMINA, and Shell as well as those from international organisations such as the United Kingdom Oil and Gas Industry Association Limited (OGUK), International Energy Agency (IEA), World</p>	<p>PETRONAS plans to collaborate with GHGSat in a research study on satellite readings for onshore facilities to enable reconciliation of methane ground measurements.</p> <p>To continue collaboration efforts and implement the identified initiatives/ solutions through MGP.</p> <p>Additionally, continued planned engagements with non-MGP Upstream operators in Malaysia to advocate methane emissions measurement and quantification in their operations. Engagements between Malaysia Petroleum Management and Sea Hibiscus, PTTEP, Vestigo, Sapura Kencana, HESS, ConocoPhillips, Enquest and JX Nippon are planned in May and June 2022.</p>

Open



2021 completed activity	2022 intended activity
<p>Bank Group, the UN Environment Programme (UNEP) and Methane Guiding Principles (MGP).</p> <p>Moreover, PETRONAS also conducted engagements with service providers/contractors who have been doing methane measurements globally to understand the latest development in methane measurement and quantification for improvement in PETRONAS practices.</p>	



Principle Three: Improve accuracy of methane emissions data

2021 completed activity	2022 intended activity
<p>PETRONAS has established an internal standard to govern its practice on methane emissions quantification and reporting for all 11 common methane emissions sources. In addition, the methane standard is complemented with an internal guidance document that provides technical guidance on the application of measurement technologies, quantification approach and calculations, as well as an inventory of methane reduction technologies for respective methane source. The implementation of the methane standard across PETRONAS's natural gas value chain under operational control is aimed to improve the accuracy of methane emissions reporting.</p> <p>PETRONAS has developed iCON Methane, an in-house process simulation software where the calculations used in the software are aligned with the API compendium, United States Environmental Protection Agency (Method 21 – Determination of Volatile Organic Compound Leaks) and Intergovernmental Panel on Climate Change (Revised 2019 IPCC Guidelines for National Greenhouse Gas Inventories). To improve the modelling software, a pilot study was carried out for sampled onshore and offshore Upstream facilities, where the outcome of the study was incorporated into the modelling software to enable assessment of other sites' methane emissions without site measurement.</p> <p>Moreover, the pilot study used ground measurements data, which was established through a leak detection exercise that is aligned with Level 4 as per OGMP 2.0. Fugitive emissions were detected using optical gas imaging (OGI) cameras and measured using lower explosive limit (LEL) detectors. The methane concentration was further quantified through the iCON Methane software. Through the pilot study, we obtained detailed quantification of selected sample facilities, which in turn enabled the improvement of the emissions factors, which were then used to simulate emissions for the rest of Upstream facilities.</p>	<p>As part of the operationalisation of PETRONAS's methane emissions internal standard and guideline, PETRONAS is planning for quantification of ground level methane emissions measurements to be further reconciled with top-down measurements.</p> <p>As part of top-down measurement, PETRONAS plans to pilot satellite technologies to measure methane emissions from onshore facilities and plans to compare the accuracy against ground measurements.</p> <p>For offshore facilities, PETRONAS also plans to explore drone technology as a means for top-down measurement.</p> <p>PETRONAS plans to establish a digital reporting platform for methane emissions covering all 11 sources, where these data will be rolled up into the overall GHG emissions data. The methane data can be analysed by sources to pinpoint opportunities for reduction.</p>

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2021 completed activity	2022 intended activity
<p>Furthermore, for other intended methane emissions sources e.g., flaring, the methane emissions quantification used the assumption of industry best practise default of 2% non-combusted fraction. For venting sources, methane emissions are quantified based on the metered amount from vent stacks. For methane emissions from compressors and pneumatic devices, the quantification is done based on leakage rate (either actual data measured by flowmeter, design or calculated average emission factor, seal type, as well as device’s design or actual vent rate).</p>	

Principle Four:

Advocate sound policy and regulations on methane emissions

2021 completed activity	2022 intended activity
<p>PETRONAS has been advocating policies on methane to JV companies through our regulatory arm i.e., Malaysia Petroleum Management where a series of sessions on methane capability development were conducted, to increase awareness on the importance of managing methane emissions. This is a new formal platform for regular engagements and communications.</p> <p>Strengthened fugitive emissions reporting by oil and gas operators operating in Malaysia known as Petroleum Arrangement Contractors (PACs).</p> <p>Leveraged on Methane Guiding Principle (MGP) Best Practise Toolkit to support capability development of PACs in methane emissions management.</p> <p>Completed three sessions of webinars with all Upstream PACs in Malaysia, covering both MGP and non-MGP members. The webinar series were aimed to elevate awareness on the importance of and the need to accelerate the implementation of methane emissions management among Upstream operators in Malaysia.</p> <p>PETRONAS convened the inaugural ASEAN Energy Sector Methane Roundtable aimed at advocating for effective methane emissions management, sharing of best practices, and upskilling regional capabilities to ultimately accelerate efforts to reduce methane emissions. The plan is to stage the roundtable sessions twice per year in the next 5 years (up to 2026) with the following potential outcomes:</p> <ul style="list-style-type: none"> • Phase 1: Raise awareness and elevate conversation. • Phase 2: Build community of practitioners/SMEs on methane emissions best practices amongst ASEAN key oil and natural gas players. • Phase 3: Help to inform policy development at respective national and regional level. 	<p>PETRONAS through Malaysia Petroleum Management plans to establish a common standard and tool that outlines the minimum requirements on the approach of methane emissions measurements, quantifications, and reporting by all PACs in Malaysia. This is to 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>Lead methane advocacy in Malaysia as the designated regulator for Upstream operation and lead collaboration efforts on methane advocacy and engagement in ASEAN region.</p> <p>PETRONAS plans to host 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 aims to bring together participants from PETRONAS, PTT, PERTAMINA and key ASEAN oil and gas companies as well as international organisations such as the International Energy Agency (IEA), the World Bank, the UN Environment Programme (UNEP) and the Environment Defense Fund (EDF). The ASEAN energy companies at the Roundtable plans to leverage their strong presence and network to promote capability building and technical knowledge sharing to improve their practices and be transparent about their performance reporting, aligned with internationally recognised frameworks and standards.</p> <p>These activities and engagements are in line with our Net Zero Carbon Emissions aspiration by 2050.</p>

Principle Five: Increase transparency

2021 completed activity	2022 intended activity
<p>PETRONAS is not signatory to OGMP 2.0.</p> <p>PETRONAS has been reporting our GHG emissions publicly since 2009 for both our Scope 1 and Scope 2 emissions. Since 2020, we have enhanced our disclosure in PETRONAS Integrated Report by incorporating disclosure on methane emissions management, including establishment of internal standard and guidance. In 2021, we further enhanced the GHG emissions disclosure to include the breakdown of the GHG emissions by gases (i.e., carbon dioxide, methane, and other GHGs).</p> <p>Methane emissions from main sources (i.e., flaring, venting, combustion, and fugitive emissions) are currently monitored internally. In 2021, PETRONAS has included the requirement for annual reporting of methane emissions in our internal standard. Disclosure is planned upon mature implementation of methane quantification and reporting in the facilities across PETRONAS gas supply chain within our operational control.</p> <p>Since becoming an MGP member in 2020, PETRONAS had published its first report to MGP.</p> <p>Internally, PETRONAS introduced references to industry best practises from MGP and OGMP 2.0 in internal governance and guidance documents.</p> <p>As the regulator for the petroleum resources in Malaysia, PETRONAS through Malaysia Petroleum Management has established a common standard called Minimum Environmental Standards that includes the requirement for methane emissions reporting to be complied by all Upstream operators in Malaysia, including for non-MGP members. This gives PETRONAS a better overview of methane emissions by our JV partners.</p>	<p>PETRONAS plans to establish a digital reporting platform for methane emissions covering all 11 sources, where these data will go into the overall GHG data. This digital platform is aimed at strengthening accuracy and credibility of methane data compilation. It will also enable analysis for methane emissions to identify sources within PETRONAS facilities that contribute to methane emissions.</p> <p>Furthermore, PETRONAS is implementing methane quantification throughout its Upstream and Mid-stream facilities to enhance the quality of our methane emissions data.</p>



Methane Emissions

<p>Do you report absolute methane emissions within your sustainability report? <i>If so, provide link.</i></p>	<p>Yes / No <u>PETRONAS Integrated Report and Financial Report 2021</u> (page 177 & 218)</p>
<p>Do you report a methane intensity within your sustainability report? <i>If so, provide link.</i></p>	<p>Yes / No</p>
<p>What are your organisation's total absolute methane emissions? Provide a figure in tonnes. Provide latest data publicly available.</p>	<p>0.23 million tonnes of methane emission in 2021. <u>PETRONAS Integrated Report and Financial Report 2021</u> (page 177)</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 of OGMP 2.0)</p>
<p>State your reporting boundary.</p>	<p>Upstream and mid stream facilities under operational control in Malaysia and International operations</p>
<p>What are your organisation's methane intensity? 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>
<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>PETRONAS currently do not disclose its methane emissions target</p>