Net Zero Carbon Emissions

Pathway to Net Zero

Focus Areas

The delivery of PETRONAS' Net Zero Carbon Emissions (NZCE) by 2050 Pathway reflects varying national circumstances, including differences in economic development, energy security priorities, infrastructure readiness and social considerations. Progress will depend on a balanced and pragmatic approach, aligned with evolving technical, regulatory and economic conditions.

To advance towards our NZCE by 2050 commitment, we focus on reducing emissions across operations through a combination of improving energy efficiency, minimising flaring and venting, and electrifying assets where viable. Going forward, we intend to complement these efforts with carbon capture and storage (CCS) solutions, as well as investments in nature-based and technology-driven approaches to address residual emissions.

> *We treat sustainability as a core enabler of business execution, guiding how we balance near-term energy demands with disciplined progress on climate, nature and just transition priorities. Guided by our Sustainability Approach, we embed sustainability considerations into investment appraisal, capital allocation, portfolio planning and risk review. This approach allows us to better anticipate long-term risks and opportunities and to make decisions that enhance resilience for the future."*
>
> **Charlotte Wolff-Bye**
> *Vice President and Group Chief Sustainability Officer*

Zero Routine Flaring and Venting

Flaring and venting reduction is driven through targeted operational improvements across upstream assets. Flare gas recovery systems capture and reuse gas that would otherwise be lost, while increased compressor capacity improves gas handling and reduces the need for flaring. Conversion of vented gas into flared and recoverable streams further limits methane emissions. These measures collectively reduce carbon and methane emissions from upstream operations.

Energy Efficiency

Energy efficiency improvements strengthen operational performance across our assets. Initiatives include optimising plant operations, applying digital solutions and enhancing process and equipment efficiency, including heat recovery and performance optimisation, enabling greater output with lower energy consumption.

Electrification

Electrification reduces emissions from on-site combustion by replacing fossil fuel-based energy with lower-carbon electricity where feasible. This involves asset modifications, supporting infrastructure development and the integration of renewable energy sources to power operational activities.

Carbon Capture and Storage

CCS solutions address emissions that cannot be eliminated through operational improvements alone. Carbon dioxide from selected high-emission assets is captured and stored securely in geological formations, supported by subsurface expertise, existing infrastructure and partnerships across the CCS value chain.

For a detailed breakdown of our Net Zero Carbon Emissions by 2050 Pathway and progress, refer to pages 97 to 113.

Net Zero Carbon Emissions

Pathway to Net Zero

Zero Routine Flaring and Venting

Lowering Flare Emissions through Acid Gas Removal Unit Optimisation

PETRONAS implemented an Acid Gas Removal Unit (AGRU) optimisation initiative across selected Upstream fields in Peninsular Malaysia to reduce flaring by optimising existing operating conditions, increasing carbon dioxide (CO_2) export, minimising hydrocarbon losses to permeate flaring while maintaining gas quality and supply reliability. Operational trials confirmed that normal AGRU operations, even during high-CO_2 conditions, delivered optimal emissions and production outcomes. The initiative achieved an estimated annual emissions reduction of approximately 0.16 million tonnes of carbon dioxide equivalent ($MtCO_2e$), alongside lower hydrocarbon losses and incremental gas sales, demonstrating the value of targeted optimisation of existing assets in supporting PETRONAS' NZCE by 2050 commitment.

Electrification

Electrifying Operations to Lower Direct Emissions

PETRONAS Dagangan Berhad (PDB) strengthened its decarbonisation efforts through the continued rollout of solar power across its retail network. During the year, 121 PETRONAS stations were newly solarised, bringing the cumulative total to 303 sites nationwide. This represents a strong uplift in new installations compared to the previous year, underpinned by improved planning and increased execution momentum.

Looking ahead, PDB remains on track to further scale solar adoption, with a target of more than 450 solarised stations by 2030. This initiative supports the reduction of operational emissions while advancing the transition towards cleaner, more energy-efficient retail operations across the network.

Energy Efficiency

Strengthening Energy Efficiency Across Assets

Structured Energy Trending and Performance Assessment for Combustion Engine (SETPACE), an in-house digital tool developed by the Upstream business, enables a structured and data-driven approach to reducing combustion-related emissions. SETPACE was initially piloted by PETRONAS Carigali across three sites in 2022 and subsequently replicated both domestically and internationally following strong results. By 2023, it was integrated into fuel gas forecasting processes across all PETRONAS Carigali-operated sites, resulting in an estimated reduction of approximately 1.21 $MtCO_2e$ in greenhouse gas emissions in 2024.

Additionally, SETPACE achieved a 9 per cent reduction in energy intensity across 38 PETRONAS Carigali-operated facilities from a 2021 baseline, delivering energy savings of approximately 1,680,000 gigajoules (GJ) through identified reduction opportunities. This is equivalent to powering approximately 178,000 Malaysian households for one year, based on an average annual electricity consumption of about 2,620 kilowatt-hours (kWh) per household. These efforts were further expanded, enabling replication of the solution across three additional non-operated fields.

For further information on PETRONAS' efforts to achieve NZCE by 2050 targets, please refer to Delivering Net Zero, Metrics and Targets on page 102.

2025 Performance Metrics

We track emissions performance across operational control and equity share boundaries to support delivery of PETRONAS' NZCE by 2050 Pathway targets. This enables consistent oversight of our long-term climate actions and informs portfolio and capital allocation decisions, ensuring continued alignment with our Energy Transition Strategy and net zero commitment.

Progress is driven through four priority abatement levers that focus on reducing operational emissions while enhancing portfolio resilience. These levers emphasise practical and scalable actions across our assets to lower greenhouse gas emissions and support steady advancement towards NZCE by 2050.

OC *Operational Control* ES *Equity Share* ✓ *Achieved*

		2025 Performance
Short-term Targets (2024-2025)		
GHG emissions from Malaysia operations ✓	**49.50** **million tonnes CO_2e** cap for Malaysia operations	OC **47.46** **million tonnes CO_2e**
Methane emissions – PETRONAS Group-wide natural gas value chain ✓	**50 per cent** reduction by 2025 against 2019 baseline	OC **80 per cent** reduction (target exceeded)
Medium-term Targets (2030)		
GHG emissions from PETRONAS Group-wide	**25 per cent** reduction by 2030 against 2019 baseline	ES **4 per cent**
Methane emissions – Malaysia's natural gas value chain ✓	**50 per cent** reduction by 2030 against 2019 baseline	OC **80 per cent** reduction (target exceeded)
Methane emissions – PETRONAS Group-wide natural gas value chain ✓	**70 per cent** reduction by 2030 against 2019 baseline	OC **80 per cent** reduction (target exceeded)
Long-term Target (2050)		
Net zero carbon emissions by 2050 ES		

The short-term target of capping GHG emissions at 49.5 million tonnes CO_2e by 2024 excludes Maritime, Corporate and Others, as more than 90 per cent of GHG emissions are contributed by activities within Upstream, Gas and Downstream Malaysia operations.

2024 and 2025

Short-term Targets - Achieved

In the short term, we focused on stabilising emissions from our existing portfolio, especially in Malaysia, and establishing a credible starting point for our NZCE by 2050 Pathway. Having met these milestones, we now focus on deepening abatement efforts in the medium-term and aligning long-lived assets with outcomes to meet our NZCE by 2050 target.

2030

Medium-term Targets - Progressing

In the medium term, we will focus on delivering sustained reductions in line with our 2030 GHG targets. This includes improving emissions performance across PETRONAS Group-wide operations, advancing methane emissions reduction across the natural gas value chain and aligning asset and operational decisions with measurable decarbonisation outcomes.

2050

Long-term Target

NET ZERO 2050

Looking towards 2050, our NZCE target guides portfolio shaping, asset management and capital decisions to ensure PETRONAS remains resilient and relevant in a lower-carbon energy system while continuing to deliver reliable and affordable energy.

Advancing Sustainable Value Across Our Operations

In addition to our NZCE by 2050 efforts, we address a broader set of sustainability material topics that shape our long-term resilience and value creation. The Sustainability Performance section of this report presents key highlights of each material topic detailing our approach, key challenges, opportunities, mitigation actions and outlook.