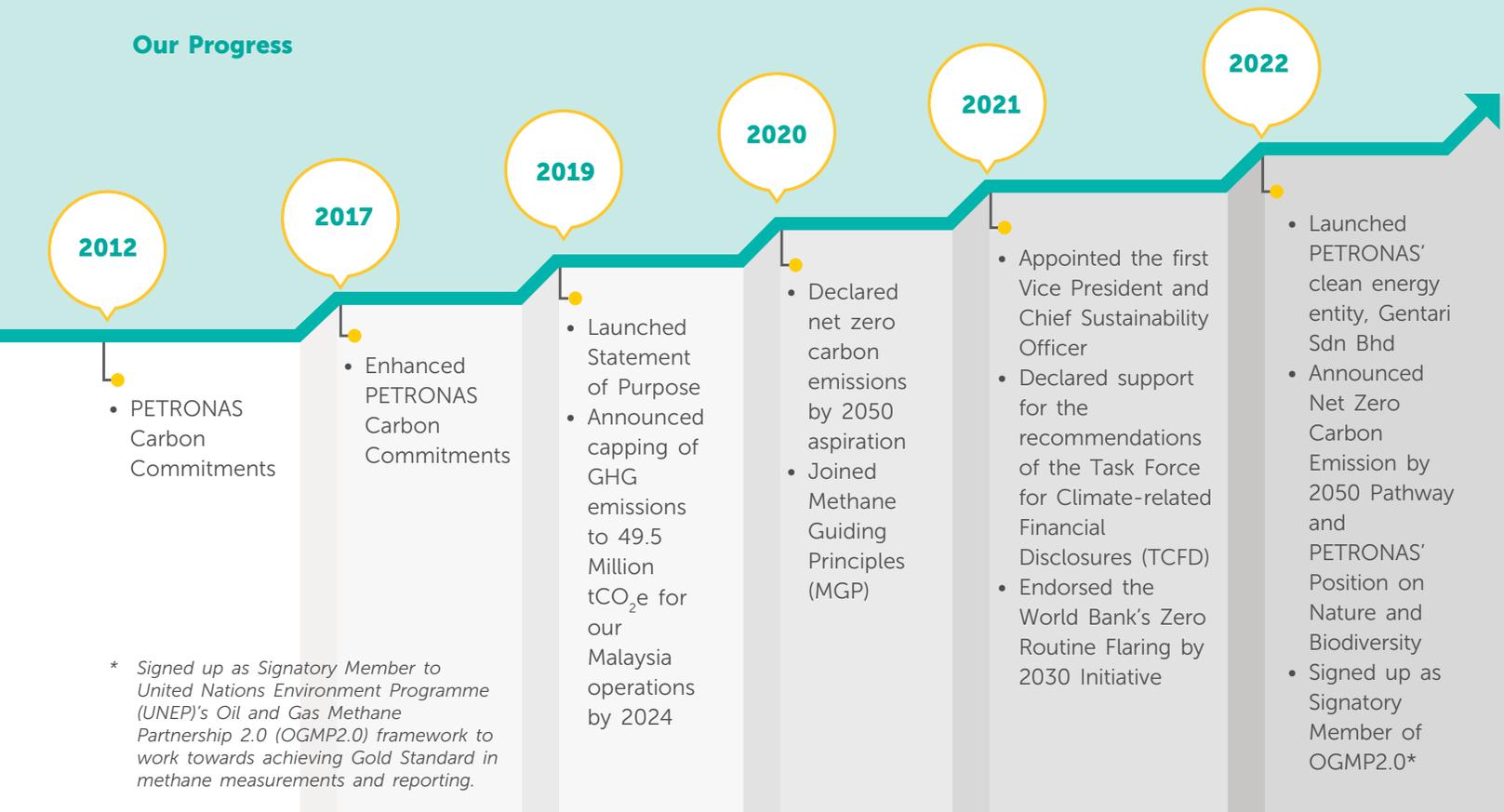


Sustainability Statement

We have a deep-rooted commitment to sustainability as it is an essential part of our business. We firmly believe in responsible practices that create positive impacts on societies and economies. According to the Intergovernmental Panel on Climate Change (IPCC)'s Sixth Assessment Report (AR6), the global community must urgently reduce total greenhouse gas (GHG) emissions by 43 per cent by 2030 to mitigate the worst effects of climate change and secure a better future for all. In 2012, we introduced the PETRONAS Carbon Commitments and over the past decade, we have been working tirelessly to reduce our emissions. As Malaysia's custodian of hydrocarbon resources, we remain steadfast in supporting Malaysia's long-term aspirations and Nationally Determined Contribution to the Paris Agreement.

Our Progress



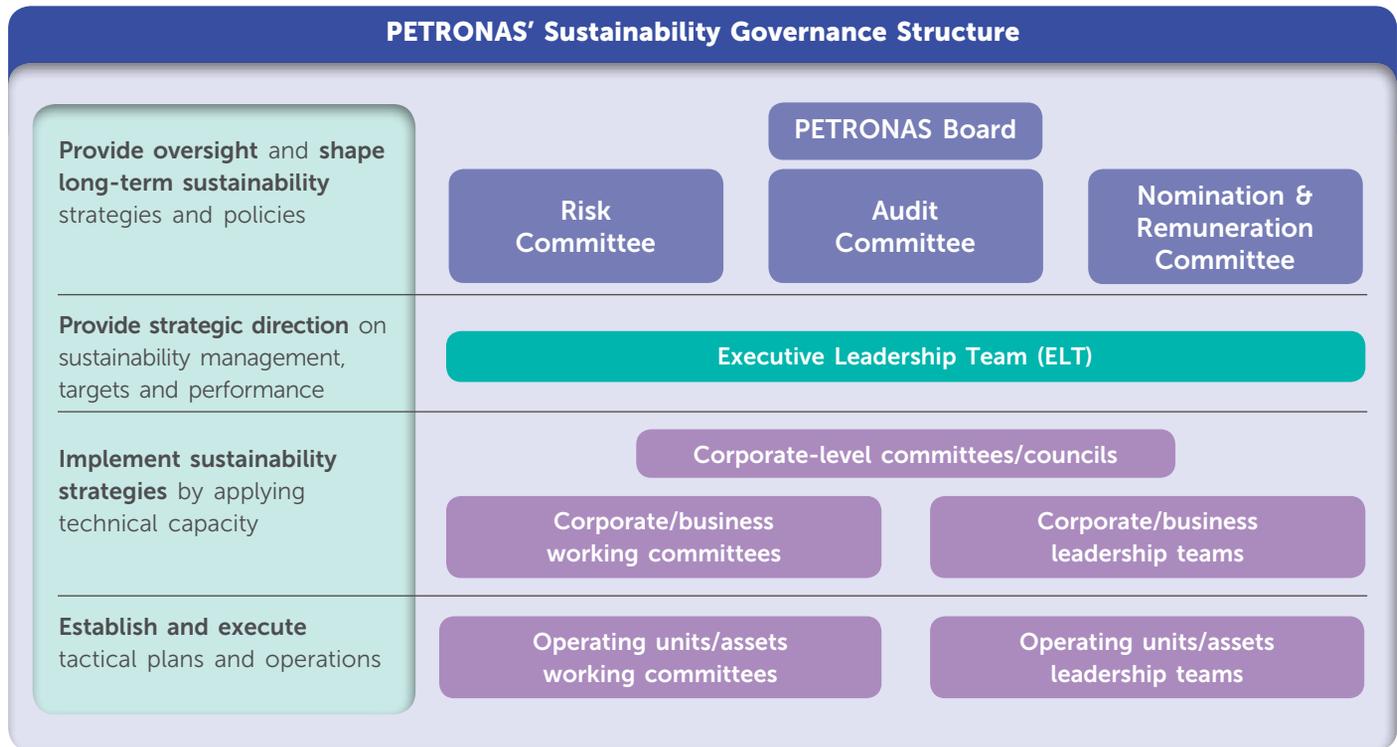
Sustainability at PETRONAS

Sustainability Governance

Our commitment to sustainability starts at the core of our operations and extends throughout our value chain. We understand that countries face an energy trilemma, with security, affordability and sustainability concerns that require a unique spectrum of solutions. Therefore, a collective approach among governments, energy players, public and private sectors is necessary. By working together, we can leverage each other's strengths to achieve a sustainable, low-carbon future in a just and responsible manner.

To ensure accountability and integrity, we have established a dedicated governance structure with clear reporting lines that drives our sustainability strategies, action plans, and initiatives. This structure ensures that our sustainability principles and priorities are fully integrated across the organisation, embedded in decision-making and execution of our sustainability-related matters. With this structure, we delineate roles and responsibilities clearly, enabling effective oversight, decision-making and efficient execution.

Sustainability Statement



Board Oversight

Our board has been taking an active role in climate-related matters discussion. We recognise that climate change is a critical business issue, contributing to a set of risks and opportunities. We are taking more deliberate actions to elevate sustainability, especially climate-related discussions at the Board, to shape the long-term strategic direction of the company.



Key activities undertaken by the Board, prepared by the Executive Leadership Team (ELT) on climate related matters in 2022 were:

- The Risk Committee reviewed the PETRONAS Corporate Risk Profile with consideration of climate-related risks and mitigation actions on a quarterly basis. The full Board approved the subsequent PETRONAS Corporate Risk Profile.
- Approved the Pathway and aligned it to the annual business plan and budget cycle.
- Approved PETRONAS Position on Nature and Biodiversity and Nature-based Climate Solutions strategy in support of the Pathway.
- Approved the long-term incentive plan for senior leadership that includes a performance measure linked to the delivery of the Pathway. In 2022, 20 per cent of the long-term incentive plan constituted sustainability elements, including net carbon intensity (NCI) as well as diversity and inclusion (D&I).
- Approved the formation of Gentari Sdn Bhd, an independent entity focused on providing clean energy solutions.
- Quarterly conversation series with global experts on climate-related topics which include TCFD, human rights and just transition.

Sustainability Statement

Management Oversight

The ELT sets the enterprise-level strategic direction with the aim to align organisational purpose, strategy and business models in support of our Statement of Purpose “A progressive energy and solutions partner enriching lives for a sustainable future”.

In 2022, the ELT prepared all climate-related deliberations that were presented for Board approval, as listed in the section above. In addition, to keep up to date with latest policy developments the ELT specifically discussed the outcomes of the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC).

Management-level corporate committees supported the ELT in the formulation of strategy relating to climate change and other sustainability themes, as well as in driving systemic change and ensuring operationalisation throughout the organisation. Key corporate committees include:



For more details on PETRONAS Risk Management Committee roles, please refer to the Risks Linked to Creating Value section on page 86

Memberships and Associations

As we move forward in supporting the global agenda, we believe that building relationships through trust and respect is crucial. We continuously explore and actively participate in professional associations, events, and memberships to strengthen our sustainability efforts, aligned with our strategic direction and Net Zero Carbon Emissions by 2050 (NZCE 2050) Pathway. Through our participation and engagements, we are able to better understand the concerns that need to be addressed and identify ways in which we could do to help. Our aim is to contribute to the nation-building of Malaysia and create a positive impact across industries and society.

In 2022, we further demonstrated our commitment to the industry through three additional involvements. We became a member of the Energy Transitions Commission where we aim to strengthen our leadership role in championing the energy transition agenda in Malaysia as well as in the ASEAN region.

We also affirmed our methane commitments by joining United Nation's Environment Programme (UNEP) Oil and Gas Methane Partnership 2.0 (OGMP2.0) Framework. It is a comprehensive, measurement-based reporting framework that improves the accuracy and transparency of methane emissions reporting in the energy sector.

We also joined the International Renewable Energy Agency (IRENA)'s Alliance for Industry Decarbonisation alongside other global companies across industrial sectors. The Alliance aims to contribute to the achievement of country-specific net-zero goals, foster action for decarbonisation of industrial value chains and enhance understanding of renewables-based solutions and their adoption by industry.

Further details on Memberships and Associations can be referred to on our website <https://www.petronas.com/sustainability/our-approach-to-sustainability>.

Safeguard the Environment

Aligned to:



We continue to accelerate our climate actions to realise our Net Zero Carbon Emissions by 2050 (NZCE 2050) Pathway. Throughout 2022, we ramped-up our efforts to advance our performance. With a resolute focus on driving progress, we will continue bridging the emissions gap and work with stakeholders to embrace the changes on the path to net zero.

Climate Change and Greenhouse Gas (GHG) Emissions

Why Is It Important?

Climate science plays a significant role in driving the transition to renewable energy sources and low-carbon technologies. As awareness of the need to mitigate climate change grows, there is increasing demand for cleaner, sustainable energy. This shift creates both risks and opportunities for PETRONAS.

We risk being left behind as the world transitions to a low-carbon economy, leading to stranded assets, lost revenue streams and reputational damage. However, we see opportunity to lead in the energy transition, leveraging our legacy, expertise and resources to develop greener technologies and business models.

What Is Our Approach?

PETRONAS is dedicated to our role as custodian of Malaysia's hydrocarbon resources and to meet customer energy demands, while contributing towards the climate ambitions of the Paris Agreement. Our NZCE 2050 Pathway was launched in November 2022, outlining the actions needed to achieve our net-zero ambitions. The

development of the NZCE 2050 Pathway was informed by our business context, national policies, international frameworks, and scientific consensus on climate change.

In driving a focused delivery of the NZCE 2050 Pathway, 20 per cent of total capital expenditure will be allocated for decarbonisation projects and expansion into cleaner energy solutions from 2022 to 2026. We will also track our GHG emissions to ensure we are on the right trajectory to meet the targets.

We aspire to proactively strengthen transparency in reporting while shaping the national climate-related risk disclosure practice in Malaysia. We have commenced to apply the framework recommendations put forward by the Task Force on Climate-related Financial Disclosures (TCFD) to our assessment of climate risk. By aligning our strategic assessment of risk with TCFD, we strive to effectively manage and capitalise on climate-related risks and opportunities and accelerate progress towards our path to net zero.

1 Governance

We recognise that climate change is a critical business issue, contributing to a set of risks and opportunities. We are taking more deliberate actions to elevate sustainability, especially climate-related discussions at the Board, to shape the long-term strategic direction of the company.

[The role of the Board in climate-related matters can be referred to in the Sustainability Statement section on page 155]

2 Addressing Climate-Related Risks and Opportunities

In November 2022, we defined our NZCE 2050 to accelerate and advance groupwide actions and commitment. The NZCE 2050 Pathway – with its short-, medium- and long term targets – will steer the group towards realising our ambitions.

The Pathway is two-pronged, reducing operational GHG emissions and increasing investments in business growth opportunities in the low carbon economy. PETRONAS will implement activities through four main decarbonisation levers – zero routine flaring and venting, energy efficiency, electrification and carbon capture and storage (CCS) – to reduce operational emissions as far as possible and offset remaining hard-to-abate emissions with nature-based climate solutions.

Safeguard the Environment

PETRONAS Energy Transition Strategy is Shaped In Response to Expectations of Changes in Customer Demand and Climate Risk Considerations

<p>Core Business >></p>	<ul style="list-style-type: none"> Operate oil and gas in a differentiated manner, with targets in place to produce carbon abated volumes at competitive cost to ensure asset portfolio is resilient to changes in demand. 		
<p>New Business >></p>	<ul style="list-style-type: none"> Capture growth opportunities in renewables and cleaner, less emission-intensive energy solutions, including wind and solar, hydrogen and green mobility. 		
<p>Specialty Chemicals</p> <ul style="list-style-type: none"> Strengthen presence in the specialty chemicals business segment, with an emphasis on strong sustainability attributes. 	<p>Carbon Capture and Storage (CCS)</p> <ul style="list-style-type: none"> Position Malaysia as a leading CCS hub in Asia by offering CCS as a service for high emitting industries around the region. 	<p>Bio-based Value Chain</p> <ul style="list-style-type: none"> Scale up bio-based products and offerings to meet changing customer preference. 	<p>Renewable Energy, Hydrogen and Green Mobility</p> <ul style="list-style-type: none"> Establish Gentari as our clean energy solutions arm with strong growth portfolio in renewables, hydrogen and green mobility.
<p>Net Zero Carbon Emissions (Operational Levers) >></p>	<ul style="list-style-type: none"> Ongoing emissions reduction of our portfolio delivered through key abatement levers, based on their abatement potential and doability to ensure a credible Pathway to Net Zero Carbon Emissions by 2050. 		
<p>Zero Routine Flaring and Venting</p> <ul style="list-style-type: none"> Flare gas recovery projects, improved compressor capacity, vent-to-flare conversion and vent recovery projects. Delivery in support of the World Bank's Zero Routine Flaring by 2030 Initiative. Pledged to avoid routine flaring in new oil field developments and end routine flaring at existing oil production sites by 2030. 	<p>Energy Efficiency</p> <ul style="list-style-type: none"> Digital solutions and process equipment advancement to uplift process optimisation initiatives, by optimising gas turbine operations, superior heat transfer, furnace, and boiler efficiency. 	<p>Electrification</p> <ul style="list-style-type: none"> Renewable energy infrastructure to power our operations and processes, which include fuel gas replacement with electricity, where feasible. 	<p>Carbon Capture and Storage (CCS)</p> <ul style="list-style-type: none"> CCS solutions delivered through technology partnerships.

[Details of Risks and Opportunities Quantification on Financial Performance can be referred on page 165]

3 Climate-Related Risks and Opportunities

Risk management accountability and oversight is an integral part of our governance including Climate Change governance. The Board reviews and considers our principal risks in the PETRONAS Corporate Risk Profile, covering operational and strategic risks based on periodic updates. The updates include an overview of the principal risks, a summary of material changes, as well as updates on mitigations and performance against key indicators. The Risk Management Committee, Executive Leadership Team (ELT) and Risk Committee assist the Board with the oversight of risk management including environmental, social, and governance (ESG) and climate-related risk management.

[Further details on risk governance can be referred to in the Risks Linked to Creating Values section on page 86]

We apply a groupwide approach to the management of risk through the establishment of the PETRONAS Risk Policy and complemented by the PETRONAS Resiliency Model, which the Enterprise Risk Management (ERM) Framework is part of. These policies and frameworks provide an integrated and holistic view of the overall strategy towards effective risk management.

[Details of PETRONAS Resiliency Model can be referred to in the Risks Linked to Creating Value section on page 87]

Our ERM includes requirements and guidance on the tools and processes involved to systematically identify, assess, evaluate, manage, report and monitor all types of risks. The ERM process requires a thorough assessment of entities and functional risks, including climate-related risks. It also includes an impact and likelihood assessment, which supports consideration of the relative significance of risks. Principal risks are identified and approved by management as pertinent risks to the entity and requires close monitoring.

[Details of Sustainability Risk and other principal risks can be referred to in the Risks Linked to Creating Value section on page 90]

Recognising the exposure of climate-related risks to our business operations and strategies, the impact of climate change has been taken into consideration and reflected in the development of relevant principal risks such as Sustainability Risks, Financial Liquidity Risk, Market Risk and Legal and Regulatory Risks. We are also strengthening our climate-related risk management efforts and corresponding disclosures to ensure they align with global sustainability frameworks and standards. Our efforts are positioned to align with the TCFD recommendations and the World Economic Forum's Stakeholder Capitalism Metrics.

We have been actively addressing climate change for almost a decade with our Climate Change Position and Framework which is the impetus of our climate change risk assessments that have been conducted since 2015. However, increasing stakeholders' expectations towards energy companies to align the climate risk assessment with global sustainability standards and frameworks has led us to progressively review and enhance our climate-related risk assessment approach.

We have adopted TCFD's categorisation of climate-related risks into two major categories which are transition risks and physical risks.

Safeguard the Environment

Transition Risks

Transition risks refer to potential risks arising from the global shift towards a more sustainable, net-zero economy, which encompasses policy, regulatory, market and technological changes that could impact our business operations.

One of the transition risks identified is the impact of oil and gas pricing or margins, which may reduce commercial returns stemming from the change in consumer preferences, regulatory pressure and/or our approach to sustainability. This in turn may result in diminished revenue, cash generation and returns realisation.

International Energy Agency (IEA) scenarios provide oil and gas prices, which are built on underlying assumptions of socio-economic growth and climate policies and commitments' development. For instance, oil prices are expected to be the lowest in the Net Zero Emissions by 2050 Scenario (NZE), due to reduced demand for oil. This would have a material impact on our upstream business. We also recognise carbon pricing as a means of driving emissions reduction across economic activities. Carbon pricing is used to assess our potential cost impact based on the different climate scenarios.

Furthermore, the energy transition calls for better disclosures and enhanced transparency given the impact of significant climate-related issues or risks to our financials. Our inability to respond at pace will lead to reduced access to capital, inflated capital cost and limited investment types. In addition, a downgrade of our ESG score may lead to higher borrowing costs, which further limits capacity to access capital markets.

Strategic measures to manage the implication of transition risks to our organisation are highlighted in the Our Approach to Climate-related Risks and Opportunities section. These measures are aligned with the mitigations and Key Risks Indicators of the identified principal risks in the PETRONAS Corporate Risk Profile, which are Sustainability Risk, Financial Liquidity Risk, Market Risk, and Legal and Regulatory Risk in the Risks Linked to Creating Value section.

[Further information on actions to address climate-change-related risks by our businesses can be referred to in the Business Review section]

Physical Risks

Physical risks resulting from climate change can be in the form of acute risks due to one-time events or chronic risks due to longer-term changes in climate patterns such as rise in sea levels and average global temperature, water shortages, and intense precipitation. Our physical assets and ongoing projects are exposed to physical risks as we have presence in more than 30 countries globally. Thus, we are not and will not be spared from the direct and indirect damages brought about by the impact of physical climate-related risks.

While actions are ongoing to manage physical risks, we continuously re-assess implications, taking into consideration the changing outlook for geographical locations where we are present. The re-assessment outcome serves as an imperative to strengthen our existing mitigation strategy in ensuring robustness and sustainability of our organisation moving forward.

Taking into account these factors, we will continue to pursue a deliberate energy transition strategy, balancing Core Business and New Business with our NZCE 2050 Pathway aligning with changing customer preferences, evolving regulations and increasing expectations by stakeholders for low-carbon energy solutions.

[Details of PETRONAS Energy Transition Strategy can be referred to on page 102]

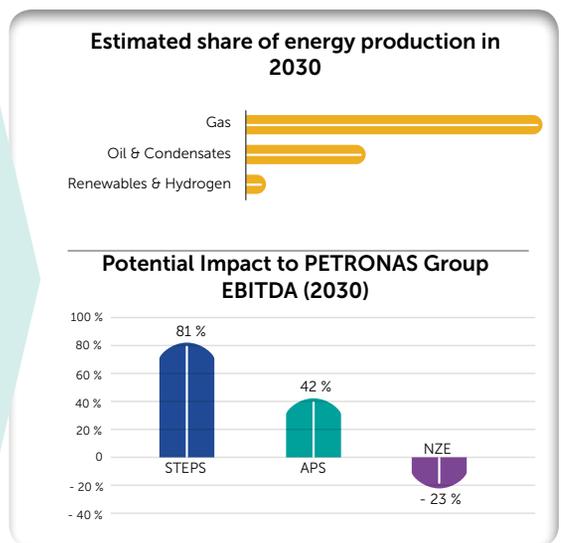
Risks and Opportunities Quantification on Financial Performance

We have identified certain risks and opportunities to our business based on the three International Energy Agency (IEA) scenarios – Stated Policies Scenario (STEPS), Announced Pledges Scenario (APS), and Net Zero Emissions by 2050 Scenario (NZE). The scenarios were chosen based on their breadth that consider the world’s different states based on energy makeup and carbon dioxide emission levels. They present three climate pathways, with temperature rise ranging from below 2°C to 2.7°C by 2100, providing granular and regional data breakdown.

The time horizons used were short term (2024), medium term (2030) and long term (2050). Identified risks relate to how oil, gas and carbon prices will impact PETRONAS Group EBITDA*, based on analysis for Upstream, Gas and Downstream businesses for FY2030. We have identified opportunities in renewable energy, hydrogen and green mobility based on their impact on our EBITDA for the New Energy business for FY2030. The chosen scenarios and the corresponding climate outcomes are summarised as below:

Stated Policies Scenario (STEPS)	Announced Pledges Scenario (APS)	Net Zero Emissions by 2050 Scenario (NZE)
<ul style="list-style-type: none"> Reflects current policy context based on sector-by-sector assessments of specific policies and measures affecting the energy markets that are in place and those that have been announced by governments around the world, as of mid-2021. Includes relevant policy proposals, though implementation measures are yet to be developed to put them into effect. Where policies are time-limited, they are generally assumed to be replaced by measures of similar intensity, but the scenario does not assume future strengthening – or weakening – of future policy action, except where there already is specific evidence to the contrary. 	<ul style="list-style-type: none"> Assumes that all climate commitments made by governments around the world, including Nationally Determined Contributions (NDCs) and longer-term net zero targets, will be met in full and on-time. 	<ul style="list-style-type: none"> Sets out a narrow but achievable pathway for the global energy sector to achieve net zero carbon emissions by 2050, with developed economies reaching net zero emissions in advance of others. Does not rely on emissions reductions from outside the energy sector to achieve its goals. Assumes that non-energy emissions will be reduced with the same proportion as energy emissions. This is consistent with limiting the global temperature rise to 1.5°C without a temperature overshoot (with a 50 per cent probability). Meets key energy-related United Nation’s Sustainable Development Goals, in particular achieving universal energy access by 2030.

- Reduce our Scope 1 emissions (emissions directly associated with our operations) and Scope 2 emissions (includes the energy we buy to run them).
- Establish a centralised Carbon Management Division to drive the decarbonisation of our upstream value chain.
- Manage our carbon storage portfolio for emissions produced by our operations.
- Position Malaysia as a CCS solutions hub in the region.
- Position Gentari as a one-stop clean energy solutions provider. Designed for pace and innovation, Gentari is expected to run independently to deliver our renewables, hydrogen and green mobility aspirations.
- Allocate approximately 20 per cent of our CAPEX for decarbonisation projects and expansion into cleaner energy solutions from 2022 to 2026 to reduce Group emissions and overall carbon intensity.



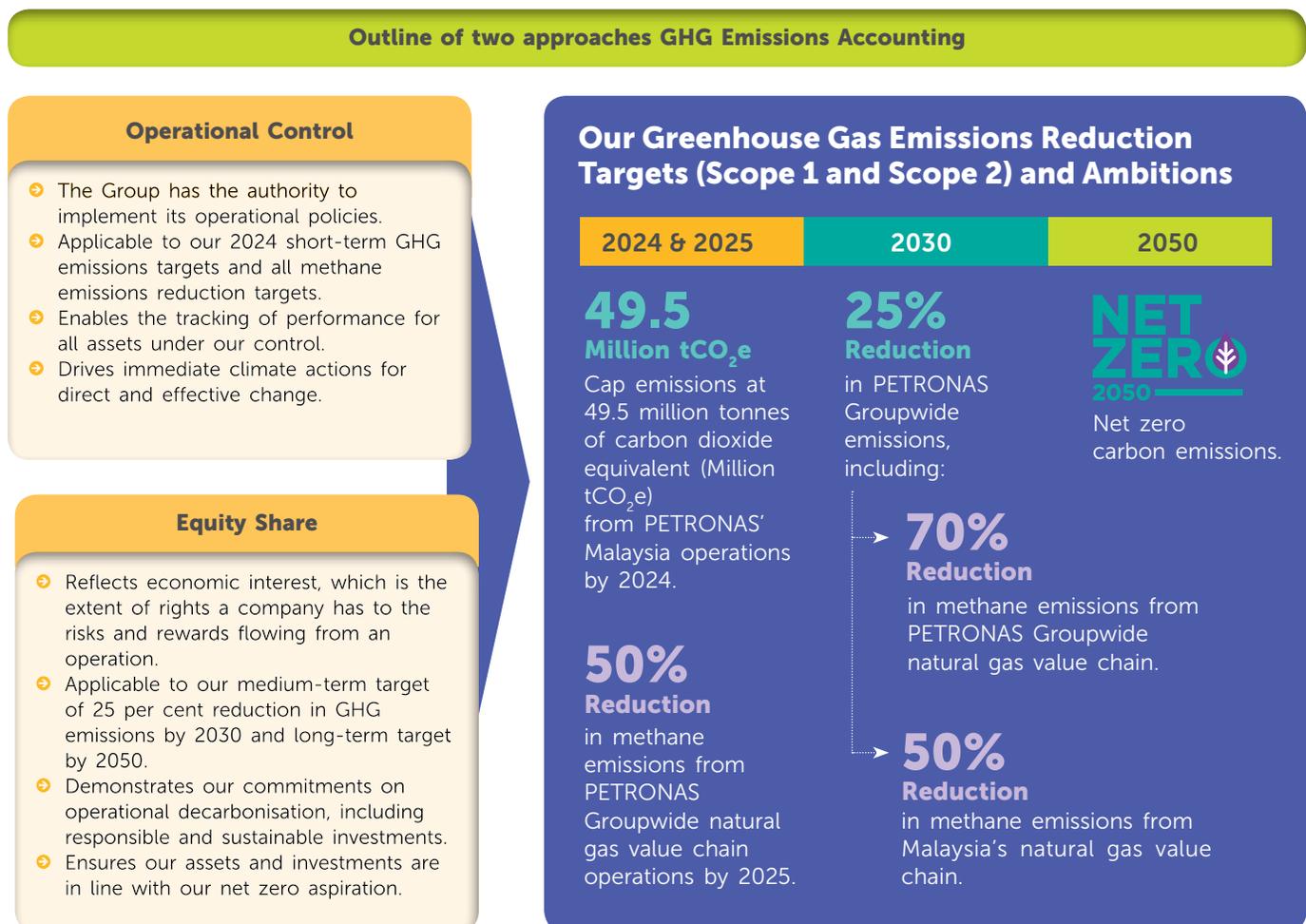
* EBITDA stands for Earnings Before Interest, Taxes, Depreciation, and Amortisation, and is used to evaluate a company’s operating performance.

Safeguard the Environment

4 Metrics and Targets

We have revised our carbon emissions accounting method to adhere to international frameworks and sector specific guidance to give us a robust basis for Scope 1 and Scope 2, and a better understanding of Scope 3 GHG emissions. The financial year 2022 marks the beginning of disclosures of GHG emissions through both operational control and equity share approaches.

In charting our NZCE 2050 Pathway, PETRONAS has adopted the equity share approach to account for our emissions inventory and performance against mid- and long-term milestone targets, with 2019 as the base year.



Our 2024 short-term GHG emissions target and all methane emissions reduction targets are based on the operational control approach. This allows us to track performance of all assets under our control and to drive immediate climate actions for direct and effective change.

The equity share approach will guide our assets and investments to be in line with our Pathway and be reflected in our annual integrated report. This methodology allows for business' long-term energy transition pathway development and portfolio transition tracking.

As a result of our enhanced emissions accounting practices, which includes a change in organisational boundary, we have adjusted our 2019 baseline reference to 54.87 Million tCO₂e via equity share approach.

The Pathway has short-term and mid-term targets focusing on absolute GHG and methane emissions. The short-term target is to cap Scope 1 and Scope 2 emissions to 49.5 Million tCO₂e by 2024 for PETRONAS operated assets in Malaysia.

We have set a mid-term target to reduce 25 per cent GHG emissions for Scope 1 and Scope 2 under equity share approach by the year 2030.

A key area of our net-zero efforts is to reduce methane emissions. Methane is a primary component of natural gas and a more potent GHG than carbon dioxide. Thus, we have specified targets for methane emissions reduction as part of our broader GHG targets.

The target is to reduce methane emission groupwide by 50 per cent by 2025 and by 70 per cent by 2030. Additionally, we are committed to drive down methane emissions beyond PETRONAS' own operations within our industry. To this aim, we have established a 50 per cent methane emissions reduction target for Malaysia's natural gas value chain by 2030. The methane emissions reduction targets will support Malaysia's commitment to the Global Methane Pledge of reducing national methane emissions by 30 per cent by 2030.

Moving forward, PETRONAS is updating internal standards and procedures, and building capabilities in GHG and methane emissions management. Commencing in 2023, PETRONAS will commission third party assurance of Scope 1 and Scope 2 GHG emissions.

Footnote:

CO₂e = carbon dioxide equivalent. This unit converts all other GHGs into the common dominator of CO₂e using Global Warming Potential (GWP) factors following Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (AR4).

Guided by international principles, frameworks and standards

- Greenhouse Gas Protocol Corporate Accounting and Reporting Standard
- Ipieca/API/IOGP Sustainability Reporting Guidance for the Oil and Gas Industry
- Ipieca Climate Change Reporting Framework
- ISO 14064-1:2018; ISO 14064-2:2019; ISO 14064-3:2019
- Methane Guiding Principles
- United Nations Environmental Programme (UNEP) Oil and Gas Methane Partnership 2.0 (OGMP2.0) Reporting Framework
- American Petroleum Institute (API) Compendium of GHG Emissions Methodologies for the Natural Gas and Oil Industry (2021)

Safeguard the Environment

2022 Greenhouse Gas (GHG) Emissions Management

As part of the embedment process and to ensure sustainable GHG management practice across PETRONAS operations, several initiatives were undertaken during 2022:

1 Enhancement of GHG Management System

Following the mainstreaming of GHG Management as part of PETRONAS HSE Mandatory Control Framework (MCF) in January 2022, PETRONAS has conducted four internal assurance activities – second line assurance and internal reviews – based on a risk-based approach. This activity helped to identify key gaps and enablers to improve GHG accounting and reporting.

2 GHG Digital Tools

PETRONAS has improved and automated the quantification of Scope 1 and Scope 2 GHG emissions in Gas business by linking activity data from plant information systems to the calculation tool, eliminating the need for human intervention in the process.

3 GHG Capability

PETRONAS has identified GHG Management as a crucial skill set to be developed as an enabler to realise our NZCE 2050 Pathway. A new discipline has been established under the HSE skill group with a set of competency requirements, recommended trainings and required resources across corporate and business functions.

4 Physical Impacts of Climate Change

A vulnerability assessment was conducted on PETRONAS' assets covering 1,140 locations in Upstream, Gas and Downstream in Malaysia as part of Malaysia's Fourth National Communication Report (NC4) to the United Nations Framework Convention on Climate Change (UNFCCC). Through this assessment populated in a Geographic Information System (GIS) system, climate hazards data such as sea level rise, coastal floods, river floods, droughts and temperature rise were gathered and forecasted up to year 2100 for Peninsular Malaysia, Sabah and Sarawak. This initiative has created value by identifying high risk assets and serves as an input to our adaptation strategy.

PETRONAS also has completed vulnerability assessments in South Africa for Downstream refinery and retail operations. Key climate hazards are floods and storms. A training and upskilling session was conducted for Engen staff to enable them to develop and maintain an adaptation plan.

Accelerating Methane Emissions Management in PETRONAS

We align our methane emissions management with the Methane Guiding Principles (MGP) that prioritise key actions along the natural gas supply chain.

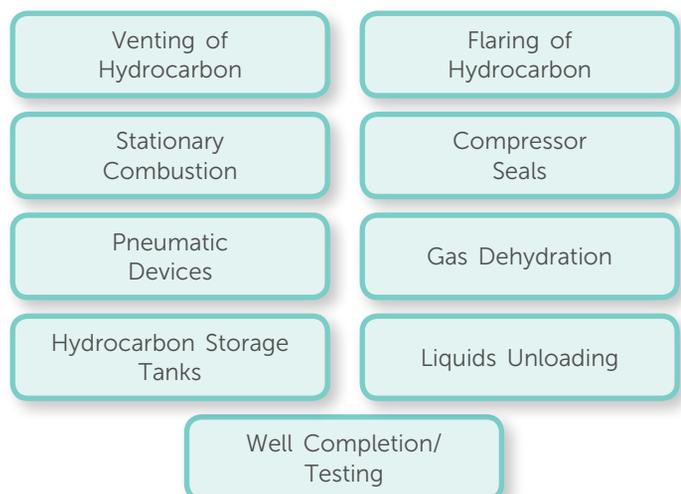
As a signatory member of the Methane Guiding Principles, we commit to advancing robust performance across gas value chains, enhancing the accuracy and quality of methane emissions data, advocating best practices, sound policies, and regulations on methane emissions, capability building and increasing the transparency of methane emissions to better manage them.

In 2022, PETRONAS became a member of the United Nations Environment Programme (UNEP) Oil and Gas Methane Partnership 2.0 (OGMP2.0) Reporting Framework, a multi-stakeholder initiative established by UNEP and the Climate and Clean Air Coalition (CCAC). OGMP2.0 provides a comprehensive, measurement-based reporting framework that improves the accuracy and transparency of methane emissions reporting in the energy sector.

1 Advancing Techniques for Methane Measurement

Acknowledging the importance of reporting accurate methane emissions to facilitate effective reduction, PETRONAS is improving our quantification beyond the main emissions sources of flaring, venting and combustion. Rigorous efforts were made throughout 2022 to improve methane data accuracy for PETRONAS' natural gas value chain covering 11 common sources below:

Intended Releases:



Methane quantification was based on best available operational data guided by internal and international standards from Oil and Gas Methane Partnership 2.0 (OGMP2.0) and Oil and Gas Climate Initiative (OGCI). Additionally, PETRONAS' Group Technical Solutions department have developed a quantification tool using location specific operational data and emission factors from the American Petroleum Institute (API) Compendium to perform the detailed quantification of methane emissions covering 11 common methane emissions sources.

Major methane sources i.e., flaring and venting, were measured using direct measurements (flowmeters) or quantified using detailed engineering calculations based on specific process parameters. For the remaining methane sources, improvements were made to the quantification by inventorying the equipment and components. Methane emissions were then estimated by multiplying the respective emission factors according to the equipment type with the number of equipment of the same type.

We are improving quantification of fugitive emissions by moving away from an estimation approach using production values, to a more detailed quantification method at component level, or using actual leak survey data where available. This method provides a better understanding of methane emissions from each source. A key finding was that quantified fugitive methane emissions using granular data were lower than calculated estimates. We also have a better understanding of our emissions from compressor seals and pneumatic devices, which were never quantified previously.

➤ **80 per cent to 90 per cent** of our methane emissions along the natural gas value chain can be attributed to hydrocarbon venting, flaring and gas-driven pneumatic devices. We prioritise our mitigation measures to these areas through our current GHG emissions reduction projects.

2 Advocating for Methane Management to Partners

As the regulatory body overseeing Upstream operations in Malaysia and collaborating with partners across the ASEAN region, PETRONAS has initiated methane advocacy efforts nationally as well as internationally with the aim to increase awareness among our partners to effectively manage methane emissions. Through Malaysia Petroleum Management (MPM), PETRONAS rolled out the Exploration and Production Minimum Environmental Specification (MES) that outlines the requirements on methane emissions measurements, quantifications, and reporting by all upstream operators that are operating in Malaysia. Adhering to these standards ensures that reported methane emissions are accurate and consistent, thereby driving efforts towards reduction.

The ASEAN Energy Sector Methane Roundtable

Hosted by PETRONAS and supported by Thailand's PTT Public Company Limited (PTT) and Indonesia's Pertamina.

Objective:

To set a networking platform among the oil and gas players in Southeast Asia to advocate and promote effective methane emissions management.

Outcome:

- Attended by participants from ASEAN national oil companies, several energy companies, as well as international, multilateral and non-governmental organisations such as the International Energy Agency (IEA), World Bank, United Nations Environment Programme (UNEP) and the Environmental Defense Fund (EDF).
- Strong network presence at the roundtables set the foundation for promoting capability building and technical knowledge sharing, improving methane emissions management practices and transparency in performance reporting, aligned with internationally recognised frameworks and standards.

Safeguard the Environment

USAID Workshop on Innovative Technologies 2022

Conducted in collaboration with USAID Smart Power Programme (SPP), ASEAN Centre for Energy (ACE), PTT Exploration and Production (PTTEP) and Asia Natural Gas and Energy Association.

Objective:

To identify and measure oil and gas sector methane emissions in Southeast Asia.

Outcome:

- 👉 Attended by participants from ASEAN oil and gas operators, EDF, United States Environmental Protection Agency (US EPA) and methane emissions management technology providers.

3 Accelerating Competency for Methane Management

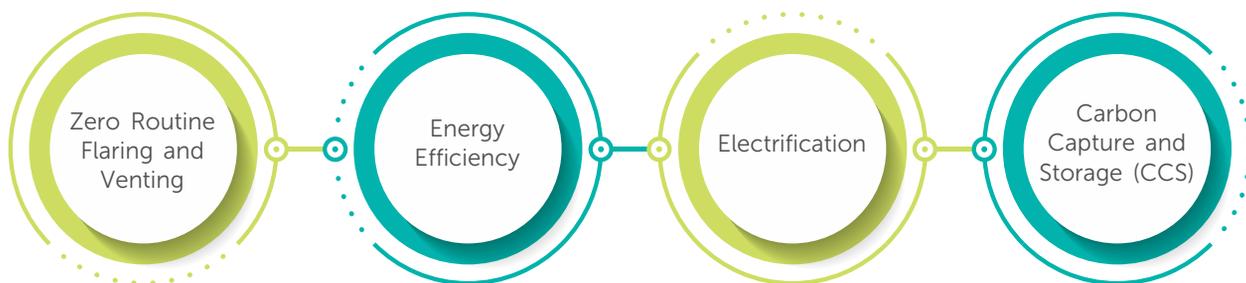
Since 2020, we have increased our efforts to raise awareness, build skills, and take action to reduce methane emissions throughout our operations. We conducted training sessions to improve employee knowledge on methane management and put into practice internal standards. These standards were aligned with industry expectations and guidance on managing methane emissions.

In addition, we developed e-learning modules on methane management to promote self-learning and increase awareness on achieving methane reduction targets.

In 2022, PETRONAS conducted five upskilling sessions on methane emissions management for 84 internal practitioners aimed at strengthening their understanding in support of operationalising our internal standards, aligning to industry expectations and guidance on methane emissions management. In addition, methane e-learning was also developed to create an avenue of self-development that could accelerate awareness on methane emissions management.

Harnessing the Power of Technology to Aid GHG Emissions Reduction

PETRONAS is continuously finding opportunities to reduce its carbon emissions to meet our NZCE 2050 Pathway through various climate actions. In 2022, we achieved GHG emissions reductions of 0.6 Million tCO₂e and cumulatively since 2013, we have reduced 18.1 Million tCO₂e of GHG emissions from our operations. PETRONAS has classified its operational emissions reduction efforts into four decarbonisation levers as follows:



In 2022, PETRONAS completed 44 projects and initiatives mainly covering zero routine flaring and venting reductions, energy efficiency, and electrification categories as follows:

1 Zero Routine Flaring and Venting

PETRONAS had conducted three flare reduction and one vent reduction projects in Upstream Business in Malaysia where 0.18 Million tCO₂e was reduced in 2022. The projects were conducted using technologies that recover the hydrocarbon gas and monetise it.

- Three Flare Reduction: Kinabalu (0.003 Million tCO₂e), Bintulu Integrated Facilities (0.09 Million tCO₂e), Sabah Oil and Gas Terminal (0.05 Million tCO₂e); and
- One Vent Reduction: Dulang (0.04 Million tCO₂e)

2 Energy Efficiency

40 energy efficiency and optimisation efforts throughout PETRONAS have also reduced 0.44 Million tCO₂e in 2022.

- Upstream: Three projects and 0.09 Million tCO₂e
- Gas: 15 projects and 0.19 Million tCO₂e
- Downstream: 22 projects and 0.16 Million tCO₂e

3 Electrification

The intent of electrification is to either increase efficiency or to switch to an electric source with a lower GHG emission factor compared to the existing practice. In 2022, Malaysia LNG Sdn Bhd signed a Power Purchase Agreement with Syarikat SESCO Bhd, a subsidiary of Sarawak Energy, for 90MW of hydroelectric power import to PLC in Bintulu. This will result in about 40 per cent of PLC to be powered by renewable energy and reduce Scope 1 GHG emissions.

4 Carbon Capture and Storage (CCS)

CCS efforts in PETRONAS are driven by the need to develop high carbon dioxide (CO₂) gas fields. PETRONAS has been conducting research and development (R&D) on various capture technologies and patented a single and multi-stage membrane technology for onshore and offshore application in the past years. PETRONAS has also identified potential storage sites in offshore Malaysia. This has become an enabler to the development of CCS projects in PETRONAS.

Upstream business has embarked on a CCS project in the Kasawari gas field in offshore Sarawak to reinject the inherent CO₂ from the gas reservoir into a neighbouring depleted oil and gas field. The CCS facility is expected to be in operation in stages starting from 2024 (Phase 1), with first injection in 2026 (Phase 2).

When operations are in full swing, the Kasawari project can potentially store 3.3 Million tonnes of CO₂ per annum in a depleted reservoir making it the largest offshore CCS project in the world.

In 2022, PETRONAS signed several Memoranda of Understanding (MoUs) on CCS to partner and explore opportunities across the CCS value chain. Moving forward PETRONAS is also looking into building a CCS hub and becoming a leader in the CCS business within the region.

Methane Emissions Management

PETRONAS continues to explore the optimal top-down methane measurement via various MoUs to assess emerging technologies. Among the technologies tested in 2022 were satellite and drone to measure methane emissions from onshore and nearshore facilities. Based on the evaluations, suitable top-down measurement technology will be selected to enable reconciliation with bottom-up measurement and meet OGMP2.0 Gold Standard expectations.

We tested satellite technology to measure methane emissions where the results showed no emissions above the detection threshold of 100kg/hr at PETRONAS sites.

PETRONAS is pursuing another remote sensing technology through strategic collaborations with a local drone service provider to test methane sensors on drones (multi-rotor type) at selected sites i.e. gas transmission assets, refineries and regasification terminals.

PETRONAS also entered into a collaboration to test a technology that enables continuous monitoring of methane emissions from the assets through visualisation as well as measurement capabilities.

Striving Towards GHG Emissions Reduction Targets

As a result of our enhanced emissions accounting practices, which includes a change in organisational boundary, we have adjusted our 2019 baseline reference to 54.87 Million tCO₂e (previously calculated 57.73 Million tCO₂e) via equity share approach.

PETRONAS' short-term GHG emission target is to cap Scope 1 and Scope 2 operational emissions to 49.5 Million tCO₂e by 2024 for PETRONAS operated assets in Malaysia. In 2022, operational emissions in Malaysia amounted to 46.11 Million tCO₂e (2021: 44.12 Million tCO₂e).

In 2022, we achieved 0.6 Million tCO₂e GHG emissions reduction from projects and cumulatively since 2013, we have reduced 18.1 Million tCO₂e of GHG emissions from the implementation of decarbonisation activities for PETRONAS Groupwide assets under operational control.

Safeguard the Environment

The mid-term target for 2030 is to reduce 25 per cent of PETRONAS' Groupwide Scope 1 and Scope 2 GHG emissions under equity share approach, compared to the base year of 2019. To date, the reduction amounts to 8.49 per cent, delivered through projects addressing flaring and venting reduction and energy efficiency.

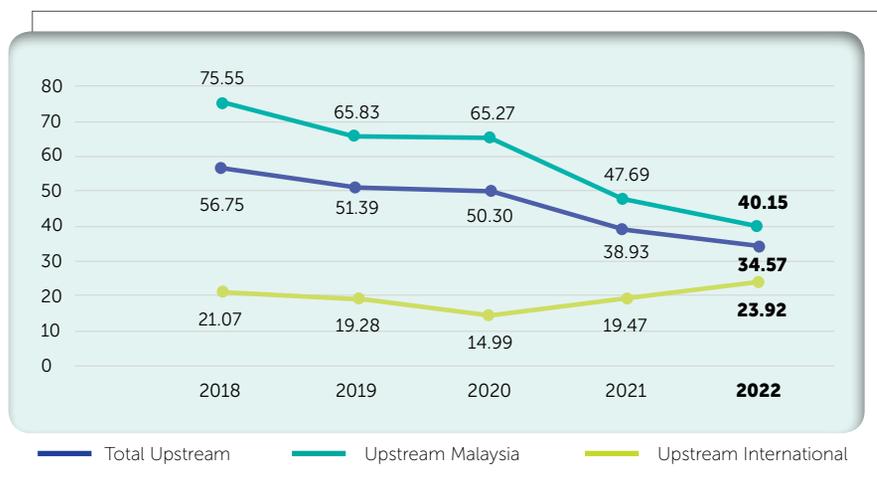
Our short-term methane target is to reduce 50 per cent of methane emissions from our natural gas value chain operations by 2025 compared to 2019. In 2022, we reduced absolute methane emissions by 49.88 per cent from 2019 levels, with Upstream flaring and venting reduction efforts playing a significant role. These efforts included setting flaring and venting targets, operational campaigns, and implementing capital expenditure projects. We plan to further reduce our methane footprint through continued reduction efforts and improved quantification accuracy.

Special Highlights

PETRONAS' commitment to the World Bank's Zero Routine Flaring by 2030 (ZRF) Initiative and UNEP's OGMP2.0 can be presented using the three key metrics below – Upstream GHG intensity, share of methane in total GHG emissions and reduction of hydrocarbon venting.

1 Upstream GHG Intensity Reduction

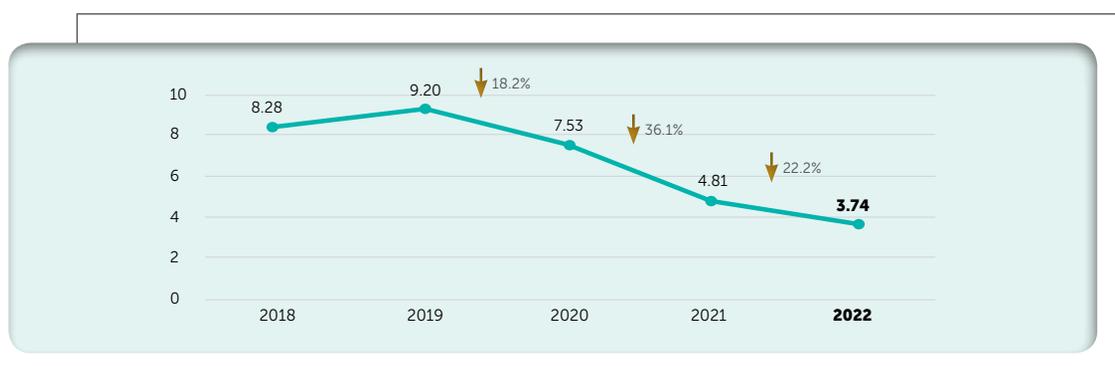
Upstream GHG Emissions Intensity under Operational Control Approach (tCO₂e/kboe)



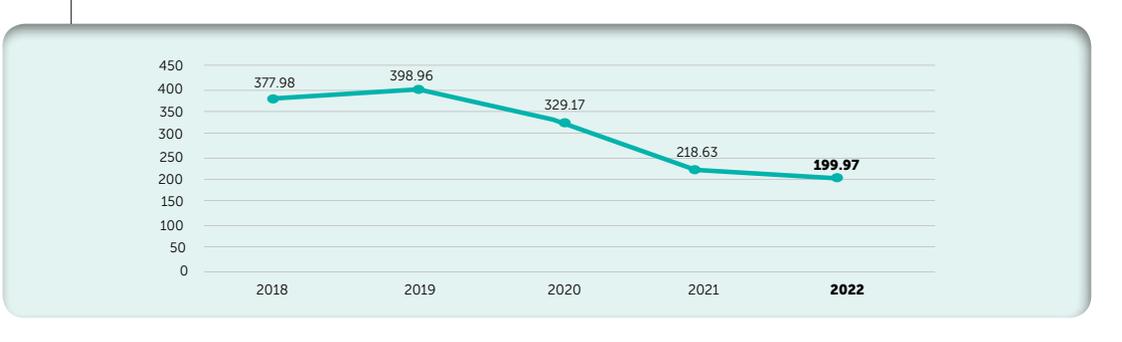
Upstream GHG intensity for total upstream operations has reduced by 32.73 per cent from 2019 driven by zero continuous flaring and venting requirement in PETRONAS Carbon Commitments.

2 Reduction of GHG Emissions Including Methane Through Venting Reduction Efforts

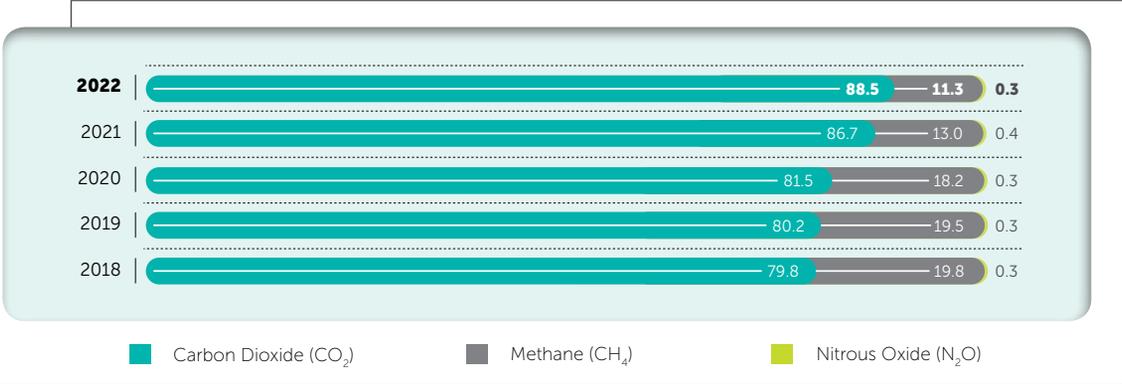
GHG Emissions Reduction from Venting under Operational Control Approach (Million tCO₂e)



Methane Emissions from Natural Gas Value Chain – Upstream and Gas only (thousand tonnes CH₄)



GHG Emissions Breakdown by Gases under Operational Control Approach (%)



Safeguard the Environment

Responsible Waste Management

Why Is It Important?

Waste management is a major challenge for society, as the overproduction of waste negatively impacts the environment, health, and economic growth. Effective waste management can reduce operational costs and environmental impact while improving reputation and stakeholder trust.

What Is Our Approach?

We practice the concept of waste management hierarchy, namely remove, reduce, reuse, recycle, recover, and dispose in order of most to least environmentally preferred. Across all our sites, activities that generate waste are categorised and identified according to type, quantity, frequency of generation, handling requirements, treatment and disposal methods. Our waste management plans are regularly reviewed, while performance indicators are submitted monthly to a central reporting platform, which helps measure progress and performance. Typical waste generated from operations include oily sludge from tank cleaning activities, sludge from wastewater treatment plant, spent catalyst and spent oils.

In 2022, PETRONAS generated 144,620 tonnes of hazardous waste, an increase of 19,736 tonnes from 124,884 tonnes in 2021. The higher amount of waste generated in 2022 was contributed by scheduled maintenance and tank cleaning activities. The total amount of waste recycled or recovered during the year in review was 73,643 tonnes of which 63,133 tonnes was attributed by operations in Malaysia. These are equivalent to waste recycling and recovery rates of 51 per cent for the Group or 77 per cent for Malaysia operations.

Guided by international principles, frameworks and standards:

- Host country requirements on waste management
- Global Reporting Initiative (GRI) Standards on waste reporting



Value Creation in 2022

Waste Management

1 Managing Waste

In 2022, despite facing increased waste generation, we found opportunities to improve our waste management practices and increase our waste recycling and recovery rate, contributed largely by a close and continued collaboration between our operations and waste treatment technology and waste management service providers.



Quarterly assurance assessments were also carried out at all off-site waste treatment and disposal facilities owned by our waste management contractors to verify that they meet both regulatory and our requirements.

2 Reducing and Reusing Hazardous Waste

Oily sludge is one of the most common waste of our operations. In collaboration with the Shimizu Institute of Technology, we embarked on a pilot project to use carbonisation technology to treat hazardous waste, including oily sludge generated from the refining process. The initiative aims to explore broader means of a circular economy by reducing hazardous waste and reusing it for other purposes instead of merely disposing it to a licensed facility. The pilot project was funded by the Japan Cooperation Center for Petroleum and Sustainable Energy (JCCP), utilising selected sites provided by the Malaysia Refining Company Sdn. Bhd. (MRC SB).

During the Phase 1 pilot (50kg kiln), the identified hazardous waste types generated by MRC SB were tested in batches and was extended to other types of hazardous waste including Vacuum Gas Oil (VGO), used activated carbons, spent clay and effluent treatment sludges. The Phase 1 pilot test was completed in December 2022 and preliminary results showed promising results with 99.6 per cent to 99.9 per cent of oil recovered from oily sludge samples and a weight reduction range of 84 per cent to 97 per cent for all samples. Phase 2 pilot testing is planned in 2023, utilising 500kg kiln capacity. The pilot results will determine the feasibility for full-scale implementation.

Safeguard the Environment

Circular Economy

PETRONAS' Circular Economy Definition

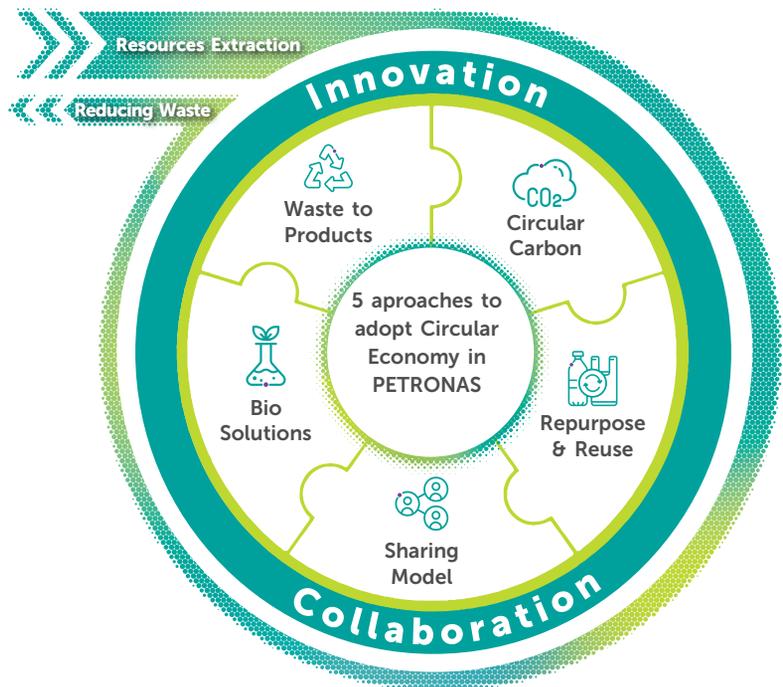
A circular economy is a systemic approach that moves away from a linear (take-make-waste) economy to one that extends the life cycle of materials and resources, ultimately reducing waste to a minimum.

For PETRONAS, circular economy is integral to our sustainability approach, embedded across the group to

- i. enable a low waste future
- ii. steward natural resources
- iii. minimise our carbon footprint

while creating value.

We aim to contribute to a circular future, providing impactful solutions to our stakeholders and the betterment of our society through innovation and collaboration.



Five Approaches to Adopt Circular Economy in PETRONAS

 Circular Carbon	 Sharing Model	 Bio Solutions	 Repurpose and Reuse	 Waste to Products
<p>Closed loop system involving 4Rs (reduce, reuse, recycle, remove) to manage GHG emissions</p> <p>Example: Condensate Recovery Systems (CRS)</p> <p>Capturing gas volumes that would have been 'wasted', channels it into the system, and converts the gas into condensate. This then flows through our usual processes, and is made into a valuable product.</p>	<p>Optimisation of resources via shared platform</p> <p>Example: Liquid8</p> <p>An online marketplace to encourage re-utilisation of surplus inventories, which would have otherwise been idle, accumulated and eventually become waste in warehouses – participated by Petroleum Arrangement Contractors (PACs) in Malaysia.</p>	<p>Bio-based inputs or products (regenerate)</p> <p>Example: Sustainable Aviation Fuel (SAF)</p> <p>A blend of SAF made from used cooking oil mixed with conventional jet fuel.</p>	<p>Extending useful life of materials/resources/facilities whether for their original or a new purpose to improve efficiency</p> <p>Example: Rig-to-Reef</p> <p>Cleaning platforms from hydrocarbons, removing non-reefable items, designing how it should be positioned (placement and stability analysis), which supports the growth of adjacent industries such as fishing and tourism.</p>	<p>Changing waste to base materials or other products, creating new revenue lines</p> <p>Example: Plastic Recycling</p> <p>Recycles plastic waste and uses it as feedstock for producing high-quality soft and hard plastics.</p>

Why Plastics?

Plastics have become a vital component in the economy given its usefulness in our everyday lives. It is a durable and lightweight material that has been used widely across industries worldwide. However, when it is used or disposed in an irresponsible manner, it becomes a significant problem as it is made of non-biodegradable material. Plastic waste is a significant part of the problem, and we are addressing it by promoting a circular economy and moving toward a New Plastics Economy (NPE). By recycling plastic products, we are minimising waste, promoting innovation, and creating new business opportunities. This supports a circular supply chain, reduces carbon footprint, conserves raw materials, and lessens the use of fossil fuels, all of which contribute to a more sustainable future.

We are addressing this by promoting circular economy and moving towards a NPE. By recycling plastic products, we are minimising waste, promoting innovation, and creating new business opportunities. We believe that our shift towards circularity will have a positive multiplier

effect, as we have in place a long value-chain that serves our ecosystem partners and broader society. Our ability to do this supports a circular supply chain, reduces carbon footprint and renders better stewardship of raw materials.

What Is Our Approach?

Through the circular economy approach, we have taken a waste-to-products approach, where we convert waste to base materials or other products to create sustainable value. However, we believe that the circular economy is not just about recycling and reusing but, instead, solving the problem at its source to eliminate waste and pollution. This will help us realise our NZCE 2050 Pathway.

We also continue to deepen our research and technology to identify gaps and accelerate our circular economy initiatives, as this will ensure sustainable consumption. Our ability to do so will lead to creating a more resilient economy.

Value Creation in 2022

1 PETRONAS' Positioning on Plastics

The increasingly harmful impact of plastic pollution on life and the environment is prompting regulations to crack down on plastic pollution, both globally and nationally, and has intensified in the last year alone, with industries facing the greatest risk and pressure to act. Plastic's wide range of applications includes medical, hospitality, construction/building, as well as fittings and furnishings. What makes plastics 'problematic' are single-use plastics (SUPs), such as plastic bottles, cutlery, and containers that are almost certainly littered. These are the primary sources of plastic pollution, with plastic bottles accounting for the greatest volume.

This year, we introduced PETRONAS' Position on Single-Use Plastics, which centres on our strategic focus on phasing out single-use plastics.

As we have a wide footprint across the plastics value chain, both as producers and consumers, this presents a wide range of opportunities for us to transition according to our circular economy principles and sustainability approach. Through this positioning, we acknowledge that plastics are still useful in industries such as food packaging, medical equipment, household appliances, etc. and recognise the need to take steps to strengthen their design and end-use sustainability. This will be done by phasing out problematic and unnecessary SUPs. In addition, we will also develop systemic plastic collection and recycling mechanisms at our operations to stop plastic waste from polluting or leaking into the

environment. This creates value by regenerating end-of-life plastic into valuable materials hence closing the loop in plastic circularity.

PETRONAS has a considerable footprint in the plastics value chain, both as a producer and a consumer, which means there are opportunities for us to transition according to our circular economy principles and our approach to sustainability. This enables PETRONAS to continue protecting value while also being a force for good.

PETRONAS Chemicals Group (PCG) leads the NPE initiative as it has embarked on Operation Clean Sweep (OCS), which is a global programme to eliminate plastic resin leakage to the environment during production and distribution.

In support of this, PETRONAS Lubricants International (PLI) launched the Bag-In-Box in Europe. This is a new 20-litre format made with recyclable cardboard and plastic, which guarantees loading, safety, and palletisation advantages, including an integrated tap.

Based on the recently launched Plastics Positioning, plastics will now be viewed as a force of good where we leverage circularity to encourage collaborative solutions that generate sustainable plastics, moving away from the traditional linear approach.

Safeguard the Environment

- ▶ PETRONAS Syntium Bag-In-Box (BIB) new **20-litre** format reduced plastic quantity up to **92 per cent** compared to traditional **20-litre** packs

PETRONAS' Four key New Plastics Economy (NPE) Workstreams

Innovation:
Establishing a viable collaboration in innovative technology solutions to address plastic pollution



Infrastructure:
Developing strategic partnerships and collaborations for an effective, sustainable waste recovery system



Education:
Imparting knowledge and education on plastic to address misconceptions and promote change in behaviour and culture



Clean-Up:
Enhancing awareness of caring for the environment through reduce, reuse and recycle (3R) education, Social Impact activities and green campaigns



PETRONAS Dagangan Bhd (PDB) redesigned their mineral water bottles to ensure they can be easily recycled. They have also discontinued retail sales of 350ml and 500ml bottles due to the non-optimal use of plastics.

2 Driving Plastics Circularity with ExxonMobil

PCG has joined forces with ExxonMobil to revolutionise the way plastic waste is managed, by transforming it into circular naphtha. As part of our commitment to sustainability, we are currently undertaking comprehensive feasibility studies to explore the potential implementation of ExxonMobil's advanced plastic waste recycling technology at suitable locations within PETRONAS production facilities.



3 Producing Waste-based Fuels

We participated in the Mid-Term Review of the 12th Malaysia Plan (RMK-12) – Technical Working Group (Oil and Gas and New Energy) Workshop by the Ministry of Economy. We presented a paper on the development of bio-economy in Malaysia, where we communicated our capabilities in leading Malaysia's bio-economy industry as a part of Malaysia's decarbonisation journey in achieving NZCE 2050. Through this presentation, we highlighted Malaysia's capabilities in being a regional leader in producing waste-based biofuels, especially Sustainable Aviation Fuel (SAF), Hydrogenated Vegetable Oil (HVO) and other biofuel products via our first bio-refinery in Pengerang. This biorefinery aims to achieve Final Investment Decision (FID) in 2023 and be commissioned by 2026.

The establishment of this bio-refinery will create a bio-economy ecosystem in Malaysia, including the full value chain for feedstock sourcing and biochemicals. Once fully operational, this bio-refinery is expected to drive the local economy, generate more than 5,000 new jobs, benefit more than 1,000 SMEs and attract more than USD2 billion in green Foreign Direct Investment (FDI) into Malaysia.

4 Developing Plastic Modified Bitumen

We introduced our latest technology, Plastic Modified Bitumen (PMB), consisting of plastic waste mixed with bitumen. This mix of repurposed waste gives it extra strength and higher cohesiveness while reducing the maintenance lifecycle, making it a favourable material for infrastructure.

We tested these solutions at two separate locations, namely PETRONAS Research Sdn Bhd (PRSB) in September 2021 and at the Malaysian Federal roads, Jalan Simpang Pulau-Lojing-Blue Valley in December 2022.

Given the promising results, we will be collaborating with several government agencies in 2023. We will also be showcasing this technology to potential local and international partners.

- PMB will extend the lifecycle of pavement and roads by **25 per cent**.
- Every 100 metres with plastic-modified bitumen utilises a minimum of **79kg** of plastic waste.

5 Achieving a Circular Economy for Plastic Waste in Malaysia

Through PCG, we have set a target to recover 100 per cent of plastic waste equivalent to domestic polymer sales by 2030. To achieve this, we will focus on four key areas: innovation, infrastructure, education and clean-up. We are collaborating with various stakeholders, including waste management concessionaires, recyclers and technology providers, to create innovative solutions and enable a plastic circular ecosystem in Malaysia. This will enhance the recyclability of plastic materials and regenerate end-of-life plastic into valuable materials.

Under the innovation workstream, we collaborated with Plastic Energy Ltd to develop innovative solutions for plastic waste. This involves turning low quality, mixed plastic waste into pyrolysis oil, which can be further processed to produce certified circular polymers.

To strengthen the infrastructure system, we partnered with waste management companies; namely Alam Flora, KDEB Waste Management, One Biosys and E-Idaman to unlock the value of plastic waste ecosystem in Malaysia. Through these partnerships, we can ensure a secure supply of plastic waste, which is a crucial feedstock for converting plastic waste into circular polymers.

Safeguard the Environment

Environmental Management

Why Is It Important?

Managing environmental quality is essential to the preservation of our planet and the protection of our natural ecosystem. Irresponsible business activities can have severe consequences, such as oil spills, air pollution and resource scarcity. These consequences not only affect the health and well-being of humans, but also pose a threat to biodiversity and the sustainability of our planet. Managing environmental quality involves responsible resource utilisation, pollution prevention and sustainable practices which can help mitigate these environmental consequences.

From a business perspective, effective management of environmental quality can result in significant cost savings and improved operational efficiency and enhanced reputation. Minimising our environmental impact through responsible and sustainable practices can reduce waste, conserve resources and limit exposure to environmental liabilities. It also builds trust among our employees and reinforces our position as a corporate citizen.

What Is Our Approach?

At PETRONAS, we recognise the important role we have in managing our relationship with the environment. Throughout our operations and business, we implement various assessments, practices and site-specific actionable plans to protect the environment.

We continue to make significant investments to reduce our environmental impact by implementing and inculcating a strong environmental protection culture throughout our supply and value chain. As we work with a broad range of suppliers, partners and vendors, we ensure they are also optimising their environmental footprint in key areas. We do this by encouraging them to adhere to our sustainable practices and improve their own environmental footprint as well. We also pursue collaborations with our stakeholders to ensure we gain a wider reach. By working together with our partners and stakeholders, we can create a positive impact on the environment and protect it for future generations.

Guided by international principles, frameworks and standards

- Host country standards for the design and operation of pollution prevention and control equipment
- World Bank/International Finance Corporation (IFC) Group Environmental, Health and Safety Guidelines (EHS Guidelines)
- World Resource Institute's (WRI) Aqueduct Water Stress Atlas
- Decommissioning Option Assessment (DOA)

PETRONAS' Environmental Focus Areas

» Air Emissions

- Monitor, evaluate and address risks related to air emissions.
- Leverage on our online monitoring platform to provide early warning for increasing trends in emission load that will enable timely intervention.
- Measure Sulfur Oxides (SOx) and Nitrogen Oxides (NOx) emissions through continuous monitoring or periodic samplings.
- Ensure measurements are in accordance to host country requirements and internationally-accepted standards.

» Oil Spill Prevention

- Embed industry best practices on spill prevention into our facility design.
- Implement scheduled inspections and maintenance programmes.

» Decommissioning

- Adhere to Decommissioning Option Assessment (DOA) in disposing petroleum facilities.
- Conduct feasibility studies on transforming decommissioned oil and gas platforms into artificial reefs to maximise the lifecycle of decommissioned structures and protect marine biodiversity.

» Water Management

- Implement internal standards, policies and practices to optimise freshwater withdrawal.
- Focus on three pillars – conduct water accounting, understand water availability and increase water use efficiency.
- Carry out regular tracking of freshwater withdrawal in water stress areas.
- Monitor, evaluate and address risks from waste water discharge from our facilities.

2022 Environmental Quality Performance

1 Water

Freshwater Withdrawal	2021	2022
Malaysia (million cubic metres per year)	70.2	76.8
International (million cubic metres per year)	1.0	4.8
Total (million cubic metres per year)	71.2	81.6
Discharges to Water (tonnes of hydrocarbon)	452	487

In 2022, our total freshwater withdrawal was 81.6 million cubic metres as compared to 71.2 million cubic metres recorded in 2021. The increase in water withdrawal was attributed by two major new sources i.e. Pengerang Integrated Complex and new processing trains in Iraq operations.

2 Air Emissions

We continued to monitor air emissions from all our facilities.

	2021	2022
Total of Sulphur Oxides Emissions (tonnes)	47,954	60,116
Total of Nitrogen Oxides Emissions (tonnes)	133,962	62,790

In 2022, the Group's sulphur oxides emissions increased to 60,116 tonnes compared with 47,954 tonnes in 2021. The increase in emission load was attributable to higher gas production in Sarawak's Upstream asset and gas processing plant.

Total nitrogen oxides emissions for 2022 stood at 62,790 tonnes from 133,962 tonnes in 2021, mainly due to omission of emission load data from ships due to ongoing review of reporting method, and revision in calculation methodology for floating LNG and power plant.

Safeguard the Environment

3 Environmental Health

Human Health Risk Assessments (HHRAs)

We are committed to safeguard the health of communities in areas where we operate.

We proactively conduct HHRA beyond facility fencelines to evaluate community exposure to chemicals in the ambient environment. Since 2018, we have been conducting baseline HHRAs at selected operations and continued our efforts in 2022 to establish the environmental health risk profile for our global operations. From the baseline HHRAs, we have identified areas of improvement to reduce chemical exposures in air emissions and groundwater, going beyond regulatory compliance.

4 Oil Spill Prevention

	2021	2022
Number of Hydrocarbon Spills into the Environment over One Barrel (Number of cases)*	2	2

* One barrel is equivalent to 159 litres

- In 2021 and 2022, there were two cases of oil spills, compared to five in 2020.
- Several Joint Offshore Oil Spill Response (OSR) Standard Operating Procedure development workshops were conducted involving 13 government agencies in collaboration with the Department of Environment (DOE). The purpose of these workshops was to brainstorm on the effective methodology to overcome challenges during the response to oil spill incidents. This includes managing transportation from OSR service providers' bases to incident locations, chartering spotter aircrafts, mobilisation of equipment and experts from outside Malaysia.
- Document Guideline to request government assistance for oil spill response operations was approved during the National Oil Spill Operation Committee (NOSC) sitting.
- Conducted an Oil Spill Response Capability Assessment (OSRCA) for various PETRONAS OPU's
- Enhancement of OSR personnel capability via OSRL Masterclass IMO Level 3 and webinars.
- Organised 3 regional forums on Malaysia Oiled Wildlife Response (MOWReP) and developed new PETRONAS Technical Guideline (PTG) 18.41.02 Oiled Wildlife Response for Malaysia's government agencies and industry players.

5 Decommissioning

In 2022, we achieved the following on the decommissioning front:

- Complete the plug and abandonment of 13 wells.
- Successfully secured a preliminary agreement for the 10-year Sabah Master Reefing Plan with the Department of Fisheries (DOF), Sabah.
- Organised a Decommissioning Enhancement Workshop with Production Arrangement Contractors (PACs) and decommissioning service providers from 13 to 14 December 2022. A total of 12 papers were presented to further improve future execution of decommissioning projects. Other benefits from the workshop included clarity in future decommissioning outlook and better resource planning.
- In collaboration with DOF, the Kapal rig-to-reef site monitoring indicated a growth of fish species by ~30 per cent with an annual average fisheries' economic growth by ~5 per cent.
- Continuous active regional and international industry collaborations:
 - International Association of Oil and Gas Producers (IOGP)'s Decommissioning Committee's Expert Groups on Asset Retirement Obligations (ARO), Habitat Retention on Reefing Guidance, and Co-Chairing the IOGP Asia Pacific (APAC) Decommissioning Sub-Committee.
 - Finalised the ASEAN Council on Petroleum (ASCOPE) Decommissioning Guideline (ADG) revision draft based on inputs from the Exploration and Production Task Force (EPTF).



Biodiversity

Why Is It Important?

Biodiversity is the total sum of life on Earth comprising flora, fauna, microorganisms, ecosystems and habitats as well as the interdependent relationships between all of them. We depend on this web of life, both terrestrial and marine, to gain access to fresh water, food, medicine and a stable climate – all of which help sustain livelihoods, human health and economies.

Our inability to conserve and protect biodiversity will adversely affect the benefits it provides. For example, forests and wetlands are essential in our efforts to combat climate change by sequestering carbon while providing a habitat for various species, protecting coastlines and supporting surrounding communities as sources of livelihood. Where PETRONAS is concerned, our relationship with biodiversity is one of the impacts and dependencies where our activities could potentially impact the biodiversity around us.

At the same time, PETRONAS also depends on biodiversity and ecosystem services such as water, land and marine resources for the continuity of our operations.

As such, we are responsible for protecting and, where necessary, reversing biodiversity loss to avoid irreversible damage, which may impact our ability to deliver on our business goals and Net Zero Carbon Emissions by 2050 Pathway. Within this context, protecting Malaysia’s biodiversity is important to PETRONAS, given our large operational footprint in the country and its large potential for forest-based carbon offsets and the fact that Malaysia is one of the 17 mega diverse countries in the world, despite its small land mass.

What Is Our Approach?

In 2022, PETRONAS established our Position on Nature and Biodiversity (the Position) to improve oversight on our nature and biodiversity footprint at enterprise level and strengthen our attainment of NZCE 2050 aspiration. In establishing the Position, PETRONAS was guided by various international agreements and national policies such as the Convention on Biological Diversity (CBD) and Malaysia’s National Policy on Biological Diversity 2016-2025, as well as industry best practices from organisations such as Ipieca (i.e., the global oil and gas association for advancing environmental and social performance across the energy transition), the International Association of Oil and Gas Producers (IOGP) and the World Business Council for Sustainable Development (WBCSD). The Position consists of five areas of action that demonstrate visible leadership in nature and biodiversity conservation, harnessing the right expertise and resources to positively impact the nation and the ASEAN region.

Biodiversity and Ecosystem Services (BES) management tools applied in PETRONAS

- PETRONAS Technical Guideline (PTG) on BES Management
- Integrated Biodiversity Assessment Tool (IBAT)
- BES Risk Assessments (BESRA) and Biodiversity Action Plan (BAP)
- Environmental Impact Assessments (EIA)

Safeguard the Environment

PETRONAS' Position on Nature and Biodiversity

The introduction of our nature and biodiversity position enables us to accelerate our momentum in establishing plans and ensuring internal alignment on nature and biodiversity matters. We will shape the necessary work processes, systems and establish a centralised database to ensure the smooth implementation of this positioning, which will be enforced in 2024. To operationalise the Position during 2023, PETRONAS will also strengthen our capacity and capability on nature and biodiversity, including setting up a dedicated Centre of Excellence (CoE). Moving forward, we will continue to focus our efforts in making progress in the below key focus areas:

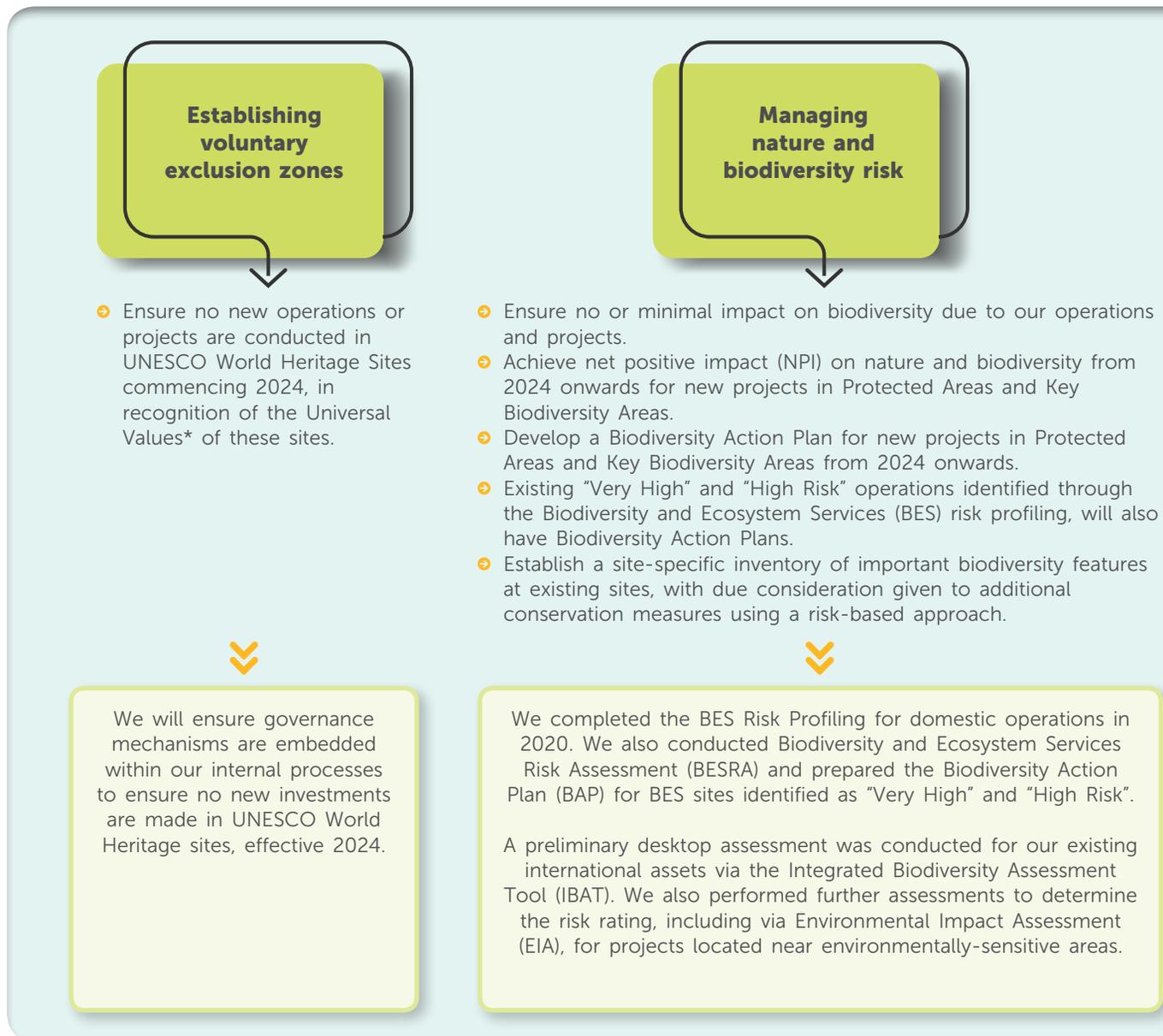


Figure 1: The Position on Nature and Biodiversity, with the work conducted on respective areas of action and/or our plan moving forward.

* Outstanding Universal Value means cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity. As such, the permanent protection of this heritage is of the highest importance to the international community as a whole. The Committee defines the criteria for the inscription of properties on the World Heritage List.

Promoting nature and biodiversity through partnerships and collaborations

- Support and participate in local nature and biodiversity conservation, restoration and enhancements to safeguard and protect ecosystems, habitats and endangered species in Malaysia and the countries where we operate.
- Partner with credible international organisations to leverage global best practices, international frameworks and standards.



Ongoing efforts to support biodiversity conservation were carried out via Yayasan PETRONAS' Sentuhan Alam pillar in Malaysia, and various business units of PETRONAS locally and internationally with various stakeholders from governments, non-governments, and communities through various collaborations to halt biodiversity loss. Business and operating units also implemented conservation activities in ecosystems, habitats and endangered species.

Supporting public policy that aims to protect nature and biodiversity

- To support the implementation of the Kunming-Montreal Global biodiversity Framework and Malaysia's National Policy on Biological Diversity
- Recognise policies and ambitions on nature and biodiversity in the countries where we operate.



We are members of several international biodiversity industry-level working groups such as the Ipieca Biodiversity and Ecosystem Services (BES) Working Group, the National Biodiversity Roundtable and the Malaysia Platform for Business and Biodiversity.

Promoting high-quality nature-based climate solutions

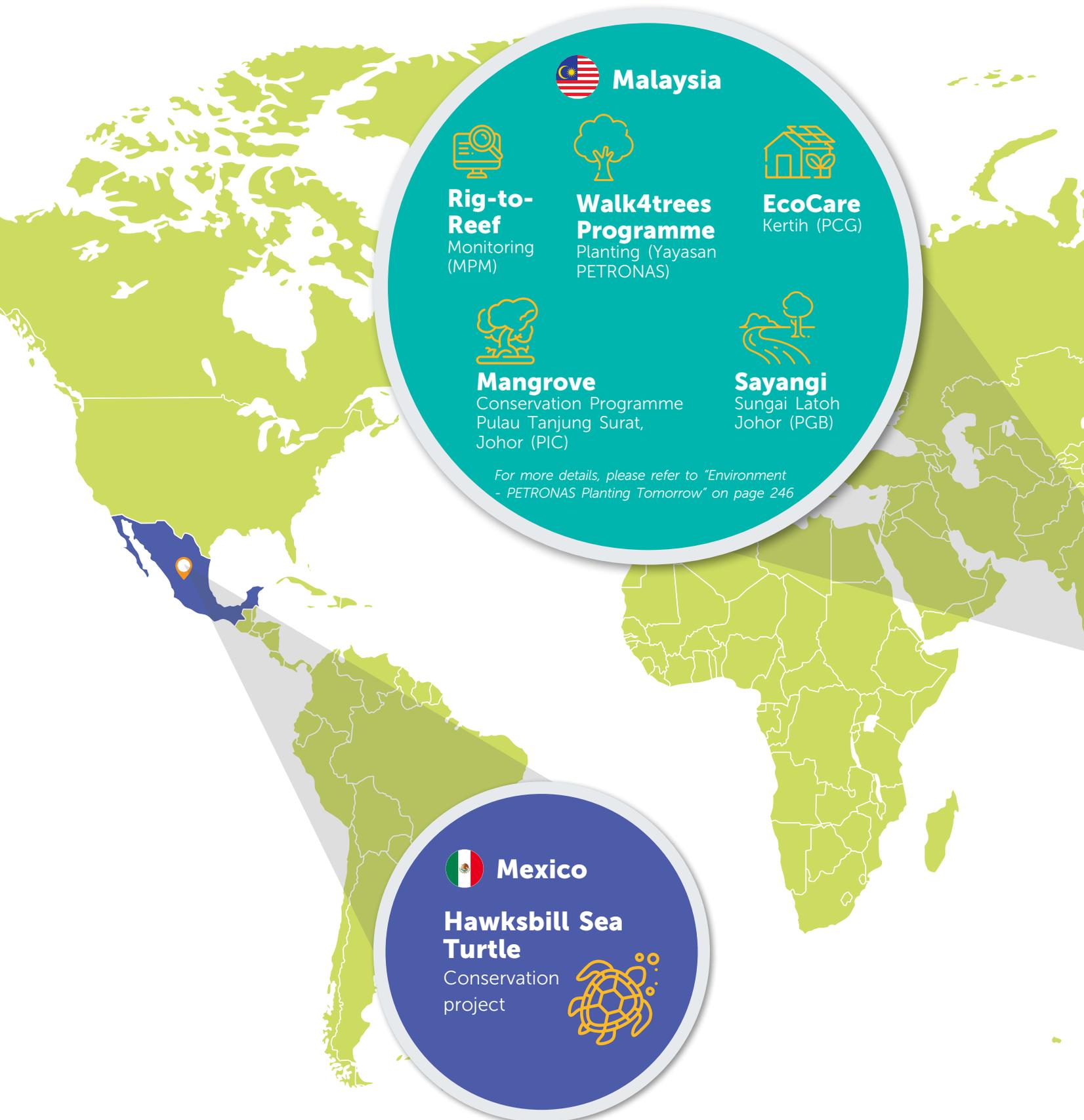
- Support nature-based carbon offsets to realise NZCE 2050.
- Actively explore and invest in opportunities in high-quality nature-based climate solutions, anchoring on credible, internationally recognised certification standards.



We believe that nature-based climate solutions form an important lever to offset residual and hard-to-abate emissions. Going forward we will identify investments that will generate high-quality carbon credits which will benefit the community and conserve the nature and biodiversity of the area.

Safeguard the Environment

PETRONAS' Biodiversity Conservation Efforts Through Social Impact Around The World



 **Malaysia**

 **Rig-to-Reef**
Monitoring (MPM)

 **Walk4trees Programme**
Planting (Yayasan PETRONAS)

 **EcoCare**
Kertih (PCG)

 **Mangrove**
Conservation Programme
Pulau Tanjung Surat,
Johor (PIC)

 **Sayangi**
Sungai Latoh
Johor (PGB)

For more details, please refer to "Environment - PETRONAS Planting Tomorrow" on page 246

 **Mexico**

Hawksbill Sea Turtle
Conservation project





Figure 2: Map to showcase PETRONAS’ biodiversity conservation efforts through Social Impact around the world*

For 2022, we included reporting of PETRONAS Malaysia’s operation site in Protected Areas and Key Biodiversity Areas. The activity was conducted utilising data from Integrated Biodiversity Assessment Tool (IBAT). The summary of results is shown as per Table X below:

Type of protected area	Within the boundary	Near (1-10km) (up to 10km outside of boundary of protected area/key biodiversity area)
World Heritage Site	0	0
Ramsar Site	0	0
IUCN Protected Area Category I-VI*	5	29
Key Biodiversity Area	1	2

Table 1: PETRONAS Malaysia’s Operations within/near Protected Areas and Key Biodiversity Areas.

* International Union for Conservation of Nature (IUCN) Protected Area categories are as below:

- Ia Strict nature reserve
- Ib Wilderness area
- II National park
- III Natural monument or feature
- IV Habitat/species management area
- V Protected landscape or seascape
- VI Protected areas with sustainable use of natural resources

IUCN management categories are voluntary for countries to apply to their protected areas and are not being used by all countries. However, for the purpose of standardisation of reporting for PETRONAS operations globally, these categories will be used.

Positive Social Impact

Aligned to:



As a leading integrated global energy company, we play a crucial role in shaping the future. We take a collaborative approach to embedding sustainability into our practices, working hand in hand with our employees, suppliers, and communities to promote responsible growth.

Health and Safety

Why Is It Important?

The health and safety of our employees and contractors is of paramount importance to us. Given the nature of our industry, our people are exposed to a range of health and safety risks, such as hazardous environments, exposure to pressurised hydrocarbon, gas and chemicals, as well as heavy machinery and equipment. Workplace injuries and incidents can lead to severe impacts for both our business and stakeholders.

The consequences of poor health and safety practices are far-reaching and can result in regulatory fines and penalties, stop-work orders and reputational damage.

But above all, our people’s physical and mental well-being are at stake, affecting their quality of life and ability to work and care for their families. Poor health and safety in the workplace can even lead to loss of life, with devastating effects on loved ones.

Four fatalities were recorded despite the increased focus on safety culture and improving safety practices. The fatalities reported were from fire, electrocution, dislodged pipeline and diving activity. Following these tragedies, we conducted four groupwide Health, Safety and Environment (HSE) stand-downs attended by 54,000 participants, underscoring our continuous commitment to prioritising the health and safety of our people. Immediate interventions have been implemented to address key issues and reduce incidents by strengthening frontliner and contractor competency, compliance to HSE requirements, as well as intensifying learning culture.

We also observed a 33 per cent increase in employee Total Recordable Occupational Illness Frequency (TROIF) compared to 2021. Food poisoning was one of the contributors with 35 cases reported. To avoid recurrences, interventions were implemented to ensure our external caterers for food and water supply are verified by the Ministry of Health (MOH).

[For more information about our health and safety performance, please refer to page 253]

Given the inherent risks in our industry, the ability to effectively promote a culture of safety throughout our operations enables employees and contractors to achieve their full potential, as they feel safe, secure and engaged. This will lead to a more high-performing and productive work environment. Moreover, investments in health and safety will strengthen our position as a caring and responsible organisation to retain top talent in the industry.

What Is Our Approach?

At PETRONAS, we continuously reinforce a culture of safety across our operations, taking cue from the learnings gained over the last few years. This is important given the transformation in our work environment as the country transitioned into COVID-19 endemicity. We drive impactful interventions, mainly enhancing competencies and driving culture and assurance, enabled by digital technology. We continuously scale up contractor management and strengthen the implementation of the Generative HSE Culture (GC) programme at all levels through Accountability and Behaviour Reinforcement Programme (ABR). The ABR encourages HSE Desired Behaviours across our operations, and minimises undesired behaviours.

In addition to the current standards, guidelines, systems and processes, we pushed ahead on improving HSE First Line Assurance to drive HSE Management System and Legal Compliance groupwide, which included Self-Regulation capability development. Meanwhile, Process Safety continues to experience further improvements with the establishment of the Loss of Primary Containment (LOPC) Reduction Framework and the Fire Prevention and Mitigation Framework (FPMF).

In terms of risk management, we subscribe to Hazards and Effects Management Process (HEMP) which ensures hazards and risks are controlled. We use As Low As Reasonably Practicable (ALARP) principle to set the control levels for risks. Additionally, we continue to leverage on HSE Integrated Risk Assessment (HIRA), a one-stop centre for risk assessment located in myHSSE, which provides analysis, trends and also common issues that require efficient intervention.

We have a comprehensive list of policies, guidelines and standards that ensure a culture of health and safety:

- PETRONAS HSE Policy
- PETRONAS Substance Misuse Policy
- PETRONAS HSE Management System (HSEMS)
- PETRONAS HSE Mandatory Control Framework (MCF)
- PETRONAS Technical Standards (PTS)
- PETRONAS Technical Guidelines (PTG)
- Hazard Effect Management Process (HEMP)
- Process Safety Loss of Primary Containment Reduction (PSLR) Framework
- Fire Prevention and Mitigation Framework (FPMF)
- PETRONAS Contingency Planning Standard
- Crisis and Incident Management System

Positive Social Impact

Digital myHSSE at PETRONAS

The myHSSE digital platform serves as our one-stop knowledge centre for all PETRONAS Health, Safety, Security and Environment (HSSE) matters.

By adopting a single information platform that houses all 16 systems of our HSSE digital solutions, each of which addresses different business pain points for users' easier access and fit-for-purpose usage.

We are also enabling users to harness the power of HSSE data to derive insights on HSSE performance, trends, emerging risks and other essential elements so that we can make proactive interventions. As we move towards our goal of realising predictive and even prescriptive HSSE analytics. Group HSE endeavours to improve this further.



<p>IPSS</p> <p>Integrated Process Safety Solution</p> <p>An integrated solution to optimise Process Safety Work processes and ensure governance in minimising human error, driving compliance and providing valuable insight for risk management.</p>	<p>FMS</p> <p>Fatigue Management System</p> <p>A centralised system to track and monitor the Hours-of-Service Limit (HSL) for PETRONAS' employees and contractors.</p>	<p>ICMS</p> <p>Integrated Contractor Management System</p> <p>A system to screen contractors and prevent unauthorised personnel from entering PETRONAS' premises.</p>
<p>CMIS</p> <p>Crisis Management Information System</p> <p>A solution to minimise human interventions by providing an assisted approach in managing a crisis through technology.</p>	<p>EPICS</p> <p>Environment and Social Performance Integrated and Centralised System</p> <p>An integrated system that provides holistic environmental and social performance data management for compliance and sustainability reporting.</p>	<p>UAUC</p> <p>Unsafe Act, Unsafe Condition</p> <p>A centralised platform to report, track and provide analytics of Unsafe Act, Unsafe Condition and Safe Observation for PETRONAS Group.</p>
<p>e-RGO</p> <p>Ergonomics Management System</p> <p>An ergonomic self-assessment adjustment and case tool to reduce the risk of musculoskeletal disorders.</p>	<p>HIRA</p> <p>HSSE Integrated Risk Assessment</p> <p>An integrated system to manage and perform HSSE-related risk assessments.</p>	<p>MARS</p> <p>Monitoring and Reporting System</p> <p>An integrated and centralised system to report, record and monitor HSSE performance indicators for PETRONAS Groupwide.</p>
<p>AM</p> <p>Action Management</p> <p>A centralised platform to record and track groupwide HSSE-related action items for PETRONAS.</p>	<p>HSE ABR</p> <p>HSE Accountability and Behaviour Reinforcement</p> <p>A digital solution to manage both positive and constructive reinforcements.</p>	<p>IM</p> <p>Incident Management</p> <p>A system to report, record and track actions on groupwide HSSE incidents and grievances for PETRONAS.</p>
<p>eCHEMS</p> <p>e-Chemical Management System</p> <p>A centralised system to request, screen and approve chemicals before purchases are made as this ensures compliance to HSE Legal Requirements.</p>	<p>ePTW+ 2.0</p> <p>ePTW+ 2.0</p> <p>A Groupwide Permit-to-Work (PTW) system that standardises the ePTW system across PETRONAS operations.</p>	<p>PSRS</p> <p>PETRONAS Self-Regulation System</p> <p>A centralised digital platform for Plant Management System (PMS) implementation.</p>

STEWARDSHIP, HEALTH, INFORMATION AND ENVIRONMENT LINKED DATABASE (SHIELD)

<p>PETRONAS Safety Data Sheet (SDS) Portal</p> <p>A portal where PETRONAS product SDSs are made publicly available to all stakeholders in efforts to promote transparency and sound chemical management. Results of product risk assessments are also summarised and made available to stakeholders through Global Product Strategy Safety Summaries (GPSS) to further communicate product risk in line with our overarching objective of supporting proper product risk management throughout our products lifecycles.</p>	<p>myHealth</p> <p>Aims to support the general employee occupational health for PETRONAS. This includes the planning, execution, and archiving of Fitness-to-Work, Medical Surveillance & Substance Misuse health protocols. myHealth also includes a self-service health assessment which can be done in one go and includes self-generated Letter of Undertaking, as well as a selection of preferred Approved Medical Examiners (AME).</p>
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Value Creation in 2022

Culture

We continued to reiterate the importance of building a culture of Health and Safety throughout our operations and processes, as this will protect our employees, improve productivity and strengthen our reputation in the industry.

Shaping Generative HSE Culture Towards Self-Regulation

We strengthened our safety culture by introducing the Generative HSE Culture (GC) Framework, which promotes accountability and pace to business units, operating units and assets based on site-specific needs. Themed "Doing Things Differently", we collaborated with *Institut Teknologi Petroleum* (INSTEP) whereby INSTEP will fully manage and execute the GC training programmes, and work towards Self-Regulation (SR) certification. This was done to enable Group Health, Safety and Environment (HSE) to refocus on enhancing the overall effectiveness of this programme, maintain standards and quality, perform continuous improvements and measure impact based on its alignment to SR requirements and expectations.

Regular engagements with key stakeholders across all business units were conducted to ensure alignment with the Generative HSE Culture framework and strategy to drive the GC journey forward.

Generative HSE Culture Highlights:

- **25** engagement sessions to drive GC forward.
- Developed three new GC modules to align with Self-Regulation Framework.
- Total number of **1,209** GC participants trained in 2022.
- Developed governance documents on GC trainings in collaboration with INSTEP.

HSE Accountability and Behaviour Reinforcement (ABR)

Good behaviours often go unnoticed. But when things go wrong, we are quick to jump and forget to consider human factors. With HSE Accountability & Behaviour Reinforcement (HSE ABR), it is different.

PETRONAS continues the implementation of HSE ABR programme, which was rolled out in 2021 to elevate the HSE Culture towards achieving Generative HSE Culture. The HSE ABR is to ensure a consistent approach across PETRONAS when recognising and rewarding the Desired HSE Behaviour, and fairness when addressing Undesired HSE Behaviour.

In 2022, through the HSE ABR implementation, we achieved the following:

- Evaluated Human Behaviour Categorisation (HBC) elements in 97 per cent of completed investigations on major HSE incidents and major HSE non-compliances.
- 100 per cent domestic operations and selected international operations have HSE ABR Committee (ABRC) established.
- Successful integration of other HSE Systems with the HSE ABR system, which improves management of positive and constructive reinforcements.

Positive Social Impact

Towards Achieving Good Health and Well-being with MESTIfit4health

PETRONAS has taken a proactive step to prioritise employees' wellness towards achieving SDG 3 on Good Health and Well-being via MESTIfit4health, which is our signature programme. MESTIfit4health covers five main elements of Move Right (physical activity), Eat Right (healthy eating habit), Sleep Right (adequate and quality sleeping habit), Think Right (mental health and well-being) and Individual Right (responsibility of making healthy living as a choice to manage health risks). Among the initiatives for health risk reduction and management through MESTIfit4health are:

Think Right (Mental Health and Well-being)

Objectives

- Address psychosocial risks factors faced by employees.
- Encourage affected employees to reach out for early psychological support and reduce risk of developing mental health conditions.
- Implement and drive effective mental health and well-being interventions at the workplace.

Outcomes

- Implementation of *"Towards No Meeting"* after planned work hours reflected through leadership tone at all levels.
- Embedded knowledge in creating psychosocially safe work environment through leadership training modules.
- Upskilled 885 leaders on psychological safety and creating psychosocially safe work environment through Generative Culture programme and PETRONAS Leadership Centre's Strategic Excellence programme.
- Leaders conducted 24 sessions of Intentional Wellness Engagement or Leaders Reach Out with 12,500 employees focussing on mental health and well-being.
- 33 MIND-A-CARE Facilitators and 169 MIND-A-CARE Ambassadors trained through unique in-house MIND-A-CARE programme for early detection and intervention of psychosocial risk factors and subsequently to reduce mental health burden faced by employees.
- 5,380 employees including those at offshore facilities completed MIND-A-CARE Awareness training.
- 1,046 employees enrolled in the Individualised Coaching for Resiliency Enhancement (i-C4RE) programme to build mental health resiliency for coping with adversities/challenges and bouncing back from setbacks/failures.
- Structured Return to Work programme post prolonged mental illness leave.
- Strengthened and enhanced promotion of Employee Assistance Programme (EAP) and MyFriends with strong traction for early reach out and digital coaching.
- Achieved significant cost reduction on mental health treatment, 13.5 per cent lower (RM4.5 million) in 2022 compared to 2021 following the mental well-being interventions implemented. The risk of developing mental health conditions such as anxiety and depression potentially also reduced, with an estimated Return of Investment (ROI) at RM15.98 million.

Move Right (Physical Well-being)

Objectives

- Promote active lifestyle and foster team-work culture in prevention of non-communicable diseases.
- Support environment and community well-being.

Outcomes

- Opened 10 virtual walking trails across 10 countries, namely Brazil, Brunei, Indonesia, Iraq, Malaysia, Mexico, South Africa, Spain, Turkmenistan and United Arab Emirates.
- Achieved more than 6.4 billion steps through our virtual walking routes, exceeding the target of five billion steps.
- More than 50,000 trees have been planted at 14 sites across 11 states in Malaysia.
- Reduced approximately 200 tonnes of carbon and generated RM872,000 in income for 254 underserved people through the Walk4Trees programme in collaboration with PETRONAS Young Professionals Club (YPC).

Eat Right

Objectives

- Prevent occurrence of food poisoning incidents.
- Establish strong collaboration with the government and other stakeholders including the Ministry of Health Malaysia (MOH), food service providers, In-house Caterers (IC) and External Caterers (EC).

Outcomes

- Continuous implementation of Food and Water Safety programme.
- Carried out timely hygiene inspections to ensure IC and EC adhered to hygiene certifications and regulatory compliance.
- Strengthened collaboration with the Food Safety and Quality Unit, MOH.
- Introduced a one-stop digital centre for Food and Water Safety Resources, which lists out verified EC and reference materials.
- Catering of food from external service providers are only allowed to be selected from the EC listed in the one-stop digital centre.

Sleep Right

Objectives

- Reduce fatigue-related incidents among PETRONAS' staff and contractors.

Outcomes

- Strengthened and implemented the Fatigue Management System (FMS) for Non-Plant high risk groups (remote onshore – pipeline right-of-way (ROW), land transport and offshore).
- The Sabah-Sarawak Gas Pipeline (SSGP) emerged as the first non-plant to implement FMS across all our operations and businesses where Global Positioning System (GPS) mobile application was introduced in areas without internet connection.

M

MOVE RIGHT!

E

EAT RIGHT!

S

SLEEP RIGHT!

T

THINK RIGHT!

I

INDIVIDUAL RIGHT!



MESTI
fit4health™



Positive Social Impact

Compliance

In scaling up our efforts to improve safety performance, we proactively implemented various initiatives and measurements to ensure safety precautions are embedded throughout our businesses and operations.

Achieving HSE Compliance Through Self-Regulation (SR)

We continue to improve on our Self-Regulation practices and strived to achieve Self-Regulation certifications as this would result in a higher level of compliance towards legal and safety standards, as well as effective implementation measures to control hazards and minimise incidents.

We focused on driving key engagements and alignment of the Self-Regulation Implementation Masterplan with key stakeholders and completed the necessary pre-certification audits and Self-Regulation culture assessments. We also ensured Self-Regulation Department (SRD) personnel obtained the required certifications to strengthen SRD as a qualified third-party auditor for Self-Regulation implementation and surveillance audit in PETRONAS.

In terms of governance, we officialised the Self-Regulation Tripartite comprising members from Regulator (DOSH), Occupiers (PETRONAS OPU) and Third-party Service Providers (Institut Teknologi PETRONAS (INSTEP) and Universiti Teknologi PETRONAS (UTP)) as a platform that advocates Self-Regulation governance and regulations to support and sustain SR Programme journey towards operational and compliance excellence. We also completed the integration of PETRONAS Self-Regulation System (PSRS) with other relevant PETRONAS systems namely PETRONAS Risk-Based Inspection (PRBI), myAssurance and Health, Safety, Security, and Environment (HSSE) Monitoring and Reporting System (MARS), creating an integrated digital platform for the SR programme implementation which was deployed to all OPU embarking on the programme.

Conducted SR Implementation Masterplan engagement with **24** CEOs and OPU Heads including leaders from Upstream governance departments, as well as Department of Occupation, Safety and Health (DOSH) state representatives to share and roll-out the Masterplan.

Completed **seven** audits and Culture Baseline assessments in **four** OPU as part of their overall journey towards SR certification.

Achieved certification for **22** out of **27** SRD personnel with ISO45001 as Lead Auditor by Chartered Quality Institute (CQI) and International Register of Certificated Auditors (IRCA) in preparation for SRD to become the SR Qualified Third-Party for PETRONAS.

Conducted **10** stakeholder engagements and workshops with OPU and DOSH representatives to facilitate and provide the necessary advisory on the development and implementation of Self-Regulation programme.

Leveraging Digital Technology in Managing Crisis and Emergencies

PETRONAS Communication and Control Centre (COMCEN)

COMCEN is PETRONAS' one-stop centre for incident and crisis management, as well as the designated centre to coordinate and respond to emergencies and crisis. This one-stop centre manages numerous HSE and Security-related incident notifications and crisis, including issuance of various HSE advisories and warnings across our businesses.

Crisis Management Information System (CMIS)

Launched in 2019, Crisis Management Information System (CMIS) is a digital solution that minimises human actions and communications errors by providing technology and systems to manage emergencies and crises at enterprise level.

CMIS has allowed us to enhance crisis management best practices as it provides real-time emergency response updates to internal stakeholders seamlessly transfer data and information. We have also integrated state-of-the-art oil spill consequence modelling tool (OILMAP) into CMIS to enable swift and comprehensive emergency response to oil spill incidents.

- Conducted **16** CMIS trainings and **2** webinars across PETRONAS Group.
- Utilised in **8** Tier-2 and **2** Tier-3 emergency exercises, with positive feedback from stakeholders.

COVID-19 Reporting and Monitoring

As Malaysia transitions towards endemicity and business activities resume, we ensured seamless and safe normalcy interventions on readiness and implementation of processes and procedures to return to office through 50 per cent work in office and 50 per cent work from home rotation and subsequently 100 per cent with Flexi-Work Arrangement, including opening up for unvaccinated and partially vaccinated employees, without disruptions.

As part of our COVID-19 reporting and monitoring, Strategic Crisis Management in collaboration with Occupational Health (OH) division, spearheaded the introduction of Microsoft Forms and a digital dashboard to replace the conventional Notification Form (NF) used previously to report COVID-19 cases. The dashboard provided overall insights into the latest COVID-19 situation across our businesses and operations. With this in hand, the Executive Leadership Team and Corporate Command Centre (C3) were able to make data-driven decisions and decide on the right approach to be taken by its Pandemic Preparedness and Response Team (PPRT).

Our ability to make effective and swift adjustments amidst an evolving environment is considered to have led to a significant reduction in COVID-19 cases, clusters and deaths following the introduction of stringent measures and effective communications across all businesses and operations.

- Reduced **94 per cent** of manhours to produce daily COVID-19 reports and achieved cost avoidance of up to **RM300,000**.
- Zero business and reputational interruptions recorded.
- Achieved **99.8 per cent** primary vaccine uptake and booster uptake as compared to **49.7 per cent** for Malaysia's overall population.



We implemented measures to protect the health of our workforce during the COVID-19 pandemic while ensuring business sustainability through effective collaborations between Pandemic Preparedness and Response Team (PPRT) COVID-19 members, internal and external stakeholders including government and private bodies.

Prioritising Industrial Hygiene

One of our topmost priorities is to ensure the health of our employees and contractors within and beyond the workplace. We go beyond regulatory compliance and implement global best practices to deliver sustainable value and ensure a dedicated, productive and high-performing workforce. This include continuous efforts to address all workplace health hazards and respective risks such as chemical hazards, physical hazards (i.e., noise, radiation, thermal and vibrations), as well as biological, ergonomic and psycho-social hazards.

In 2022, we made progress on the following areas:

Hazardous Chemical Management

We strengthened the management of hazardous chemicals aimed to reduce overexposure to hazardous chemicals and increase compliance. One such initiative is an online digital platform named eCHEMS that manages and tracks the procurement, receiving and storage of hazardous chemicals. The digital system minimises human-interface manhours spent on verifying compliance of incoming procured hazardous chemicals and ultimately reduce the possibility of rejection at the receiving end.

Positive Social Impact

- **Zero** cases of over exposure to chemicals in 2022.
- Achieved **95 per cent** compliance to chemical management in 2022.

Noise Reduction Programme

We implemented a groupwide Noise Reduction Programme focusing on reducing noise at source and strengthening overall Health Risk Management. This was done through Noise Engineering Control studies targeting identified high noise-emitting equipment and enhanced controls.



Digitalising the Health Risk Assessment (HRA)

Health Risk Assessment (HRA) was digitalised and integrated into HSSE Integrated Risks Assessment (HIRA). We implemented the enhanced HRA methodology, focusing on operationalisation and integration into other Safe System of Work (SSOW). The enhanced methodology includes a newly-developed psychosocial risk assessment (PsyRA), improving how workplace psychosocial risk factors are being identified and assessed.

- Operationalisation of HRA output within other Safe System of Work, and overall company health risk profile.

Advanced Ergonomics Risk Assessment (ERA)

We fortified the Ergonomics Risk Management by implementing the Advanced Ergonomics Risk Assessment (ERA) Tool, which is known as Humantech and Ergonomics Control Inventory.

- Reduced ergonomic risk from **60 per cent** in 2021 to **20 per cent** in 2022 and achieved time saving for **50** tasks in 12 locations through Advanced ERA.

Improved Risk Management Related to Industrial Hygiene

We continue to conduct First Line Assurance for Business Units, OPU's and our assets, which looks into managing risks related to Industrial Hygiene that are linked to day-to-day operational activities. We achieved increase in overall compliance as follows:

Programme (%)	2021	2022
Chemical Management	95	95
SDS Availability	91	94
Chemical Labelling	90	95
Hearing Conservation	93	97
Hearing Protection Zone Sign	98	99
Personal Hearing Protector (PHP) Issuance Record	94	95
Radiation Protection	99	99
Calibration of Measuring Equipment	91	93
Availability of Measuring Equipment	91	95
Annual Equipment Maintenance	91	96

Safety Management

We strengthened site supervision and compliance to SSOW to address key issues and reduce incidents.

- Seven Second Line Assurances and **17** unannounced visits were conducted at selected sites to strengthen site compliance of HSE requirements.
- As an effort to better understand the human performance aspects that contributes to incidents, PETRONAS has introduced the Categorisation of Incident Causes (CIC) that further defines categories of Human Factor for every incident investigation.
- This led to improved site discipline and interventions:
 - Experienced a **55 per cent** increase in Stop Work Authority (SWA) from the previous year.
 - Reported a **20 per cent** increase in Unsafe Act Unsafe Conditions (UAUC) from the previous year.

As a lagging indicator that demonstrates improvement of safety performance, Lost Time Injury Frequency (LTIF) for the PETRONAS Group reduced by seven per cent (from 0.14 to 0.13) compared to the previous year.

	2018	2019	2020	2021	2022
Lost Time Injury Frequency (LTIF) (Number of cases per one million man-hours)	0.09	0.11	0.10	0.14	0.13

Process Safety

Our commitment to Process Safety is a crucial aspect of our operations and is demonstrated by our concerted efforts to achieve significant reductions in Process Safety Events (PSE) 2022.

Governance

- Implemented Fire and Loss of Primary Containment (LOPC) Reduction Framework (FPMF and PSLR) across all domestic and international assets through collaboration with technical experts.
- Conducted peer-review on FPMF and PSLR to verify implementation effectiveness.
- Completed engagement for domestic and international assets for an effective dynamic risk management.

Leveraging Digitalisation to Improve Oversight

- Continue using Fire Prevention and Mitigation Framework (FPMF) and Process Safety Loss of Primary Containment Reduction (PSLR) Framework to optimise Process Safety work processes, provide governance oversight to minimise human error and ensure compliance, while providing valuable insights into risk management.
- Enhanced Integrated Process Safety Solution (IPSS) by launching and enhancing the Engineering and Organisational Change Management and Safety Review prior to starting up digital modules.
- Launched the Process Safety Awareness for Frontliners via digitalised HSE Learning modules to strengthen frontliners' awareness to manage risks and ensure business continuity.

Strengthening Competencies

- Conducted OPUs site engagements to strengthen staff ownership of Process Safety culture.
- Partnered with the Center for Chemical Process Safety (CCPS) to encourage knowledge sharing on Process Safety for PETRONAS and the industry.
- Formed the Integrated Process Safety Management (IPSM) Committee to improve collaboration efforts in steering Process Safety requirements from various Management Systems.

We reduced LOPC by 33 per cent with an impressive 81 per cent reduction in Operational Integrity-related LOPC compared to 2021. Furthermore, we reduced Tier 1 PSE by 30 per cent.

HSE Performance Indicators	2018	2019	2020	2021	2022
Number of Tier 1 Process Safety Events (Number of cases)	12	9	9	10	7

Positive Social Impact

Capabilities and Competencies

We aim to constantly embed safety in everything we do. In reinforcing this principle, we focused on realising our Generative HSE Culture programme by enhancing HSE capability development programmes, improving the sustainability of HSE programmes while embedding HSE values and importance among our stakeholders and the larger community.

Drive Learning Culture as Part of a Continuous Effort in Learning from Incidents

As part of our journey in building safety culture, we emphasize on the importance of learning from previous incidents in order to avoid or minimise issues in the future.

Contractor HSE Management

01

Conducted **13** Reflective Learning and incident sharing sessions involving **2,724** participants.

02

Developed and published **four** lessons learned videos on PETRONAS internal platforms to improve learning from past incidents.

03

Conducted four groupwide collaborative learnings involving **1,237** participants. Learning focus areas included Electrical Fire, Auto Ignition, Piping Corrosion and Process Safety in design.

We enhanced contractor HSE management, where our contractors were required to undergo specific training to ensure they possessed the necessary competencies in order to be part of our value chain.

- The focus on contractor management is demonstrated through the continuation of the PETRONAS Contractor HSE Mentorship Programme to improve the HSE system and performance. **Fifty** contractors subscribed to the programme whereby four contractors graduated in 2022.
- Established a Community of Practitioners (CoP) as a common platform for HSE Frontliners from contractors' companies to communicate HSE requirements and sharing of best practices.
- Launched PETRONAS Safety Frontliners Development Programme in July 2022, intended to standardise Contractor Safety Practitioner roles (including Safety and Health Officer, and Site Safety Supervisor) and equip them with relevant/tailor-made knowledge.

Collaborations and Partnerships

• PETRONAS Disaster Management Collaborative (PDMC) Workshop

We recognise the importance of collaborating with our internal and external stakeholders in strengthening our crisis management preparedness. Towards this end, we collaborated and involved various Government authorities and agencies in the workshop.

- **Three** PDMC workshops in East Coast and Sarawak Region (Kemaman, Miri, Bintulu)
- Participated by **31** PETRONAS operating units and **84** government authorities and agencies, involving **370** participants.



Improving Fire and HAZMAT Response Management

We focused on improving Fire and HAZMAT Response Management (FHRM) across our operations by collaborating with the Fire and Rescue Department Malaysia (FRDM) to strengthen our regulatory compliance. We also strengthened leadership and best practices with CEFS entities and our operations' Fire Response Unit which resulted in quarterly cross collaborations and advisory meetings between Group Health, Safety and Environment (GHSE) and Centralised Emergency and Fire Services (CEFS) entities. Collaborations with government authorities and agencies, including international stakeholders were also held.

- Introduced **five** Emergency Response Training Modules;
- Conducted study on firefighting foam with Fire Research Centre (PUSPEK) BOMBA CEFS Kerteh;
- Established guidelines in Managing Community Awareness and Emergency Response (CAER).

Our ability to develop these practices internally led to cost savings of approximately RM200,000.

- Collaboration with the Centralised Emergency and Fire Services (CEFS) and OPU's Fire Response Unit resulted in the introduction of three best practices in FHRM:
 - Standardised *Ujian Kecergasan Jasmani Kebangsaan* (UKJK)
 - Identified training module content on emergency response
 - Emergency response equipment dashboard to be implemented in 2023
- The Fire Safety and Emergency Response Community of Practitioners (CoPs) was chosen as the Top 2 Performing CoPs in PETRONAS (among 68) during Knowledge Management Day 2022, with **RM90 million** potential value creation.

Upskilling our Emergency and Crisis Management Capabilities

• Natural Disaster Management Committee (NDMC)

In strengthening our crisis management capability, we established and provided guidance to our Natural Disaster Operation Committee (NDOC) and Natural Disaster Operation Coordination Committee (NDOCC) members in managing natural disasters to minimise impact on people, the environment, assets and our reputation.

Completed the Natural Disaster Contingency Plan (NDCP) for all **six** identified regions (Southern, Northern, Central, Sarawak, Sabah and Labuan).

01

02

Upskilled **127** members and facilitated natural disaster crisis management exercises.

• Country Contingency Plan

We reviewed and revised the Country Contingency Plan (CCP) Technical Training and made it available to all our international assets. We also introduced two new CCP Technical Trainings, namely to Japan and Australia.

Successfully upskilled Country Contingency Team (CCT) members to improve capabilities and preparedness in managing crisis in international assets.

Conducted **six** exercises on crisis management for Japan, Mexico, South Sudan, and the United Arab Emirates.

Positive Social Impact



Security

We are fully committed to implementing a high-level, well-coordinated and integrated security approach that safeguards our assets, ensures the safety of our people wherever we operate and provides sustainable value for our stakeholders.

Why Is It Important?

Persistent geopolitical tensions, global economic uncertainties, increased competition, extreme weather patterns and accelerated technological development have increased security concerns. Given our wide geographical spread and the asset-heavy nature of our operations, we are strengthening our security preparedness further to withstand the changing risk environment.

Our business value chain including offshore and onshore assets are exposed to protests, violence, crime, insider threat, terrorist attacks and geopolitical conflicts. The increasing use of technology has also led to cybersecurity threats and consequently cyber-crimes which call for a holistic focus on enterprise security management. These interruptions may lead to incidental exposures, operational disruptions, supply chain breakdowns, ransomware, price risks and decreased productivity, which lower our ability to deliver sustainable stakeholder value. We are committed to maintain a high-level, well-coordinated and integrated security approach for the integrity of our assets and safety of our people, wherever we operate.

What Is Our Approach?

Our emphasis is on ensuring security excellence throughout our value chain. We continuously elevate our in-house security culture, harnessing physical security infrastructure and technologies to optimise business efficiencies and productivity whilst providing a conducive workplace. We also embed a security mindset into our organisational culture, supported by coordinated cross-functional awareness measures.

We are governed by the laws and regulations of the countries where we operate. Our practices are supported by robust internal governance stipulations that are regularly updated to help us adapt to the ever-changing external operating environment. With the rising focus on digital security, we fortified our priority on digitalisation, operational and strategic security acumens, steered by governance, compliance, capabilities, communications and technology application.

We established a security academy with targeted programmes to hone a pool of capable security personnel and equip them with suitable capabilities. We offer timely security training and ground exposure that prepares colleagues to manage security effectively, particularly at our high-risk operations.

We also pursued industry-wide engagements to uphold a conducive working environment and prevent maritime security threats on our shores in Malaysia.

Policies and Standards:

- PETRONAS Security Policy
- Security Management Systems (SeMS)
- Minimum Security Standard (MS2)

Value Creation in 2022

1 Proactive Security Risk Management

The robustness of our security controls and practices is vital to how we do our business. Gap closure efforts, assurance activities, penetration tests and security drills were some of the key activities carried out in the year under review covering selected domestic and international assets. A key effort included fortifying and streamlining compliance to our Security Policy via execution of the PETRONAS Group Management Framework, with roll-out planned in 2023. The Groupwide undertaking to enhance governance and assurance marks a formalised approach to accelerate security excellence in all that we do, through clear, concerted and coordinated initiatives, supported by improved communication on demarcation of roles and responsibilities.

Additionally, we continued to provide proactive security insights to facilitate informed management decision that take into account evolving external vulnerabilities.

2 Partnering for Greater Security

We believe in fostering closer ties with various stakeholders in Malaysia, including enforcement agencies, to strengthen security excellence for propelling energy security.

In 2022, we signed a Memorandum of Understanding (MoU) with the Royal Malaysia Police to further strengthen collaboration on security awareness and the integration of best practices via cooperation in training and operational support. This aims to spur collective knowledge sharing and enhanced capabilities for PETRONAS' onshore and offshore assets in Malaysia.

The aim is to strengthen our resilience and robustness as we navigate a more dynamic business environment.

We also worked with various enforcement agencies to strengthen maritime security, deploying a range of assets for optimum surveillance of our offshore interests including unmanned platforms. The joint operations led to zero intrusion cases between June and December 2022.

We also leveraged our Auxiliary Police (AP) personnel at our onshore assets in Malaysia. The APs are entrusted with enforcement powers as stipulated in the Police Act 1967. The coverage of PETRONAS' APs also includes certain offshore platforms that have been identified as national

critical infrastructure. Targeted joint operations with the local enforcement agencies were carried out on several occasions.

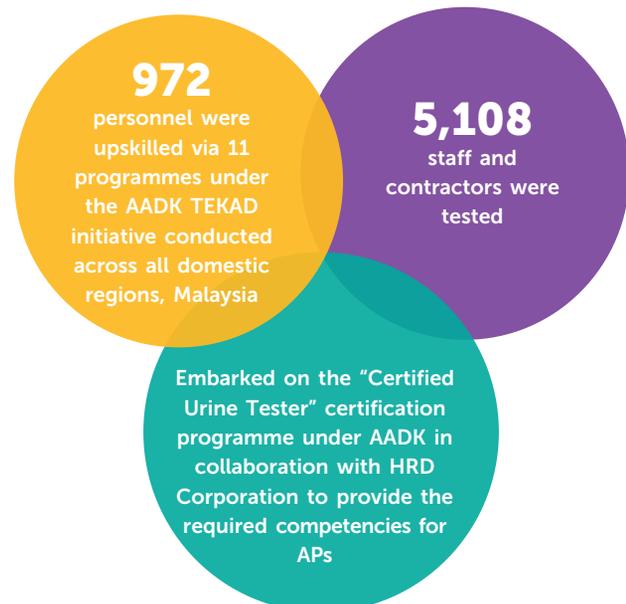
Additionally, we partnered with the industry players to drive collective action via the Sahabat Maritim programme to drive awareness on the dangers of vessel encroachment within the 500 metre safety radius surrounding our offshore operation. The programme ongoing since 2015, also educates local communities in Sabah and Labuan on wider security and safety implications.

3 Preventing Substance Misuse

Substance misuse can result in security issues, leading us to embark on *Tempat Kerja Bebas Dadah* (TEKAD), a programme under the *Agensi Antidadah Kebangsaan*, AADK, Malaysia.

TEKAD is a strategic partnership to promote a workplace free of substance misuse. It promoted discussions across multidisciplinary teams on illegal, prohibited substances and arising complexities if mismanaged.

The awareness programme involving staff and contractors also included a Training of Trainers (ToT) for our Auxiliary Police (APs) to undertake urine screening for drug detection. This was conducted as per the Police Act, P.U.A 461/1970 and relevant clauses/sections from Act 234 (Dangerous Drugs Act 1952) and Act 283 (Drug Dependents (Treatment and Rehabilitation) Act 1983).



Positive Social Impact

4 Strengthening Security with Technology

Our security personnel are our frontliners protecting our assets, information, employees and communities to ensure uninterrupted operations. Hence it is vital that we equip them with the latest security equipment and cutting-edge technology.

In 2022, we completed a pilot project in Pengerang, Johor, to maximise our AP's enforcement powers by expanding their focus into marine, investigation and air units. In addition to testing a drone surveillance and monitoring system at the PETRONAS Twin Towers and the East Coast Region, we introduced a facial recognition system at the PETRONAS Twin Towers to improve security at our headquarters. Concurrently, we engaged relevant authorities and agencies on proactive counter-drone measures – exploring the feasibility of drone jammers the need for streamlined standard operating procedures on drone management activities for the corporate sector in Malaysia.

We also enabled centralised monitoring with an Integrated Security Control Centre, equipped with an Emergency Communication Centre (ECC), Mobile Monitoring Control System (M2CS), and drone technology. PETRONAS was also among pioneering corporate organisations to deploy body-worn cameras at our headquarters in Kuala Lumpur, Malaysia, thereby safeguarding our premises.

- Obtained certification for **81** identified personnel (73 APs and eight executives) as drone operators, aligned with the Civil Aviation Authority of Malaysia (CAAM) regulations.

We also signed an agreement with University Teknologi PETRONAS (UTP) to collaborate on various security analytics technology initiatives. This partnership encourages participation between academic and industry practitioners to venture into research on data, cybersecurity and physical security analytics.

- **Three** joint-ventures are being pursued through UTP's Centre for Research in Data Sources (CeRDAS).

5 Establishing a Culture of Security

Engagement is critical in upholding a robust security culture, extending existing focus beyond our staff and domestic enforcement agencies to include international constituents. We also strengthened our relationship with local stakeholders to contribute to upholding national energy security.

- Achieved a **5-star** Certification of Key Point Facilities for PETRONAS Chemicals Fertiliser Kedah (PCFK), Gas Processing Santong (GPS) Dungun and Malaysia Refining Company Sdn Bhd (MRCSB) facilities; part of an initiative led by the Malaysia Office of the Chief Government Security Officer (CGSO) of the Prime Minister's Department.



Towards this end, we conducted several key efforts, some of which included:

Pilot Regional Security Hub – Asia Pacific

Objectives

Streamline security practices across international operations for better line of sight and instil security acumen aligned with local cultures.

Outcomes

- Bridged the governance and operational gap between Group Security and ground operations.
- Enhanced relationships with international security stakeholders.
- Provided timely security insights and support on managing ground security complexities.
- Mitigated potential hazards through timely security controls.

PETRONAS International Security Symposium

Objectives

Establish a common platform for the industry’s security practitioners to share, deliberate and network on the topic of physical security to advance security excellence.

Outcomes

- Over 867 virtual participants and 150 physical participants from 11 countries including Indonesia, India, Iraq, Sudan, Turkmenistan and the United Kingdom. The event held on 18 August 2022 in Kuala Lumpur, Malaysia also saw participation from PETRONAS’ Board members, ELT and representatives from various companies from the Energy sector.
- Pioneered a dedicated platform on security for the energy sector featuring a suite of Malaysian and international speakers, with discussions on topics such as security’s transition towards net zero to convergence of physical and digital security acumen.
- Received positive feedback from participants citing a previous absence of a formal platform bringing together the energy sector’s physical security practitioners.

Security Awareness

Objectives

To propagate security via discourse on timely topics of interest in effort to drive security uptake through better understanding and appreciation of security acumen across the operational and strategic fronts.

Outcomes

- 10 webinars, including some for a groupwide audience. Some of these sessions attracted between 200 to over 500 participants.
- Wide range of topics including security risks, security geopolitics and security behaviours. (e.g. Terrorism, country updates and revolutionising security through technology, Kidnap for Ransom, Cybersecurity, Fix the Leak, Information Sharing and Raya Festive Season travel safety advisory).
- Developed podcasts, with three episodes dedicated to Climate Change, Security and Human Rights. The insights reflected correlation between security and sustainability, enabling better appreciation on the role of security in realising long-term business growth. These podcasts also featured PETRONAS subject matter experts and their views on how security is a vital aspect of sustainability.

We established a Security Academy to enhance our security practitioners’ skills, knowledge, and capabilities, enabling them to deliver optimum value and provide equitable services as a business growth partner.

Additionally, identified personnel also attended sessions on Drone Certification, Train the Trainer, Basic Investigation Technique, Basic Forensic Technique and Basic Marine Survival among others. These sessions focused on striking a proper balance across the technical, strategic, and leadership spheres, emphasising the familiarisation of law and regulations.

Positive Social Impact

Human Rights

Why Is It Important?

Respecting human rights is essential for our social license to operate. It is our responsibility to manage human rights risks and impacts arising from areas of our operations while contributing to society in a responsible, ethical and transparent manner.

PETRONAS is committed to respecting human rights in areas of our operations, complying with our Code of Conduct and Business Ethics (CoBE) and all relevant legal requirements.

Respecting human rights across our value chain, inclusive of employees, suppliers, contractors, partners and communities where we operate is very important to PETRONAS in upholding our duty as a business enterprise. Human rights is the foundation of sustainable development and creating positive social impact comes with proper management of social risks. Upholding human rights through fair and ethical practices is fundamental to our business. It creates a safe and secure operating environment that complies with laws and regulations and meets the expectations of our stakeholders. Respecting human rights is also essential to achieve our purpose in being a progressive energy and solutions partner, enriching lives for a sustainable future.

To support our Human Rights Commitment, we integrate controls throughout our systems and processes including risk management, procurement and supply chain, HSE, human resource management, business operations, legal and security. The following standards, policies and guidelines guide us:

Human rights tools applied in PETRONAS

List of external human rights tools applied in PETRONAS:

1. United Nations Guiding Principles (UNGPs) on Business and Human Rights
2. Fundamental Principles of the International Labour Organisation
3. UNGP Effectiveness criteria

List of internal human rights tools applied in PETRONAS:

Policies:

1. PETRONAS Human Rights Commitment
2. PETRONAS Code of Conduct and Business Ethics (CoBE)
3. PETRONAS Health, Safety and Environment Policy
4. PETRONAS Anti-Bribery and Corruption Policy and Guideline (ABC Manual)
5. PETRONAS Contractors Code of Conduct on Human Rights

Standards:

1. PETRONAS Technical Standard on Social Risk Assessment
2. PETRONAS Technical Standard on Grievance Mechanism
3. PETRONAS Security Management System

Guidelines:

1. PETRONAS Technical Guideline on Human Rights Due Diligence
2. PETRONAS Technical Guideline on Indigenous Peoples Assessment
3. PETRONAS Technical Guideline on Cultural Heritage Assessment
4. PETRONAS Technical Guideline on Land Acquisition and Involuntary Resettlement

As the industry evolves with the energy transition, respecting human rights has become even more critical to our business. It shows strong alignment to respecting the best interests of our rightsholders and interested parties.

What Is Our Approach?

Identifying exposure to potential human rights risks and impacts, mitigating and addressing them are important in our operations. Salient potential human rights issues material to PETRONAS are:

Labour and Working Conditions	Community Well-being	Supply Chain	Responsible Security
<ul style="list-style-type: none"> ➤ Forced and trafficked labour in contractors' and subcontractors' workforce. ➤ Child labour. ➤ Condition of employment and work. ➤ Discrimination in hiring and contractual terms. ➤ Freedom of association and collective bargaining. ➤ Workers' health and safety. ➤ Workers' camp conditions. 	<ul style="list-style-type: none"> ➤ Community health and safety. ➤ Access to natural resources for health, cultural needs and livelihood. ➤ Land acquisition and involuntary resettlement with/without economic displacement. ➤ Indigenous peoples. ➤ In-migration. 	<ul style="list-style-type: none"> ➤ Contractor/supplier performance related to labour and working conditions, community well-being and security. 	<ul style="list-style-type: none"> ➤ Use of force and conduct of third-party security. ➤ Provision of Human Rights training for staff and third-party security.

Our human rights approach is embraced and advanced by our leaders, with clear governance processes to ensure implementation and accountability. Our commitment is led from the top, our work in human rights is overseen by the PETRONAS Board and ELT.

The Board and ELT regularly discuss human rights as part of our approach to sustainability, reviewing issues with actual or potential impact, where a business-critical decision needs to be taken, or where substantial financial investment may be needed to address the impact.

Efforts to uphold human rights are integrated throughout our organisation and extend to our broader ecosystem, including suppliers, contractors, partners and the communities we serve.

Our Due Diligence

To minimise social risks and their impact on our employees, partners, contractors and communities, we have established technical standards and guidelines on due diligence that include assessments on indigenous peoples, cultural heritage, land acquisitions and involuntary settlement as well as grievance mechanism. Our Social Performance technical practitioners lead our due diligence programmes, identifying, mitigating, tracking, and monitoring potential human rights issues.

We also require human rights due diligence for potential mergers and acquisitions. As we transition to a low carbon future, we ensure our processes, tools, and practices remain updated and applicable in identifying how new energy infrastructure and developments impact human rights. We also share best practices with our supply chain partners to ensure the effective implementation of human rights due diligence.

Throughout 2022, there were no reported violations involving indigenous peoples' rights. There was also no activity on land acquisition and involuntary resettlement.

As part of our policy, we do not practice discrimination on any grounds. We continuously conducted reviews, strengthened policies and practices to ensure employees rights on equality and non-discrimination were upheld.

There were no complaints of discrimination received in 2022, based on our Industrial Relations data.

Access to Remedy

Grievance mechanisms create channels for dialogue, problem-solving and investigation and are applied to provide timely and fair remedies when needed. Workers and other rightsholders can raise complaints freely and with the expectation of obtaining effective and transparent resolutions. It also helps to identify country-specific solutions and actions to avoid recurrence.

Our grievance mechanism covers HSE, security, labour and working conditions, and supply chain concerns where we operate. We have designated personnel, community liaison officers and online complaint channels to manage grievances.

Additionally, PETRONAS contractors are required to establish a grievance mechanism for their workforce within our value chain. This mechanism shall be made known and communicated in relevant languages, providing a way to report grievances while ensuring that the identity of the person filing the grievance is protected. The grievance mechanism must adhere to the United Nation Guiding Principles (UNGPs) 'access to remedy' pillar.

Positive Social Impact

Value Creation in 2022

Strengthened Governance

1 Included Human Rights Section to the Revised PETRONAS Code of Conduct and Business Ethics (CoBE)

In 2022, we updated the PETRONAS CoBE to include a human rights section under Part III: Workplace, Culture, and Environment. The revised policy mandates all employees, contractors, partners and those involved in our operations to uphold the principles of respect for human rights and take measures to mitigate social and human rights risks, prohibit child labour, engage in or support human trafficking or modern slavery, including forced, bonded, or involuntary labour.

2 Sustained PETRONAS' Commitment to Zero Forced Labour and Child Labour in Malaysia-Based Supply Chain

We continue to uphold our pledge to eradicate forced and child labour in all our operations as part of our firm commitment to respecting human rights.

We comprehensively assessed our contractors performing high-risk activities from 2019-2022 to ensure full compliance with our human rights policies and practices. Bureau Veritas Certification (M) Sdn Bhd, a third-party verifier, assessed our supply chain due diligence on qualitative and quantitative data related to our key performance indicators for the PETRONAS Contractor Code of Conduct on Human Rights (CoCHR). The results affirmed that PETRONAS has adequate supply chain due diligence, and there was no evidence of child or forced labour practices within our supply chain.

We found no incidents of child and forced labour in the reporting year. To further strengthen the awareness and understanding of risks related to child and forced labour among our employees, we have organised an engagement as well as a Masterclass on Forced and Child Labour on 5 July 2022, with a speaker from the International Labour Organisation (ILO), and a Masterclass on Standard and Industrial Research Institute of Malaysia (SIRIM) 50¹ Social Accountability Standard on 17 November 2022.

These efforts were organised to promote and elevate our employees' awareness and knowledge of child and forced labour risks. Understanding the child and forced labour indicators and why they are essential, ensures our employees can identify potential child and forced labour risks in their respective operations.

3 Strengthened Social Risk Assessment Implementation

An evaluation on the effectiveness of social risk assessment (SRA) implementation was conducted by sampling 20 per cent of total SRAs for the past five years. No deviations were found from our SRA technical standard, indicating effective implementation of the assessment process. Enhancements were also made to our digital SRA tool from the review, with an upgrade of the SRA documentation from guideline to standard.

4 Human Rights Due Diligence (HRDD) in India

We reviewed the adequacy of controls to manage potential child and forced (bonded) labour risks in our operations across India.

The risk of child or forced labour is low due to compliance with regulatory requirements, strict penalties, and limited activities for contractors in our facilities in India. We have recommended further improvements to minimise our risk exposure, as listed below:

- Enhancement of contractor management to include human rights awareness briefings, and fit-for-purpose contractor self-assessments on labour, potential collaborations with partners or within joint ventures (JVs) on respect for human rights initiatives, revision of Codes of Conduct and relevant processes to align with revised CoBE, assessment of adequacy of controls on forced or bonded labour risks across the value chain, as well as assessment of forced and child labour risks across key contractors and suppliers.
- These include source material to comply with regulatory requirements such as the Factories Act 1948, The Child Labour (Prohibition and Regulation) Act 1986, Bonded Labour System (Abolition) Act 1976 and The Payment of Minimum Wages Act 1948.

¹ SIRIM 50 is a Malaysian social accountability standard that assesses an organisation's compliance with health and safety regulations and Malaysian labour laws and ethical practices. It defines social accountability requirements consistent with those in other international social standards such as ISO 26000 and SA 8000.

5 Contractors Code of Conduct on Human Rights (CoCHR)

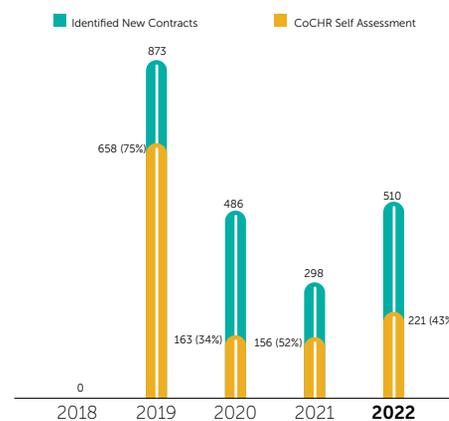
We continue to reinforce our commitment to human rights across our value chain, by assessing compliance on our Contractors Code of Conduct on Human Rights (CoCHR). The CoCHR is our supply chain due diligence on labour and working conditions, requiring ethical practices from our contractors in compliance with the PETRONAS Human Rights Commitment. We value contractors who share our commitment to integrity, anti-bribery and anti-corruption practices and sustainable development. Compliance with the CoCHR, including the principle of freedom of association and collective bargaining, is mandatory for all contractors. This requirement has been embedded into our procurement processes in Malaysia, where respect for human rights has become a contractual obligation for all goods and services providers who participate in our procurement process.

New Suppliers Screened Using Social Criteria

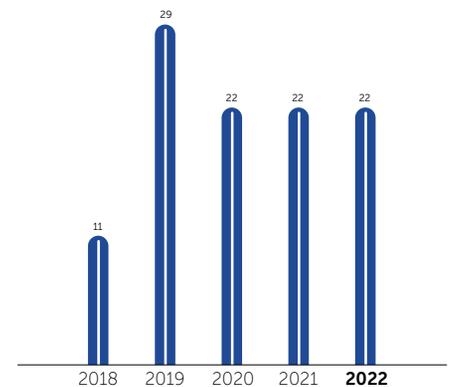
Under the PETRONAS Contractors Code of Conduct on Human Rights (CoCHR), we require our contractors to respect internationally-recognised human rights and comply with the PETRONAS Code of Conduct and Business Ethics (CoBE). We expect our contractors and suppliers to adhere to labour and working condition principles: freedom of labour, prevention of child labour, wages and benefits, working hours, grievance mechanism, non-discrimination, freedom of association, humane treatment and foreign and migrant workers.

1. From 2018 to 2022, PETRONAS conducted CoCHR Self-Assessments for identified new contracts and performed CoCHR Compliance Assessments based on the Self-Assessment results.
2. In 2022, the CoCHR survey was sent to 510 contractors.
3. Out of the 510 contractors, we identified 22 contractors with high risk exposure on human rights in 2022 and we completed 100 per cent CoCHR compliance on those contractors to understand their situations and challenges. Generally their gaps were on informal grievance mechanism within their workforce and lack of grievance management within their supply chain.

Participation Rate of CoCHR Online Self-Assessment

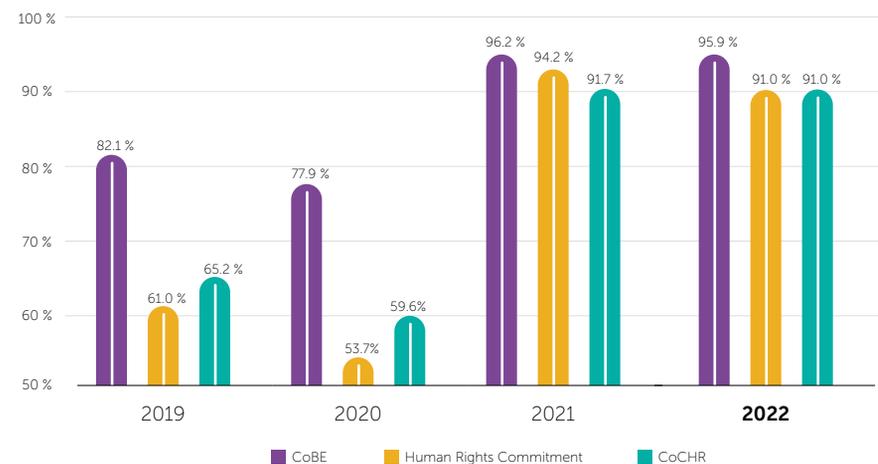


Number of CoCHR Compliance Assessments Conducted



Results from the online surveys conducted from 2019 – 2022 indicated that we managed to maintain more than 90 per cent awareness building among contractors for two consecutive years. Using CoBE as our baseline, the gap has narrowed to less than 5 per cent in 2021 and 2022, compared to about 20 per cent in 2019 and 2020.

Awareness on PETRONAS Governance Documents on Human Rights (Survey 2019 - 2022)



We conducted several engagement sessions with our employees to raise awareness of the risks associated with child or forced labour practices. We also collaborated with the Department of Labour Peninsular Malaysia to share our initiatives and gain a deeper understanding of the revised regulations.

Positive Social Impact

Engagements

Human Rights Leaders' Series Campaign

To elevate the importance of human rights felt leadership, a Human Rights Leaders Series campaign was curated to promote and relate human rights management best practices in various functions across PETRONAS.

Capability Enhancements

01

Five PETRONAS Top Leaders featured in 'Human Rights: Leaders Series' posters published from November to December 2022.

- ILO webinar = **381 participants**
- SIRIM 50 Masterclass = **268 participants**

02

Human Rights Management

We conducted an engagement session between the Department of Labour Peninsular Malaysia and the Project Delivery HSE team with Social Performance practitioners to understand the updated requirements and share on PETRONAS' human rights management practices. The engagement allowed both parties to better understand the revised regulations governing the labour practices across our business and supply chain.



81%
of permanent employees completed the Human Rights Management e-learning module

Upskilling of Contractors and Vendors

We conducted several human rights awareness and upskilling sessions for our partners and contractors on human rights legislation and practices. These were delivered as part of the Strategic Partners Engagement, Vendor Development Programme and other activities.

On 29 September 2022, 680 participants joined a webinar on our Special Oil and Gas Services and Equipment Financing Programme. Topics on human rights were presented, including on business and human rights and principles to practice towards a sustainable supply chain.

281

contractors were upskilled on human rights management, labour and working conditions legislation and labour practices.



Assessments

Social Risk Assessment Functional Checklist (SRA FC)

We developed a Social Risk Assessment Functional Checklist (SRA FC) to measure the effectiveness of SRAs conducted, as well as to identify good practices and gaps by sampling 20 per cent of SRAs conducted in PETRONAS.

This initiative did not find any deviations from the PETRONAS Technical Standards, indicating effective implementation of the assessment process, although we made enhancements on our SRA digital platform to further improve monitoring of the SRA mitigation plan.

Social Risk Assessment with Local Communities

Social risk assessments were conducted throughout our projects and operations to ensure we could identify, assess and mitigate any social and human rights risks which may affect the communities where we operate.

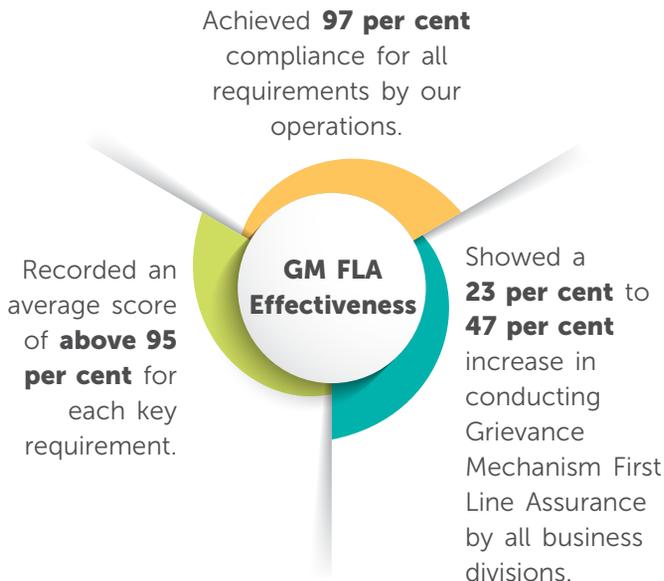
In 2022, we conducted seven Social Risk Assessments at our projects and operations. Based on the findings, there were no significant actual and potential violations involving rights of the communities surrounding our operations.

Grievance Management

Evaluation of Effectiveness of First Line Assurance

We have a Grievance Mechanism First Line Assurance (GM FLA) that acts as the first point of contact for resolving issues, thus addressing complaints swiftly and effectively.

An evaluation of the effectiveness of the grievance mechanism (GM) implementation was conducted by sampling 100 per cent of GM FLA. Results found that 97 per cent of operating units comply with the GM requirements, with a 47 per cent increase in assurance implementation from 23 per cent in the previous year. First line assurance by the operating units is risk-based.



Grievance Mechanism e-Module

We ensure our employees are kept updated on our Grievance Mechanism processes.



Managing Community Grievances

We received seven grievances in 2022, as listed below:



All seven grievance cases were closed in 2022. The number of grievances do not necessarily describe the effectiveness of the system as it is the outreach, trust and confidence in the system that is critical to us.

The evaluation on the effectiveness of our grievance mechanism processes in 2022 shows positive results, and we also acknowledge that there is room to further encourage our rightsholders to continue using our GM channels towards managing potential risks and impacts to the community, employees and contractors where we operate.

Positive Social Impact

Supply Chain Management

A Resilient and Agile Supply Chain is Essential for our Operations and Stakeholders.

Why Is It Important?

PETRONAS relies on a range of products and services throughout our value chain, sourced from a vast global network of suppliers.

Ethical and sustainable supply chains aid in product development, safeguard workers' rights, and enhance operational safety. We view our supply chain as an opportunity to contribute to positive socio-economic impacts. It allows us to channel financial capital into businesses, including Small and Medium Enterprises (SMEs), empowering their growth in environmental protection, responsible sourcing and procurement practices.

What Is Our Approach?

Our suppliers must adhere to policies and standards in managing environmental and social impacts across our integrated oil and gas value chain.

We have zero tolerance towards non-compliance, including our environmental and social standards. We conduct capacity building and engagement sessions to build capability and strengthen the resilience of the industry. To this end, we have been collaborating with nine financial institutions on the Vendor Financing Programme (VFP) to facilitate access to funding for vendors since 2018. We have also introduced Special Oil and Gas Services and Equipment (OGSE) Financing which targets underserved vendors with less than five years of experience. In driving sustainability, we partnered with industry players and government agencies by participating in the National OGSE Industry Blueprint roadshows in the Klang Valley, Sabah and Sarawak. We also participated in strategic forums such as the National OGSE Sustainability Forum.

We collaborated with OGSE industry players through our Vendor Development Programme (VDP) and SMEs to promote local entrepreneurship to contribute to socio-economic growth and improve communities through an increase in employment opportunities.



Policies and Guidelines

- PETRONAS Contractors Code of Conduct on Human Rights (CoCHR).
- PETRONAS Code of Conduct- and Business Ethics (CoBE).
- PETRONAS Anti-Bribery and Corruption (ABC) Manual.
- PETRONAS Whistleblowing Policy.

Value Creation in 2022

1 Screening for a Sustainable Supply Chain

PETRONAS' suppliers and contractors are encouraged to embrace sustainability principles and be accountable for its implementation.

Our suppliers are at various stages of implementing sustainability practices across their respective businesses. We provided our assistance through multiple engagements and training programmes to help them progress.

We organised the 101 Sustainability Awareness session, in collaboration with Yinson Holdings Berhad and SOLS Energy Sdn Bhd to strengthen our vendors' understanding and responsiveness towards sustainability. We conducted a second sustainability awareness session titled Shifting Towards Sustainability, later in the year in collaboration with our Strategic Research division, Sustainability Energy Development Authority (SEDA) and Kenanga Suria Sdn Bhd.



- **342** participants attended the 101 Sustainability Awareness programme to strengthen the awareness of PETRONAS' pool of vendors on our approach to sustainability.
- **383** participants attended the second sustainability awareness session – Shifting Towards Sustainability.

2 Simplifying Procurement with Technology

Our supply chain productivity and efficiency have been greatly enhanced through technology adoption. By digitising and automating our procurement process, we have been able to optimise our resources, reduce costs and effectively respond to disruptions. Our focus was process automation to enable contactless buying experience for low value purchasing activities.

As a result of these efforts, as well as internal cost optimisation and efficiency initiatives, we enabled local OGSE industry players to serve PETRONAS more efficiently while improving the pace of the end-to-end procurement process.

Positive Social Impact

3 Improving the Industry Through Our Supply Chain

As an integrated energy solutions provider, we play an important role in promoting Malaysia's OGSE industry development, guided by the National OGSE Blueprint 2021-2030. This is to ensure we meet market demand, harness efficiency and drive innovation and opportunities for local companies to expand into new markets. The aim is to promote a healthy ecosystem, improve competitiveness on a global scale while safeguarding strategic national interests and contributing to the country's economic growth.

Our activities included hosting the Vendor Financing Programme (VFP) Conversation Day in collaboration with Malaysian Oil, Gas and Energy Services Council (MOGSC) and Malaysia OSV Owners' Association (MOSVA) at Putrajaya to help develop Malaysian OGSE players by presenting opportunities for funding.

127 participants attended the VFP Conversation Day.

RM1.7 billion in financing was awarded to **281** successful applications under the VFP since 2018.

270 participants attended the Fostering Green Financing Solutions – From Financial Institutions to Vendors programme to learn about funding opportunities to diversify into clean energy value chains and adopt sustainability practices. This session was held in collaboration with **five** financial institutions: Bank Muamalat, CIMB, HSBC, Kumpulan Modal Perdana and Malaysian Industrial Development Finance (MIDF).





Product Stewardship

Why Is It Important?

Product stewardship is a vital aspect of ensuring that our products meet customer needs and sustainability considerations. When developing innovative products and solutions, we take a life cycle approach in meeting stakeholder expectations through minimising impact on health, safety and the environment throughout a product’s entire life cycle.

Product stewardship in PETRONAS comprises a range of cross-functional disciplines, including product safety and regulatory compliance, toxicology, ecotoxicology, environmental health, product sustainability and life cycle assessment. We also collaborate with stakeholders across extended product supply chains, going beyond compliance to improve our offerings, ensuring safer and sustainable products that are in line with customer preferences.

What Is Our Approach?

We remain steadfast in our commitment to managing risks and enhancing the performance of our products across their entire life cycle. Our approach to Life Cycle Thinking ensures that we take comprehensive steps to systematically assess, control, and communicate product HSE risks. These elements are integrated into our operations, from R&D and raw material sourcing to manufacturing, distribution, product application, consumer use and disposal.

Product safety and risk assessments are regularly performed, updated when necessary and communicated in order to ensure we do our part in safeguarding the environment and enabling our products to have a positive social impact through responsible use and application. We conduct comprehensive raw material assessments and product Life Cycle Assessments (LCA) to add value to products by meeting emerging stakeholder expectations and managing future product risks effectively. These practices are embedded into our standards and systems to ensure robust and responsible governance processes are in place which enables continuous improvements to product stewardship performance.

In addition to ensuring efficient procedures and effective communication with our partners and customers, we leverage digital and toxicology laboratory technology to safeguard our product compliance (licence to operate) in new markets, build customer loyalty and drive technical competency. Our commitment to managing product risks and enhancing performance is integral to our continued success.

Guided by international principles, frameworks and standards

- United Nation’s Globally Harmonised System of Classification and Labelling of Chemicals.
- Organisation for Economic Co-operation and Development (OECD) Guideline for the Testing of Chemicals.
- ISO 14040/44 Environmental Management – Life Cycle Assessment.

Positive Social Impact

Key Highlights of 2022

Product Stewardship and Toxicology

1 Operation Clean Sweep

Working closely with the Malaysian Plastics Manufacturers Association (MPMA), PETRONAS Chemical Polyethylene Sdn Bhd and PETRONAS Chemical LDPE Sdn Bhd officially registered our pledge under Operation Clean Sweep® (OCS) which is the global plastics industry initiative that aims to reduce polymer pellets, flake and powder loss to the environment. PETRONAS Chemicals Group Berhad (PCG) became the first OCS signatory in Malaysia, demonstrating our commitment to safeguard the environment in this important area by performing detailed onsite assessments and implementing solutions to prevent polymer loss to the environment. Recognising the importance of industry-wide participation, moving forward we endeavour to drive this important agenda by encouraging wider adoption of OCS within our polymer supply chain.

2 Establishing PETRONAS' Maiden Toxicology Laboratory

We are establishing PETRONAS' first toxicology laboratory to support R&D of safer and sustainable chemicals. The laboratory will enable early screening of key health and environmental hazards of candidate chemicals at pre-prototype stage. This will provide a feedback loop for product design improvement to create less hazardous products and minimise impact on the environment and human health. The laboratory emphasises non-animal test methods to ensure wider regulatory compliance as well as future regulatory preparedness.



3 Ecotoxicology Assessments

We continuously assess the environmental performance of our products to promote the use of safer and sustainable chemicals. Data from internationally accepted and reliable ecological tests based on the Organisation for Economic Co-operation and Development (OECD) test guidelines were utilised to improve relevant product hazard profiles.

Produced water risk-based assessments continued to be conducted at our selected onshore terminals in order to address the ecological risk of discharged produced water on sensitive receptors in coastal and marine ecosystems.

4 Strengthening Product Safety and Regulatory Compliance Governance

Operating internationally through integrated supply chains with a broad spectrum of products poses its own unique challenges. We place importance on product safety and regulatory compliance governance to ensure alignment with PETRONAS' overall objectives and aspirations. We have leveraged PETRONAS Group product stewardship situational assessments in order to:

- Identify areas of risk and enhance internal product stewardship standards with leading practices to ensure our products continue to be safe for intended use through evidence-based approaches.
- Identify areas for simplification and/or optimisation in managing our product regulatory compliance processes, as evident in the roll-out of a dedicated emergency response number to ensure any product-related emergency calls are professionally managed, with adequate coverage internationally.

5 Raw Material Compliance

As part of our efforts to drive product safety and sustainability, product raw material assessments have been identified as a key lever. With the introduction of our Raw Material Information Request (RAWMIR) process, key product stewardship information regarding presence of Substance of Very High Concern (SVHC) and conflict minerals¹ have been curated for the majority of our products and specific cases for phase out or substitution have been initiated.

Due diligence on 250 raw materials used in PCG's products revealed that no conflict minerals were supplied to PETRONAS. Efforts are ongoing to complete conflict minerals due diligence across the wider Downstream and Upstream businesses.

The RAWMIR process was also extended to Oil Field Chemicals (OFCs) in order to obtain key environmental performance related to the Offshore Chemical Notification Scheme (OCNS). Data pertaining to aquatic toxicity of OFCs was obtained to enhance our efforts to reduce risk from produced water discharges.

6 Life Cycle Assessment (LCA)

We continued to drive and embed Life Cycle Thinking across our businesses and operations, as well as for new projects and product development. The LCA approach was also used to quantify and prioritise the usage of low environmental impact raw material formulations, including formulating products with lower carbon footprint. This allowed us to capitalise on new business opportunities and generate income for PETRONAS.



36 LCA studies completed for products across Downstream and Gas businesses.

We conducted a cradle-to-gate assessment, beginning from resource extraction (cradle) to the factory gate (before it is transported to the consumer). This approach is aligned with our integrated value chain, ranging from extraction to downstream product completion.

Engagements with relevant stakeholders were conducted to encourage knowledge sharing on the concept of LCA and gain the necessary information to develop life cycle inventory data. In the absence of suppliers' information, we leverage our experience in developing the PETRONAS LCA database.

¹ In politically unstable areas, conflict mineral trade can be used to finance armed groups, fuel forced labour and other human rights abuses, and support corruption and money laundering. Conflict minerals are tin, tungsten, tantalum and gold (refer to EU Regulation 2017/821).

Positive Social Impact

Employee Well-being

Why Is It Important?

Our people are our most valuable asset and their well-being is our priority. As we recognise that a healthy work-life balance is essential for our employees' productivity and job satisfaction, we encourage flexible work arrangements, provide access to wellness programmes and offer a range of other initiatives to promote employee well-being. By investing in our employees, we promote a more motivated and engaged workforce that is better equipped to contribute to our business success.

In addition to promoting employee well-being, we are also committed to promoting diversity and inclusion in our workplace. We believe that embracing diversity brings new perspectives, fresh ideas and a wealth of talent to our organisation. This allows us to tap into a wider pool of talent, foster innovation and improve decision-making. Our commitment to create an inclusive work environment where everyone feels valued, respected and supported will contribute to wider positive societal impact, and is also a key driver to our progress. A diverse and inclusive workplace is essential for creating value and driving sustainable growth.

What Is Our Approach?

We take the time to understand the unique needs of our employees and introduce relevant programmes anchored on PETRONAS Cultural Beliefs and Shared Values to create an environment where they can thrive and help us achieve our strategic priorities.

We believe that connecting with peers both within and outside their scope of work allows employees to nurture their professional and personal interests. We encourage participation in various clubs, company-wide initiatives and volunteering activities that contribute to a positive workplace culture — instilling a sense of belonging, safety, passion and purpose over the long term.

Our commitment to diversity and inclusion is guided by the PETRONAS Diversity and Inclusion (D&I) programmes, focusing on four key areas: gender, multinational, age and culture. Meanwhile, our Wellness Steering Committee oversees employee health and well-being, including mental health.

PETRONAS also has processes and controls in place to ensure we comply with applicable wage laws. We conducted market analysis to ensure competitive compensation. In Malaysia, compensation is on average, 20 per cent above minimum wage thresholds.

Value Creation in 2022

Empowering People through Flexibility

Flexible Working Arrangement (FlexiWork)

We introduced FlexiWork to allow our people to balance between their professional and personal commitments, ultimately being their best selves while delivering for the organisation. We put in place safety measures to ensure a smooth back-to-office transition for our employees post COVID-19 pandemic. We reinforced awareness on the existing FlexiHours and FlexiWear that complement the current FlexiWork Arrangement.

We also established the PETRONAS Work Hub to enable employees who work either from home or the office to access information on best practices, digital tools and available support to help them sustain and where necessary improve their productivity levels. Consistent communication was also carried out on COVID-19 Standard Operating Procedures (SOPs) to ensure the safety of our employees and those that they encountered, at work and at home.

Caring for Our People's Support System

Employee Assistance Programme (EAP)

The EAP named myFriends was launched together with our MESTIFit4Health wellness programme in 2017 as part of PETRONAS' effort to care for the welfare of our people by providing psychological interventions to build personal resilience, reduce emotional distress and destigmatise mental health issues. In 2021, Enhanced EAP or EAP 2.0 was introduced, integrating our EAP with advances in psychology and coaching programmes via a digital platform accessible all day with comprehensive multidisciplinary support by digital physical and mental health care provider, Naluri Hidup Sdn Bhd to employees and sponsored students globally.

We extended the EAP 2.0 in 2022 to family members to help them cope with their mental well-being as an important measure to support our employees' overall health and performance.

- **282** employees received counselling with a total of 954 hours, a **15** per cent increase from 2021.
- **70** per cent of employees who received counselling reported the therapy to have been effective.
- Digital coaching increased by **119** per cent from **533** individual sessions in 2021 to **1,166** individual sessions in 2022.
- Number of callers to the EAP Careline dropped **14** per cent to **700** from the previous year's **811**.

Creating an Inclusive Culture

We remain focused on creating an intentionally inclusive culture. We do this by reinforcing the right behaviours and mindset to sustain an environment that will help us progress and accelerate our ability to deliver on our commitments. Our talent composition in 2022 comprised of 29 per cent women, which was an improvement from 28 per cent in 2021. We employ over 100 nationalities and 40 per cent of our total population is aged 35 years and below.

Driving Diversity and Inclusion (D&I)

Diverse ideas, views and backgrounds create a more progressive work environment which in turn delivers better outcomes. In creating an intentionally inclusive culture, we drive change through leadership and governance, communication, education and culture.

1 Leadership and Governance

The Board of Directors approved our baseline and targets as we work towards more focused efforts on D&I. We are governed by requirements in areas where we operate and aim to seek and nurture local talents for senior management roles across the Group.

We collaborate through reputable associations and organisations, such as the International Association of Oil & Gas Producers (IOGP), World Business Council for Sustainable Development (WBCSD) and the World Economic Forum (WEF) to network and benchmark global practices of Diversity, Equity and Inclusion (DEI). In 2022, our Senior Vice President of Group Human Resource Management was assigned the role of Commissioner in the Business Commission to Tackle Inequality (BCTI) by WBCSD.

In ensuring diversity of thought at all levels, myTalentX was introduced in 2022 as a digital platform to identify potential leaders through a process of transparent and effective succession planning.

2 Communication

Strategic conversations with the Board were held on the topic of 'Equity'. The conversations covered the foundation and fundamentals of Diversity, Equity and Inclusion (DEI), leading best practices, priorities and commitment going forward on the matter. The Board were also updated on PETRONAS' progress and efforts towards D&I.

3 Education

The Conscious Inclusion Programme was rolled out to raise awareness on the importance of D&I to PETRONAS. We conducted engagement sessions with the Board and upskilled and trained more than 250 PETRONAS leaders groupwide.

We launched e-Learning modules on Inclusive Mindset for middle managers and executives which were attended by 278 participants.



4 Culture

In strengthening a culture of D&I, we rolled out the D&I module via the PETRONAS e-Survey to encourage employees to speak up on the topic. We conducted a forum on building an inclusive workforce featuring internal and external speakers. It was attended by 1,600 employees virtually and in-person.

We introduced myCareerX, an integrated HR platform that enables employees to take charge of their own career journey. The platform promotes transparency within the organisation and gives employees equal opportunities to explore other roles available across PETRONAS. This allows for a more diverse and inclusive talent pool as we work towards developing the workforce of the future.

Positive Social Impact

Great progress was made in 2022 through our various efforts to drive D&I awareness. We achieved several important performance milestones and exceeded some 2024 targets based on the four D&I focus areas, as follows:

Activity	2022 Results	2024 Targets
Women in Senior Leadership	29%	28%
Young employees (35 years and below) involved in project leadership roles	34%	25%
Multinationals in Senior Leadership	10%	11%
Different perspectives respected and valued*	3 rd quartile	3 rd quartile

* Measured using employee survey, POCS 2022

The PETRONAS Leading Women Network (PLWN) continued to bridge the gender gap across our business and operations. We collaborated with industry players by leveraging the Malaysian Women in Energy (MyWiE) network to host a sponsorship programme with university students. Through this programme, three PETRONAS leaders participated in the Speed Mentoring and panellist session at the Offshore Technology Conference (OTC) Asia 2022, and five representatives joined the Women in Energy Reception hosted by the United States (US) Embassy.



We initiated conversations on careers in the energy industry by taking part in the Women's Global Leadership Conference on Energy (WGLC).

We also believe in the value that neurodivergent individuals can bring to the organisation, hence we intend to create a robust ecosystem to engage and retain neurodiverse talent and tap into their full potential for PETRONAS' growth.

We foster a sense of belonging among our employees through the establishment of various clubs and associations within the organisation. Through clubs such as the PETRONAS Sports and Recreation Club (KSRP), Association for Wives and Women Staff of PETRONAS (PETRONITA) and the Young Professionals Club (YPC), activities catering to diverse interests are organised and carried out.

Cultivating the Right Behaviour and Mindset

We recognise that resilience is a key factor that will help us overcome our future challenges. Therefore, it is important to reinvigorate and improve the way we do things, bravely expanding beyond our traditional business areas, guided by our Statement of Purpose, Shared Values and PETRONAS Cultural Beliefs.

1 PETRONAS Organisational Culture Survey (POCS)

We actively listen to the voices of our employees through POCS, where employees were given the opportunity to provide feedback about the organisation. It also helps to identify challenges that hinder high performance. The response rate for POCS 2022 was 90 per cent.

2 Top Leaders Dialogue (TLD)

Recognising that the right behaviour and mindset start at the top, the Top Leaders Dialogue (TLD) sessions were conducted to facilitate continuous engagement, alignment and collaboration on business direction. We collaborated with the PETRONAS Leadership Centre (PLC) to conduct several sharing sessions with well known industry thought leaders to enhance the enterprise perspective of 180 of our top leaders comprising senior general managers and above.



3 Continuous Improvement (CI) Mindset

The Continuous Improvement (CI) mindset is an essential component in sustaining our presence as a Fortune Global 500® company, and needs to be embedded in our people's mindset and behaviours as we progress. We focused on streamlining our business processes through simplification to drive performance.

- Making Impossible Possible Awards and Convention (MIPAC)

This operational excellence platform was designed to drive improvement, innovation and value-focused mindset among employees, encouraging them to push boundaries and deliver operational excellence. The two-day in person event hosted 1,500 attendees and the virtual event spanning one month engaged around 4,500 participants.

- PETRONAS Lean Six Sigma (PLSS)**

PLSS is an internal programme to drive Continuous Improvement in PETRONAS, tailored to our energy industry environment. It was established in 2016 and has since received international accreditation from the Council for Six Sigma Certification (CSSC) and International Association for Six Sigma Certification (IASSC).
- Business Process Management (BPM)**

BPM focuses on the development of PETRONAS Business Architecture and actively documents processes in a digital repository towards a fully integrated process in PETRONAS. As at 31 December 2022, the journey has seen an accumulation of over 31,000 digitised processes, which will further drive effective process integration and targeted improvement.
- Community of Practitioners on Process Excellence and Recognition (COPPER) 2022**

The annual COPPER 2022 event brought together over 900 attendees to exchange knowledge as well as celebrate and showcase achievements in process improvement initiatives that drove organisational productivity.

Trade Unions

We maintain a harmonious relationship with our trade unions to co-create solutions in supporting business strategies and driving growth.

We formed a strategic partnership with the Unions to conduct a series of leadership talks and engagements on organisational productivity and sustainability.



Nurturing Employees' Interests

We encourage and support employees to connect and engage on matters beyond work commitments via our three clubs, namely KSRP, PETRONITA and YPC.

PETRONAS Sports and Recreation Club (KSRP)

KSRP fosters camaraderie among employees through sports and recreational activities that promote a healthy lifestyle and well-being, catering to employees' interests, while harnessing their passion and skills. The club as at 2022 has 18,169 members.

1 KSRP Sports and Wellness Day 2022

Open to all employees, the event aims to strengthen the bonds between club members and their respective family members.

More than **1,000** club members and their families participated in the event.

82 teachers and students, from a charitable centre joined the fun activities.

2 Sukan KSRP Wilayah (SKW)

This signature event was organised for all regions in Malaysia and included more than 10 types of indoor and outdoor activities, such as volleyball, badminton, netball, tennis, futsal, snooker, darts, table tennis, bowling and chess.



Positive Social Impact

3 Introduction of New Clubs

Through the KSRP myHobby initiative, new clubs such as Hikers, Zumba, Move2Fit, PetTari and Bookcycle were established to accommodate members' diverse interests.



- A total of **400** members joined the new clubs with **33** activities carried out in 2022.

4 KSRP Kids Camp 2022: A Day @ Petrosains

Recognising the importance of family relationships, we encouraged employees to participate in this event to foster stronger family bonds as part of our efforts to care for the well-being of our employees and their support systems.

- **100** employees and their families participated in the event at our science discovery centre, Petrosains.

Association for Wives and Women Staff of PETRONAS (PETRONITA)

PETRONITA was established to foster unity and closer relationships among employees' spouses and women employees through recreational, charitable and experience-sharing activities.

1 Distribution of Eid festive Cookies to Auxiliary Police (AP) and Drivers for Top Management

PETRONITA distributed *Hari Raya* cookies to our AP Groupwide and the drivers for top management. Currently in its seventh year, this project is an important cultural gesture among Muslim staff in Malaysia and aims to instil a sense of belonging among employees at all levels.



1,896 Auxiliary Police and **29** drivers for Top Management received Eid cookies.

2 Orchid Run and Ride

The Orchid Run & Ride 2021 Virtual Edition was conducted from December 2021 until January 2022, garnering a total of 3,060 participants.

The Orchid Run & Ride 2021 Medical Research Grant was officially awarded by PETRONITA in 2022 to Universiti Teknologi PETRONAS (UTP) and Universiti Kebangsaan Malaysia (UKM) to sponsor their research on Developing ASD Biomarker: Utilising Deep Learning Analysis on Electroencephalogram (EEG) Signals as a Biomarker for Autism Spectrum Disorder (ASD) Diagnosis and Severity.

- The **RM217,000** sponsorship was evenly distributed between UTP and UKM.

3 Project Payung 2.0

PETRONITA collaborated with KSRP, *Badan Kebajikan Islam* PETRONAS (BAKIP), Young Professionals Club (YPC), SEEd.Lab and the Malaysian Red Crescent Society (MRCS) to assist employees and communities affected by the floods that occurred in Kuala Lumpur and Selangor in January 2022. We donated cash which was channelled through the MRCS to procure essential items for the affected flood victims.

- Disbursed **RM409,509** to assist **448** affected employees and members of the communities.



Young Professionals Club (YPC)

The YPC acts as a progressive community partner for our young talents. It is a platform to unite and empower them towards excellence. Key initiatives in 2022:

1 Collaboration with PETRONAS' Dana As-Syakirin and BAKIP

Through this collaboration, we contributed to underprivileged communities, namely aiding schoolchildren from low-income families in rural areas.

Provided **534** primary school students with back-to-school preparation, totalling RM113,800 through the Early School Aid Programme.

74 children benefitted from donations amounting to RM9,698, which included Eid cash packets and cash assistance.

2 Strengthened Relationships with Stakeholders

YPC collaborated with KSRP, Twin Towers Fitness Centre (TTFC), KLCC Urusharta Sdn Bhd (KLCCUH) and the Malaysian Red Crescent Society (MRCS) to conduct COVID-19 vaccination drives for employees and their family members in September, October and November.



Approximately **2,522** employees, contractors and their family members benefitted from this vaccination initiative.

3 Us Around The World (UATW) Programme Series

YPC collaborated with Engen Mauritius, Engen South Africa and MISC Brazil to celebrate D&I and encourage cross-cultural exchange among young professionals (YPs) located in different regions around the world where we operate.



Approximately **400** YPC members Groupwide attended this event virtually.

4 Science, Technology, Engineering and Mathematics (STEM) Mentorship Programme

YPC conducted a mentoring programme with Young Inspiring Mentees in Science, Technology, Engineering and Mathematics (STEM) or YAMS to drive the development and adoption of STEM among the upper secondary school students in Sabah, as part of our goal to drive long-term holistic development of the future Sabahan workforce. Coaching and empowering sessions were held to help them achieve their potential in pursuing careers in STEM.

40 upper secondary students were coached by 20 young professional mentors.

Positive Social Impact

Talent and Future Pipeline

Why Is It Important?

We are currently in the midst of an era of energy transition, which is predominantly driven by the need to transform the global energy system for a low carbon future. To capitalise on opportunities that the transition brings, our most valuable asset – our diverse group of talented employees – must be equipped with skills, capabilities and experience that are relevant for the future.

As competition for talent increases, we are focused on transforming our workforce to be ready to achieve our strategic priorities, including delivery of our Net Zero Carbon Emissions by 2050 (NZCE 2050) Pathway. By empowering and nurturing existing and potential talents, we can create a more equitable and sustainable future and contribute to economic growth, while positioning ourselves as a preferred employer in the industry.

What Is Our Approach?

We believe in upholding a high-performance culture, where we attract and retain talents with critical skills and offer opportunities for upskilling and reskilling. We recognise that our employees are crucial for business sustainability and we want to ensure that they are equipped with the right skills, mindset and behaviour; hence, we invested RM264 million in employee training and development in 2022.

Our five key Capability Development Priorities for developing our people to meet evolving needs are:

Sustainability	<ul style="list-style-type: none"> • Elevate sustainability practices by expanding awareness programmes. • Equip or acquire talents with technical expertise to embed sustainability into decision-making and daily operations.
Continuous Improvement (CI), Agile and Innovation	<ul style="list-style-type: none"> • Agile and Innovation skills to ideate, incubate and scale new ideas. Continuous Improvement (CI) play a big role in delivering business results to maximise cash flow and improve efficiency.
Digital	<ul style="list-style-type: none"> • Accelerate digital solutions through digital literacy programmes. • Equip or acquire talents with technical expertise in automation and advanced analytics to improve productivity, enable better decision-making and utilise data for competitive advantage.
Technical and Functional	<ul style="list-style-type: none"> • Technical and functional capabilities needed to grow our businesses. • Equip or acquire talents with expanded technical and functional expertise.
Leadership	<ul style="list-style-type: none"> • Nurture leadership at all levels to ensure talents deliver desired results expected from their roles, establishing a robust and sustainable succession plan for driving Core and Growth business respectively.

Our aim is to redefine the talent experience by focusing on people, processes and platforms. We want to create an empowered, agile and enabled workforce that can make meaningful progress and have a sustainable impact. To achieve this, we focus on developing future skills in areas such as analytics, sustainability and digitalisation. We also encourage our employees to take charge of their career progression by enhancing relevant talent management principles and processes.

In developing future talents, we provide education sponsorships to students as well as industrial and technical training opportunities for new graduates. We offer talented young people learning opportunities at our industry-recognised learning institutions such as Universiti Teknologi PETRONAS (UTP), Institut Teknologi Petroleum PETRONAS (INSTEP) and Akademi Laut Malaysia (ALAM) that provide energy industry-related curriculum and training programmes.

Value Creation in 2022

Existing Talent

For our existing talents in the company, we focused on the five key Capability Development Priorities, supported by our in-house learning institutions and platforms, enhanced talent ecosystem and a sustainable pool of leaders.

Sustainability

We scaled up efforts in building our people’s knowledge and capabilities in the area of sustainability to accelerate our ability to deliver our NZCE 2050 Pathway and fortify trust among stakeholders.

Sustainability Capability Development Framework

The Sustainability Capability Development Framework was developed as part of our efforts to equip employees with sustainability-related knowledge, practices and processes. We also identified learning pathways and priorities for leaders and top talents, functional sustainability practitioners and the broader employee population.

Advancing Sustainability Conversations

Engagement with Leaders

We engaged leaders through conversations to raise awareness on the need for change and to improve understanding of how the organisation’s performance can be enhanced.

We engaged with members of the PETRONAS Board and the Board of Directors of our public-listed companies to help oversee sustainability-driven strategies and guide stakeholder-oriented long-term goals. Executive leaders received guidance in developing a strategic direction that is aligned to organisational purpose, strategy and business models that contribute towards society and the environment.

One of the Top Leaders Dialogue sessions in 2022 featured the launch of our NZCE 2050 Pathway and provided our leaders with greater clarity on sustainability challenges and targets. As a result of this dialogue, leaders felt more engaged, aligned, inspired and united in purpose.

On a global level, we also took part in sustainability conversations and leadership programmes provided through our membership in the World Business Council for Sustainable Development (WBCSD), a network of around 200 leading companies committed to advancing sustainable business practices.

Improving Sustainability Knowledge and Skillsets

Colleagues from across the Group benefitted from a range of learning opportunities made available to enhance relevant knowledge and functional skills to drive and shape future sustainability practices.

- **101** employees completed training programmes on sustainability delivered by the Cambridge Institute of Sustainability Leadership, Yale School of Management, Harvard Kennedy School, Institute of Management Development and Centre for Sustainability and Excellence.
- **132** sustainability change agents were appointed.
- **84** employees were upskilled with Level 1 Methane Emissions knowledge.
- **289** employees including top leaders, have attended sustainability masterclasses.

We also carried out awareness-building initiatives for all employees to ensure they were able to apply the knowledge obtained on sustainability, its drivers, tools and approaches in their daily actions. Towards this end, a sustainability e-learning module was also made compulsory for all new hires.

Positive Social Impact

- **30,000** employees completed the Sustainability e-Learning module.
- All Trade Unions Executive Committee members from *Kesatuan Kakitangan PETRONAS (KAPENAS)* Peninsular Malaysia, Sarawak, Sabah, Labuan including *Kesatuan Pekerja-pekerja Optimal Chemicals Malaysia Sdn Bhd (KEPKO)*, attended our sustainability-themed engagements and information sessions.

Continuous Improvement (CI), Agile and Innovation

We believe that being agile and innovative are critical factors in realising our transition towards a low carbon future. At the same time, we also need to effectively drive business performance and maximise cash flows.

Continuous Improvement (CI)

As a business entity, we continue to equip our people with the right knowledge, methodologies, skills and mindset to understand and improve our current business processes. This will ensure sustainable operations and cost efficiency in meeting customer needs and business objectives.

Since PETRONAS Lean Six Sigma (PLSS) was introduced in 2016, production performance has become more sustainable, with reduced cost, increased productivity and enhanced customer satisfaction. We have upskilled more than 11,000 employees on CI Awareness and developed almost 2,000 PLSS practitioners.

The PLSS process is subject to an annual Maturity Assessment to sustain the deployment of LSS across the organisation. In 2022, six operating units reached the status of PLSS Matured Organisation, namely Project Delivery and Technology (PD&T), Malaysian Refining Company Sdn Bhd (MRC SB), Global HR Services (GHR S), Engen Limited, Malaysia LNG Sdn Bhd (MLNG) and PETRONAS Chemicals Methanol (PC Methanol).

- **143** PLSS improvement projects were executed.
- Saved **216,821** manhours.
- Over **4,000** employees upskilled in CI Awareness.
- **299** practitioners were certified in PLSS: 228 Yellow Belts, 66 Green Belts, five Black Belts.
- **185** practitioners were trained in PLSS: 148 Green Belts, 31 Black Belts and six Master Black Belts.
- Achieved **57.77 per cent** Process Cycle Efficiency (PCE).

Agile

In response to the dynamic pace of change experienced across the energy industry, we intensified efforts to develop more agile capabilities through our Agile Leadership and Capability Programmes. This will enable our people to ideate, incubate and scale new ideas and deliver customer solutions at pace.

As part of our goal to strengthen talent capabilities, we continued to enhance the Agile Coaching Enablement (ACE) programme by integrating it into the PETRONAS Leadership Centre to improve agile-based knowledge and application. We also strengthened the agile leadership platform by improving exposure to outside-in good practices on business agility through key engagements and learning programmes. In addition, we infused agile leadership topics into key leadership programmes and engagements such as the Top Leaders Dialogue sessions.

- **32** employees appointed as Agile coaches to support agile teams and pods across the business.
- **16** employees received Agile Coach (ICP-ACC) certification.
- **31** employees received Agile Leadership Certification.
- Launched the first e-learning module on Agile via myLearningX with participation from more than **800** employees.
- **6,690** employees upskilled with Agile capabilities programmes since its launch in 2018.

Nurturing Innovative Capabilities

We continued to strengthen our employees' capabilities in order to build an innovation ecosystem across the Group. Taking advantage of the rapid progress made in building the foundation for innovation in 2021, the PETRONAS Working Backwards (PWB) Methodology and innovation framework was expanded to business divisions in PETRONAS and the Innovation Masterclass was established as a permanent offering at the PETRONAS Leadership Centre (PLC).

As a result, innovation practitioners are actively ideating and incubating high potential projects, contributing to the innovation opportunity funnel and boosting new business possibilities for growth in Core and New Business areas.

To inculcate a comprehensive innovative mindset and culture, learning modules and engagements are seeded into key activities, events and digital platforms such as the Knowledge Series, information sessions, Venture Build Fireside chats, and exhibitions throughout the year.

Key highlights in building innovation capability in PETRONAS through PWB:

- More than **850** employees involved in new business and innovation initiatives upskilled through Innovation Masterclasses.
- More than **200** practitioners in action comprising of "sharks", coaches, programme managers and incubators.
- **3,400** employees completed the awareness self-learning training on myLearningX.

- More than **100** ideas were registered from Innovation Masterclasses, with more than **30** high potential opportunities progressing into Incubation and Venture Build stages.

- At the end of 2022, an opportunity incubated using PWB, that is Vehicle-as-a-Service (VaaS), which leases electric vehicle fleets to businesses, was successfully launched to market under Gentari and is currently generating revenue.

Digital

Digitalisation and technology play a heavy role in our transition towards net zero carbon emissions. We recognise that the future of work will involve increased cross-functional collaborations and automation to improve productivity and decision-making, supported by data to drive competitive advantage. Therefore, we need to equip our employees and acquire new talents with the right technical depth, tools and methodologies in automation and advanced analytics to harness value from digital solutions.

Shaping a Digitally-Competent Workforce

In our efforts to shape a digitally-competent workforce, we conducted upskilling sessions and introduced tools, techniques and methodologies on analytics that can be applied to better solve business pain points and improve day-to-day operations.

- Upskilled **28,000** employees as part of our efforts to prepare them for jobs of the future.
- Upskilled close to **14,500** employees in Analytics, exceeding our initial target of **14,000**.

Collaboration with Industry Players

We collaborated with Microsoft and Tata Consultancy Services to share new perspectives in our Knowledge Series webinars. We strengthened our position in the digital segment over the long term, partnering with Accenture to develop a customer-centric approach to building digital products. We also co-hosted the Amazon Web Services (AWS) User Group Meet-Up, where we extended our PETRONAS Cloud Community of Practice (CoP) to external cloud enthusiasts.

- 162** employees attended the Realising Value in Digital Product Management programme to improve customer-centric product development.

- 100** participants attended the AWS User Group event. Out of this, **80** represented a cross-section of the industry and **20** were from PETRONAS Group Digital.

Positive Social Impact

Technical and Functional

We focused on strengthening the foundational capabilities of our people in our efforts to further grow our traditional portfolio of oil and gas, as well as prepare them in our pursuit of non-traditional growth to ensure PETRONAS' long-term survivability. To achieve this, we aim to increase our capability strength to 75 per cent by 2025.

- ➔ Recorded a **62.5 per cent** capability bench strength for Technical Skill Group (SKG) and 40.4 per cent for Business SKG.

We recognise that capability building is especially important for our new businesses such as Renewable Energy; carbon capture and storage (CCS); and Remote Autonomous Operations (RAO). As such, we continued to upskill our people via formal learning and On-the-Job learning (OJL).

Various upskilling programmes were also conducted and tailored to the needs of the respective businesses as we continued to develop our people in strengthening our core business. Programmes included Multi-Skill Acceleration Programmes for technical non-executives from the Upstream business and digital marketing for the marketing and trading teams from the Downstream and Gas businesses, while Project Delivery and Technology (PD&T) employees were provided training based on our new focus areas. A Capability Development Framework review was conducted for Risk Management fraternity while Finance saw the establishment of the Finance Academy, a structured learning platform to strengthen core or niche skills in support of new business areas.

Leadership Development

Continuous development of leaders at all levels is essential in creating a robust talent pipeline and sustainable bench strength for effective succession. Working with reputable partners, we focused on three key areas to develop leadership skills, equipping senior leaders to lead and steer the workforce towards achieving organisational goals, continuously building a pipeline of leaders and supporting competency upskilling or reskilling programmes and new ways of working for talents.

84 Senior Managers graduated from the Tactical Excellence programme.

38 General Managers attended the Strategic Excellence programme in 2022 and are expected to graduate in 2023.

109 Managers graduated from the Managerial Excellence programme.

91 Executives completed the Professional Excellence programme.

90 Executives completed the Building Leaders programme.

In-house Learning Institutions and Platform

We continued to accelerate capability development by leveraging our specialised learning institutions namely the PETRONAS Leadership Centre (PLC), Institut Teknologi Petroleum PETRONAS (INSTEP), the Centre for Advanced and Professional Education at Universiti Teknologi PETRONAS (CAPE UTP), Akademi Laut Malaysia (ALAM), as well as the myLearningX virtual learning platform. In creating a future-relevant workforce, these learning institutions and platforms provide opportunities for our talents to be upskilled on leadership and the energy industry as a whole.

PETRONAS Leadership Centre (PLC)

The PETRONAS Leadership Centre (PLC), previously known as PERMATA when it was established in 1989, was created to develop progressive leaders that would not only make an impact on our organisation, but also the global energy industry. The new PLC campus was completed in 2022.

Developing and Nurturing Leaders

The programmes at PLC are designed to equip leaders with the skills and knowledge required to tackle the most pressing challenges faced across their diverse functions and industries. Towards this end, we ensure that our content is consistently relevant and delivered via the latest learning and development practices.

Powering Innovation

We recognise the need to change the way we think and work as an organisation as we navigate towards a just transition. Towards this end, we have created an ecosystem where ideas are incubated, tested and scaled to market by supporting key PETRONAS innovation initiatives, namely PETRONAS Innovation Garage (PING), SEEd.Lab and FutureTech Accelerator.

Driving Sustainability

In line with our net zero carbon emissions 2050 pathway commitments, PLC serves as a platform to upskill leaders in sustainability and at the same time build sustainability advocacy across the organisation, from the environmental and human capital perspectives. We have also designed and built a new campus to drive our sustainability efforts.



PLC also hosted several key events, namely the PETRONAS Race2Decarbonise Hackathon and a roundtable forum on Road to COP27: Alignment on Energy Sector Decarbonisation to support National Narratives on Net Zero GHG Aspirations, with the Malaysian Government's Economic Planning Unit (EPU) to demonstrate our strong commitment in lowering our carbon footprint in support of Malaysia's environmental agenda.

Sustainability Efforts at PLC

Aligned with PETRONAS' approach to sustainability, PLC's campus is built with a green vision. It is environmentally responsive with energy-saving architecture as well as green and digital technologies in place. Our campus has achieved the Platinum status of the Green Building Index Malaysia Certification and Leadership in Energy and Environmental Design (LEED) Platinum status of the US Green Building Council.

☛ Biodiversity

- Total area of 35 acres (including lakes, streams and landscapes) to provide habitats for flora and fauna such as indigenous plants, butterflies and dragonflies.
- 2,160 trees planted, which can potentially absorb 64.8 tCO₂e equivalent to the amount of carbon dioxide produced by 127 air conditioners running for a year.

☛ Wastewater Management

i. Greywater

- Wastewater generated from hand-washing basins is collected, filtered and used for toilet flushing, which reduces water demand and costs.

ii. Rainwater Harvesting Tank

- Rainwater is stored in four storage tanks with a maximum storage capacity of 1,368 m³ and is used for landscape irrigation. This capacity can wash up to 228,000 linen bedsheets.

☛ Waste Management

- A maximum of 150,124 kg of food waste per year can be fed into a vessel composting system. This generates an estimated 10,509 kg of compost per year that may be used as fertiliser for PLC's landscape.

☛ Reduction of Heat Island Effect

- Man-made lake with water volume of 14,203 m³ (equivalent to approximately 5.7 Olympic-sized swimming pools), reduces the air temperature surrounding the building.
- Main building facade is orientated north-south to minimise solar heat gain.

☛ Energy Generation

- 4,066 photovoltaic (PV) panels installed to generate an estimated 2.3 million kWh/year, equivalent to the ability to power up 327 double-storey houses per year.

☛ Daylight Harvesting and Glare Control

- Reduce reliance on artificial lighting through specially designed glass panels which are strategically placed for optimum natural light.
- High performance glazing to reduce energy consumption through the building envelope.

☛ Electric Vehicle (EV) Chargers

- 17 Gentari EV charging points are available at PLC.

☛ Health and Well-being

- Open spine area allows for well-ventilated social spaces.
- Use of MERV 13 rated air filters for better indoor air quality.
- Selection of Low Volatile Organic Compounds (VOCs) paints and adhesives.
- CO₂ sensors to maintain the quality of fresh air within air-conditioned building environment.

☛ Efficient Systems

- Air Conditioning and Mechanical Ventilation (ACMV) system with high system co-efficient performance.
- Lighting system with automated light (lux) sensors and motion sensors.

Positive Social Impact

Institut Teknologi Petroleum PETRONAS (INSTEP)

Institut Teknologi Petroleum PETRONAS (INSTEP) was established in 1981 to accelerate human capital development for the oil and gas industry through experiential learning and customised programmes. We leverage INSTEP to upskill our people to support the growth of the energy industry, anchored on its world-class facilities and industry-experienced instructors.

- More than **13,000** employees were upskilled via the following programmes:
 - Professional Development Programmes (PDP) for engineers and technicians.
 - Assessment and Certification (A&C) Programmes in meeting statutory requirements.
 - HSSE Generative Culture programmes.
 - Customised modules that fit specific business requirements.

Centre for Advanced and Professional Education, Universiti Teknologi PETRONAS (CAPE UTP)

We established the CAPE UTP at Universiti Teknologi PETRONAS (UTP) in 2016 to enhance individual and team capabilities through a unique blend of post-bachelor degree programmes and professional short courses. At CAPE UTP, we prioritise human-centred learning solutions that combine academic knowledge with industry insights that maximise the value of technology and accelerate the adoption of technical capabilities.

In 2022, more than 1,000 PETRONAS employees were upskilled at CAPE UTP through open and customised courses related to the energy industry.

Akademi Laut Malaysia (ALAM)

The Akademi Laut Malaysia (ALAM) is the leading maritime training academy in Malaysia. Through ALAM, we have been shaping maritime leaders and professionals at our fully-equipped 67-acre campus in Melaka.

Since its inception in 1977, 751 cadets have been awarded with sponsorships, with a total investment of RM24.2 million.

- ALAM won the Malaysian Society for Occupational Safety and Health (MSOSH) Gold Merit Award under the category of Educational Sectors, Petroleum, Gas, Petrochemical and Allied Sectors, affirming its move towards a generative HSSE culture.
- Successfully obtained ISO 9001:2015 for Quality Management Systems, reaffirming the commitment of ALAM to continuously improve its systems to enhance customer/student satisfaction.
- Introduced **18** new programmes to cover other segments of the maritime industry; four Ministry of Higher Education (MoHE) approved diploma programmes, four Marine Department (MARDEP) approved programmes and **10** market-ready customised programmes based on industry demands.
- Collaborated with five universities and seven industry partners to enhance education outcomes.

myLearningX

We established myLearningX in 2021, our digital learning platform that offers personalised and flexible learning options to nurture a self-learning culture across the organisation and encourage inclusive growth. We enriched the learning content through partnerships with reputable learning providers.

We understand that people who share the same interests could improve their professional and personal growth by socialising and sharing expertise through learning communities. We formed over 100 learning communities on myLearningX in 2022 with more than 12,000 employees as members.

Additionally, recognising the rapid changes in the energy industry and in the organisation, coaching has become even more vital in untangling challenges and unlocking our people's potential to grow.

30,647 learning objects available for training via curriculum, events, online courses, videos and external content.

43,633 participants (**97.1 per cent** active learners).

Achieved **50.1** learning hours per employee via myLearningX.

1,567 active coaches with **315** coaching relationships.

The refreshed EPM via myCareerX has enabled easy access for our employees and their managers to monitor performance and facilitate continuous performance conversations.

We also enhanced the Underperformer Management system to proactively carry out early intervention for identified employees.

We changed the PETRONAS Cultural Beliefs Behaviour Evaluation (BePCB) Guidelines into a 360-degree evaluation from the earlier 180-degree version. With this change, our employees' direct managers and team members were able to give feedback, as well as managers and members from other teams whom they have worked with.

We also embedded open and transparent values in BePCB to encourage employees to speak up in performance-related conversations, with a focus on learning and development aspects.

Talent Ecosystem

We empower and enable our people to drive their career progression through a robust talent ecosystem.

In 2022, we continued to enhance our principles and processes, particularly in the areas of employee performance management, career progression and personal marketability, all of which are supported by an integrated HR platform called myCareerX.

Refreshed Employee Performance Management (EPM)

We refreshed our EPM for the wholesome development of our employees and an enhanced end-to-end talent journey for them by nurturing a growth mindset and behaviour. The refreshed EPM aligns performance objectives with individual aspirations, commits employees to roles and responsibilities with the needed competencies and promotes a self-driven culture based on continuous feedback and coaching.

Enhanced Career Progression Principles

We introduced our enhanced career progression principles in late 2021, which enables role-based progression anchored on competency, and a simplified decision-making process from 2022 onward.

We initiated a pilot programme within the Human Resource fraternity, focusing on the following areas:

- Enabling our people to progress within and across roles while balancing business and talent needs, in line with matching employees' aspirations with organisational goals.
- Promoting competency-based progression through fit-for-purpose assessments, with performance managed through EPM.
- Simplifying the decision-making process by empowering line managers to make progression decisions for manager-level and below.

Positive Social Impact

Enhancing Personal Marketability via Talent Profile

We encourage our people to drive their own talent journey within the organisation. With this in mind, we introduced Talent Profile in myCareerX, which is a digital resume to allow our employees to be visible within the organisation, market themselves and attract managers and team leaders who are looking to build their team.

Close to **20,000** employees were able to access Talent Profile to build their personal marketability.

Over **10,000** users have used the Talent Profile to update their personal information and explore potential roles.

Talent Profile was intentionally used for talent deliberation in PETRONAS.

A Sustainable Pool of Leaders

Effectively identifying potential leaders is key to successful succession planning. myTalentX was designed to ensure a sustainable pipeline of leaders through comprehensive insights on talent, succession planning and position requirements across PETRONAS, leveraging AI-enabled recommendations to identify best fit talents as successors for key positions. In addition, myTalentX provides real-time data on top talent for faster decision-making in meeting business demands.

Future Talent

We continued to invest in identifying and nurturing our pipeline of future talents through our sponsorship programmes and learning institutions.

Sponsorships

PETRONAS Education Sponsorship Programme (PESP)

Since 1975, we have successfully awarded education sponsorships to more than 38,000 young students with high academic calibres from diverse ethnic and economic backgrounds, with the majority from underprivileged families. Through PESP, we offer young Malaysians and others the opportunity to pursue their studies at UTP as well as other leading local and international universities.

In 2022, 587 scholarships were awarded to Malaysian students. In addition, we began offering PESP to students who were already enrolled at universities recognised by PETRONAS with a minimum of one remaining year of studies as well as students who were offered placements at universities recognised by PETRONAS. Three scholars have benefitted in areas such as Economics and Mechanical Engineering at University of California, Berkeley, University College London and Imperial College London.

During their undergraduate years, PESP scholars undergo a structured development programme via the PETRONAS Readiness for Employment Programme (PREP) to ensure they are continuously nurtured until graduation. Students are also given the opportunity to interact with our leaders to inspire and help them achieve their potential.

- Invested more than **RM174 million** through education sponsorships awarded to **587** Malaysian students.
- 64 per cent** of our scholars were recruited to work for the organisation upon graduation.
- Seven per cent** of our graduates were recruited by other companies.
- Five** engagement sessions between scholars and PETRONAS leaders were conducted both locally and internationally to inspire students to push their potential towards success.

PETRONAS Education Sponsorship Programme for Postgraduates (PESP²)

The PETRONAS Education Sponsorship Programme for Postgraduates (PESP²) is an extension of PESP, serving as a platform for deserving students to strengthen their knowledge and capability through postgraduate studies in specific key areas that support PETRONAS' growth strategies.

Since its inception in 2018, 83 scholars have benefitted from the programme in various areas of expertise such as Drilling, Fluid Tech Solutions, Autonomous System (Robotics), Renewable Energy and Carbon Capture.

Invested over **RM4 million**, benefitting **20** recipients.

Industrial Training Programmes

We provide industrial training opportunities for graduates and tertiary students through the Graduate Employability Enhancement Scheme (GEES) and internship programmes for on-the-job learning (OJL). These will help prepare students for better employment opportunities which would contribute towards improving their standard of living ultimately contributing to the socio-economic upliftment of the community.

Graduate Employability Enhancement Scheme (GEES)

GEES provides graduates with actual working experience as part of our soft skills training programme, in support of the Malaysian government's Protégé Ready-to-Work initiative. It is a 12-month on-the-job training that aims to enhance the employability of new graduates towards securing long-term employment. We do this by instilling positive work attributes, including entrepreneurial training to encourage them to establish and manage their own business. We also provide technical bridging training to upskill students in relevant technical skills to facilitate their transition into the job market.



Since its inception in 2011, the programme has benefitted 4,683 participants.

PETRONAS Internship Opportunity Programme

We provide undergraduate students with industry experience and learning under our internship programme where they are able to gain knowledge outside of their academic setting. Our aim is to enable students to integrate theories and knowledge obtained from learning institutions and actual work situations in a professional manner.

Through this programme, students will gain their first working exposure in the energy industry and the opportunity to engage across various operational areas. This enables them to put their learning into action and equip themselves with useful skills upon joining the workforce.



1,403 students from local and international universities participated in our internship programme.

Positive Social Impact

Leveraging our Learning Institutions

Our industry-recognised learning institutions such as UTP, INSTEP and ALAM continued to introduce relevant programmes to nurture and encourage young talents to achieve their potential.

Programmes Implemented in 2022

UTP 01

1. PETRONAS scholars at UTP:
 - More than 1,000 active scholars at UTP.
 - Over 200 scholars graduated from UTP.
2. UTP-AMG Internship Programme:
 - As part of the PETRONAS Readiness for Employment Programme (PREP) Framework and through collaboration and partnership with Mercedes-AMG PETRONAS Formula One Team, we sponsored students for internships at the Team's plant in the United Kingdom. The internship programme enabled PETRONAS scholars at UTP to gain technical knowledge and valuable experience in a highly competitive environment.
 - 75 PETRONAS scholars benefitted from the programme since inception.

INSTEP 02

1. Sponsored students at INSTEP:
 - More than 300 students were sponsored at INSTEP, with RM12.3 million invested.
 - 35 scholars from the 2021 intake have been recruited (91 per cent by PETRONAS, 9 per cent by others).
2. Structured development programme for scholars:
 - Technical Enrichment Programme (TEP) learning framework, focusing on competency and experiential learning throughout a 10-month programme.

ALAM 03

1. Sponsored students at ALAM:
 - 75 out of 340 cadets with investment of RM883,170 via Post Sea Programme.
 - Sponsored students at ALAM by Eaglestar:
 - 94 out of 142 new cadets with investment of RM10,254,883.
2. ALAM provided graduates with employment opportunities by assisting 51 eligible cadets at 16 shipping companies and 11 eligible able seafarers at multiple shipping companies.

Community Engagement

Why Is It Important?

Active engagement and community development are essential for building trust, establishing goodwill and maintaining positive relationships with the communities where we operate. By engaging with local communities and stakeholders, we understand their needs, reduce conflicts and minimise the risk of project delays or cancellations. This demonstrates our commitment to sustainable operations and nurtures a positive reputation. Investing in local communities stimulates economic growth, improves quality of life and creates a more supportive environment for our business. Building strong partnerships creates shared value contributing to our overall success and sustainability.

What Is Our Approach?

At PETRONAS, we are committed to building strong, resilient and empowered communities through community engagement efforts. Our initiatives aim to improve the standard of living, enhance livelihoods, promote equitable growth and increase environmental awareness. We take a structured and systematic approach by developing a community engagement strategy that aligns with our business objectives and values while addressing the needs and aspirations of surrounding communities. Our Social Impact programmes focus on education, community well-being and development, and the environment, to encourage sustainable livelihoods and equip communities with the necessary skills for a just energy transition, a fair and inclusive process that aims to ensure no one is left behind.

Identification Process for Social Impact Activation



Positive Social Impact

PETRONAS invested close to RM900 million for our Social Impact activations in 2022, benefitting over 1.5 million beneficiaries in Malaysia and internationally. The goal of these investments is to champion the pursuit of knowledge among students and educators, provide access to essential resources for underserved communities and to empower them to reach their full potential as well as creating awareness and promoting the importance of biodiversity conservation.

Yayasan PETRONAS also conducts a significant portion of our Social Impact activations across the country, benefitting over 116,600 beneficiaries with an investment of around RM49.53 million.

Three Key Areas of Social Impact Activations

EDUCATION

- Develop knowledge and capabilities to support nation-building by enhancing the skills and ability of individuals and organisations to help them achieve success.
- This includes ensuring access to quality education for all, regardless of their income level, gender, ethnicity, physical and mental abilities to improve education opportunities and levels.

COMMUNITY WELL-BEING AND DEVELOPMENT

- Improve well-being and contribute to community development by promoting the socio-economic development of local communities, support initiatives that lead to good physical and mental health and improve the safety of local communities.
- This includes creating pathways for sustainable livelihoods and better economic opportunities for vulnerable underserved communities.

ENVIRONMENT

- Conserve natural resources for current and future generations by protecting and preserving the natural environment to maintain biodiversity.
- Provide opportunities for communities to contribute to the reduction of GHG emissions and adapt to potential effects of climate change.

Value Creation in 2022

Education – PETRONAS Powering Knowledge

Quality education is a fundamental building block for creating a strong workforce, empowering communities and supporting the nation’s socio-economic growth. To this end, we have developed a range of programmes that cater to students from primary to tertiary levels, as well as the general public, with a focus on Science, Technology, Engineering and Mathematics (STEM). We have also initiated programmes to improve educational and vocational opportunities for all.

In 2019, we set a target to achieve 24,100 beneficiaries from PETRONAS’ Educational Programmes by 2024. This was in line with our objective to provide access to quality education, as well as strengthening teachers’ capability in STEM and to serve as role models in enhancing higher order thinking skills through STEM which enables communities to progress collectively as a nation. In 2022, we managed to achieve the target two years ahead of schedule, reaching 42,839 education beneficiaries cumulatively from 2020 to 2022. The education programmes include our PETRONAS Education Sponsorship Programme (PESP), *Program Duta Guru* (Teacher Ambassador programme) and the Vocational Institution Sponsorship and Training Assistance (VISTA) programme, among others. Moving forward, we aim to continue providing better opportunities with sustainable impact to underprivileged students, and are in the process of developing other Social Impact measurement systems. We will be focusing on high impact initiatives through strategic partnerships and collaborations, and aspire to include more beneficiaries both domestically and internationally, especially in the areas where we operate.

1. Learning Institutions

Our commitment to nation-building is strongly linked with our industry-recognised learning institutions, which contributes to producing skilled talents for the workforce of the future and providing innovative solutions that enable Malaysians to achieve their full potential. By driving people forward through education, we are actively contributing to the growth and development of the nation, building a brighter future for all.

i. Universiti Teknologi PETRONAS (UTP)

A wholly-owned subsidiary of PETRONAS, UTP has produced more than 23,000 graduates from over 60 countries. It has emerged as one of the main feeders within the region producing competent talent for the workforce.

- Offered **60** academic programmes (one foundation, **13** undergraduate and **46** postgraduate programmes).
- **6,648** students were enrolled in UTP, with **1,217** in foundation programmes, **4,340** in undergraduate courses and **1,091** in postgraduate studies.
- **1,438** students graduated.



ii. Institut Teknologi Petroleum PETRONAS (INSTEP)

INSTEP has become an internationally-recognised learning solutions partner with customers from over 35 countries. It has successfully produced more than 130,000 job-ready technical workforce serving in more than 30 refineries and petrochemical plants, in addition to 100 platforms globally. INSTEP continues to push boundaries by providing technical talents with innovative solutions allowing them to grow with their respective organisations and achieve their potential.

- Offered over **70** programmes, with **11,660** enrolment.
- **116** students, sponsored by Sarawak Petchem Sdn Bhd, graduated from the Technician Training Programme.

iii. Akademi Laut Malaysia (ALAM)

ALAM offers courses with comprehensive curriculums to prepare its graduates as officers, engineers, researchers and consultants in the global maritime industry.

- **550** students enrolled in ALAM's cadetship diploma programme, maritime studies programme, able seafarers programme, advanced post sea courses and short courses.

iv. Kimanis Training Centre (KTC)

We established the KTC in collaboration with the Sabah State Government to assist in developing local youths' technical capabilities in fields related to the oil and gas industry. KTC has since produced qualified skilled workers to contribute and benefit from the East Malaysia Development Plan under the Sabah-Sarawak Integrated Oil and Gas Project (SSIOGP).

Currently managed by INSTEP under PETRONAS Technical Training Sdn Bhd (PTTSB), KTC is the first institution in Sabah to be recognised as an Accredited Centre by the Department of Skills Development under the Ministry of Human Resources to conduct a three-year full-time trainings in Industrial Instrumentation and Control, System-Monitoring and Control (Level 4) and Malaysian Skills Diploma (DKM). PETRONAS has invested RM34.6 million since KTC's inception in 2011, producing 231 graduates.

- Invested **RM4.4 million** in developing the capabilities of Sabahans.
- **20** students started their studies at KTC.

Positive Social Impact

2. Collaboration with Higher Education Strategic Initiatives (CHES)

We collaborated with Malaysia's higher education sector to bridge industry-academia knowledge sharing in technical areas aligned with PETRONAS' Education Agenda and Sustainable Development Goals (SDGs) under quality education. CHES became one of the channels for us to share our knowledge and best practices in project management, engineering solutions, technology and digital delivery as part of our commitment to contribute to the nation.

Through these initiatives, we aim to create more platforms for Technical Professionals (TPs) and Subject Matter Experts (SMEs) to perform Technical Professional Excellence responsibilities and build rapport with the Higher Education sector and young Malaysian top talents in creating awareness and interest in the oil, gas and energy industry.

- We conducted:
 - more than **90** webinars and face-to-face sessions covering topics on engineering, technology and digital, as well as Career Talks with all **20** universities under the CHES initiative;
 - syllabus or curriculum reviews with seven universities;
 - adjunct lectures at six universities;
 - internship and industry visits, including a site visit to Malaysian Refining Company Sdn Bhd (MRC SB);
 - the Digital Young Graduates Programme (YGP) where seven Universiti Teknologi Malaysia (UTM) students received work-based learning placements; and
 - three oil and gas conferences and events.
- We provided industry supervisors and coaches for students' final-year projects, established mentor-mentee programmes and included them in the universities' industrial advisory and accreditation panels.
- We partnered with four universities for research collaborations in the oil, gas and energy field.

3. Proactive engagement with students

We continuously engage with students from primary to tertiary levels through several programmes to raise awareness on the importance of gaining knowledge, fostering interest in STEM and exposing students to opportunities in the oil, gas and energy industry.

i. Discover PETRONAS at School (DPS)

Since its establishment in 2014, PETRONAS has invested RM2.7 million, benefitting 24,000 students. The programme helps secondary school students learn more about the oil, gas and energy industry and the various career opportunities available across PETRONAS. This programme serves as a guide for students to choose the right education sponsorship application course, matching their career and future aspirations.

Through DPS, we engage with secondary school students to:

- strengthen knowledge and understanding of the PETRONAS Education Sponsorship Programme (PESP);
- instil interest in the oil and gas industry and related careers;
- build and enhance PETRONAS brand awareness and image;
- establish a sustainable network and mutual relationship with the Ministry of Education, schools and students.

DPS consists of career forums and booths where our volunteers conduct interactive engagements and experimental learning.

- Over **2,000** students benefitted from the DPS programmes conducted at four centralised locations: Kota Samarahan and Mukah, Sarawak; Kuala Nerus, Terengganu and Segamat, Johor.
- **52** schools participated in DPS 2022.
- Invested about RM1 million.
- **92** PETRONAS employees volunteered.



ii. PETRONAS Vocational Institution Sponsorship and Training Assistance (VISTA)

PETRONAS VISTA was introduced in 1992 as a flagship programme to assist in delivering technical courses at selected institutions under our Technical and Vocational Education and Training (TVET) process, emphasising on job-oriented learning and training.

We collaborate with government agencies and state governments of the selected institutions on infrastructure, equipment, trainers, or programmes readiness (depending on needs) to ensure the chosen technical courses will be delivered successfully as per the oil and gas industry requirements.

In 2022, 18 institutions were identified to be part of the VISTA programme. These institutions are expected to produce more than 1,000 technical talents annually.

Six new certifications have been introduced under the three-year programme implementation (2023-2026): Mechanical Fitter, Rigger, Crane Operator, Welding Inspector, Diploma in Oil and Gas, and Diploma in Process.

Since its inception, VISTA has benefitted more than 12,000 graduates with over RM90 million invested and has collaborated with 27 TVET institutions all over Malaysia.

Invested **RM1.6 million** in VISTA.



2022

Over **400** individuals across Malaysia benefitted from this programme, gaining technical and vocational capabilities.

iii. Digital Equity Programme (DEP)

Introduced in 2022, the Digital Equity Programme (DEP) was designed by Petrosains to increase STEM interest among students in Sabah, Malaysia, cultivating 21st century and technical skills in a fun and engaging manner to prepare participants for the workforce of the future.

This initiative exposed teachers to the innovative ways they can explore to ease the teaching process and guide students in enhancing their digital comprehension level, adding value to everyday solution design and curation. Students also gained a better understanding on the four elements of STEM, enhanced their problem-solving skills and discovered career opportunities in the field.

We upskilled and enhanced the capacity of teachers in technical-and digital-related skills, as well as democratised digital creation activities for students from low-income families to deepen their interests in STEM. Teachers and students also were given opportunities to expand their knowledge through the formation of a district-level committee and school-level technology clubs that are linked to other key players in the ecosystem.

- Invested around **RM500,000** in DPS.
- **80** teachers and **82** students from **39** secondary schools in Sandakan and Tawau, Sabah benefitted from the two sessions conducted.

Positive Social Impact

iv. BeDigital Bootcamp

We curated the BeDigital Bootcamp to strengthen young graduates' digital literacy and help them prepare for the jobs of the future. The intensive learning exposure brings participants through the concepts of design thinking, data storytelling, transitioning into the working world, digital entrepreneurship and concluding with a shark tank session in front of expert evaluators. Outstanding participants are offered roles in PETRONAS or its recruiting partners.

In order to elevate the employability of graduates and ensure they are future-ready, we collaborated with Sabah state government and other partners: PETROSAINS Sdn Bhd, SEEd.Lab, Center of Applied Data Science, Tata Consultancy Services, Microsoft, Universiti Malaysia Sabah, Universiti Teknologi MARA Sabah, University College Sabah Foundation, Sabah Net Sdn Bhd, Malaysia Board of Technologists, KLCC Urusharta Sdn Bhd, Sabah Energy Corporation, Four Seasons and Internspoon.

- Recorded more than **60** participants.
- **50 per cent** of total participants stood out during the bootcamp and received a conditional offer each from PETRONAS and other companies.

v. Young Aspiring Mentees in STEM (YAMS)

YAMS is a mentoring programme by PETRONAS' young professionals that was established in 2022. We introduced this programme to coach and empower upper secondary school students in Sabah to help them achieve their potential by pursuing STEM careers and become future leaders. Our goal is to drive long-term holistic development of the Sabahan workforce, as this is part of PETRONAS' efforts in caring for the communities that we serve.

This programme consists of virtual check-ins, checkpoints and physical camps, where each young professional is assigned two students to coach. Mentors also received comprehensive training and clear guidance on the syllabus and resources to coach their mentees.

- Invested more than **RM170,000** in YAMS.
- Identified **40** science students from disadvantaged families in upper secondary schools in Sandakan and Tawau, Sabah.
- **20** PETRONAS young professionals were chosen as volunteers to mentor.

vi. PETRONAS Leading Women Network (PLWN) – UTP Mentoring Programme

The PLWNxUTP Mentoring Programme started in 2021 to mentor UTP students selected by the university. Through this initiative, students are mentored by experienced mentors to build their confidence, learn networking skills and to be flexible, adaptable and empathetic at work.

- **20** mentors from technical and non-technical backgrounds were identified from across PETRONAS.
- **20** mentees from petroleum engineering and petroleum geoscience courses benefitted from the programme.
- Four online sessions were conducted throughout the programme, with about 100 participants on average per session.

vii. Young Technologist Programme

This programme is aimed at increasing lower-secondary students' confidence in enrolling in STEM programmes and securing jobs in the future work environment. The programme focused on improving their competency in Communication, Collaboration, Critical Thinking, Creativity (4Cs).

- **2,040** students from Terengganu benefitted from this programme.

viii. Engen Mathematics and Science School

We designed the Engen Mathematics and Science School to improve the education quality and expand access to education or training for students in South Africa. The programme offers free Mathematics, Physical Science and English classes to students from grades 10 to 12.

3. Providing Opportunities through Student Sponsorships and Bursaries

We recognise that the path to gaining knowledge and pursuing tertiary-level education can be challenging for certain students. We assist through sponsorships to help the younger generation gain access to education and vocational learning opportunities.

i. Yayasan UTP

Yayasan UTP (YUTP) was established in 2007 to promote and enhance education while supporting the development of UTP as an academic institution of excellence. In addition to its role in seeking donations and forging partnerships, it also allows students to pursue knowledge, especially in science and technology. The assistance also helps students prepare to be part of the future workforce in an increasingly challenging global economy.

Since its inception in 2012, Yayasan UTP has provided financial assistance to 2,423 beneficiaries through Yayasan UTP's scholarships and bursaries.



ii. Tabung Amanah Zakat UTP (TAZU)

We believe in making education accessible to all by providing opportunities through *zakat* (alms) collection from UTP and PETRONAS employees. 50 per cent of the collection is returned to TAZU, which is then distributed to underprivileged students to ensure their continuous development and sustainable education.

Since TAZU was inceptioned in 2011, it has provided financial assistance to 5,600 beneficiaries through tertiary education sponsorship at UTP.

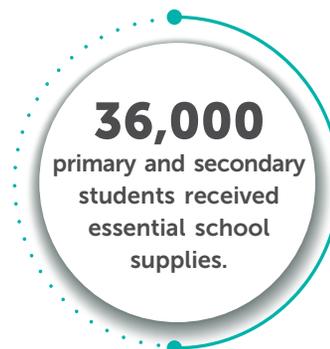
- **1,788** deserving students at UTP received financial assistance from the *zakat* contributions to cover university fees (registration, academic and hostel fees) and special assistance (laptop allowance and stipends).
- Introduced a Full Foundation Sponsorship Programme to sponsor **100** Asnaf students to further their studies at UTP.

iii. Building Brighter Futures Programme

This programme provides financial assistance to indigenous students in Canada. The programme gives indigenous learners the ability to complete post-secondary education. It also includes mentoring, youth conferences and educator support.

iv. Back to School (BTS)

We continued to reach to primary and secondary school students via Yayasan PETRONAS to help them prepare for the new academic year with essential school supplies. While the programme lessens the financial burden of their B40 (below the poverty line) parents, the school supplies are also intended to raise students' enrolment and participation.



Positive Social Impact

4. Creating Conducive Education Environments

A conducive learning environment, with the right tools, materials and space allows students to feel empowered to acquire knowledge. Recognising the importance of a conducive environment, we provide a proper infrastructure for students as part of our contributions to nation-building.

i. Facilities Improvement Programmes in Iraq

The development of three new classrooms and renovation of the main hall of the teachers' Union office has provided access to quality education and safe, non-violent, inclusive and effective learning environments for over 500 students between seven to 12 years old in the surrounding Garraf Contract Area.

ii. Construction of MARA Junior Science Colleges (MRSM)

We are collaborating with the Sabah and Sarawak state governments (via Yayasan Sarawak) and Majlis Amanah Rakyat (MARA) to construct two MARA Junior Colleges in Ranau, Sabah and Bintulu, Sarawak. This collaborative effort aims to provide students access to quality education and promote their interest in STEM while developing their talents. Each MRSM can accommodate 450 students. Construction began in 2019 and the first student intake by MARA is targeted to be in Q1 2024.

The locations and sites of both MRSMs were determined and provided by the state governments. The buildings were designed according to the facilities requirements by MARA, with PETRONAS as the main sponsor for the overall construction, provision of furnishings and equipment. Local consultation firms and contractors were hired to support both projects.

The colleges will be handed over to the state governments and MARA for operation upon completion. It will also be the fifth MRSM in Sabah and the fourth MRSM in Sarawak.

- Achieved **94 per cent** physical progress for MRSM Bintulu.
- Achieved **94 per cent** physical progress for MRSM Ranau.
- Invested more than **RM220 million** for both MARA Junior Colleges.

iii. Bridging the Online Learning Divide Programme

We remain committed to supporting students from all backgrounds despite the challenges posed by the COVID-19 pandemic, which forced schools to close and shift to online learning. Students from low-income communities (B40) needed help with their studies due to a lack of internet access and relevant devices. We have provided internet-enabled digital devices to students from B40 communities in Perak, Selangor, Johor, Kelantan, Sabah and Sarawak to help them engage in remote or hybrid learning and gain immediate learning support in early English literacy.

Lack of internet access and relevant devices resulted in dire challenges for students from low-income families. We responded to the need by providing internet-enabled digital devices. The tablets were equipped with digital resources and tutoring took place via WhatsApp, enabling volunteers based anywhere in Malaysia to tutor students nationwide.

- **2,000** underprivileged students from **B40** communities received tablets with a year of internet connectivity.

5. Building STEM Awareness Across Our Communities

PETROSAINS Sdn Bhd is our wholly-owned subsidiary that leads and steers the business and visit operations of Petrosains, The Discovery Centre and the PETRONAS Twin Towers.

i. Petrosains, The Discovery Centre

Through Petrosains, The Discovery Centre, we strive to deepen our relationships beyond school walls and build trust by engaging with the community through our interactive, experiential and hands-on programmes at the Centre.

Since its establishment in 1999, Petrosains has welcomed around eight million visitors as of 2022. The centre, approximately 7,000 square metres, hosts about 300 interactive exhibits within specific themed galleries. In 2022, Petrosains recorded the highest number of visitors since its establishment with 515,982 visitors.

As a PETRONAS Education initiative, Petrosains, The Discovery Centre provides an immersive learning experience, especially in science, technology and sustainability. We are committed to making a positive social impact and are driven to do our part in building a society equipped with skills needed for the future, in line with The PETRONAS Education Agenda.

We also aim to educate our people on the evolving digital era driven by the convergence of advanced technologies such as robotics, artificial intelligence (AI) and the internet of things (IoT) to enable the creation of innovative solutions towards shared progress for all, where no one is left behind.

Petrosains has positioned itself as a credible solution partner to various stakeholders in delivering impactful programmes, particularly in STEM Education, business and sustainability-related thematic learning. Some of these programmes include Discover PETRONAS @ Schools, Digital Equity Programme, BeDigital Bootcamp, Government-Linked Companies Open Day, PETRONAS Cub Prix, Meet The Expert, PETRONAS StreetSmart Design Thinking Challenges and Café Mesra operation.

Petrosains collaborated with:

- Ministry of Education for the *Seminar Pendidikan STEM Digital* session for educators, and Educators Brunch with the State Education Department;
- Mercedes-Benz for The Vision of an Electric Future and Sustainable Mobility for Tomorrow programme to inspire secondary and tertiary students to proactively think about responsible energy planning towards sustainable and safer living; and
- Offshore Petroleum Industry Training Organisation (OPITO) for My Energy Future



- Delivered learning programmes to **6,479** beneficiaries.
- Scored **85 points** (above 80-point baseline) for delivering five Learning dimensions knowledge and understanding; skills; attitude and values; enjoyment, inspiration and creativity; activity, behaviour and progression.

LIVE, an OPITO-led STEM project designed to engage and inspire the energy leaders of the future. School students from across Malaysia participated in the event and showcased their futuristic innovations.

Petrosains expanded its learning approach on digital platforms especially in the aftermath of the COVID-19 pandemic by partnering with content partner DELIMA (an online learning platform by Malaysia’s Ministry of Education), conducting Virtual Visit via PIXEL and SkyWalk 360, and other virtual learning programmes leveraging open platforms and social media. These activations netted 107,393 in virtual reach.

Petrosains learning includes creating awareness that resonates with PETRONAS’ material topics towards a sustainable future.

In 2022, Petrosains delivered sustainability-based content to enrich the school curriculum and equip the public by providing valuable hands-on learning experience using world-class activities designed to upskill and increase understanding of STEM. Contents included Energy Capsule through PETRONAS Innovation Catalyst Project (PICP) and thematic programmes: Chemsolve; Carbon Capture, Utilisation and Storage (CCUS); Digital, Automation and Robotics (DART); Chemical Energy Solutions. This underscores Petrosains’ commitment to support net zero carbon emissions by 2050 by creating positive social impact.

ii. Petrosains Playsmart™ and Maker Studio

Petrosains PlaySmart™ is an outreach programme implementing a hands-on learning approach in Johor, Pahang, Sabah and Sarawak. It acts as an education hub for surrounding communities through partnerships with the local state libraries in Malaysia. The various locations make STEM more accessible, fostering awareness and

Positive Social Impact

increasing STEM literacy where Petrosains PlaySmart™ played its role in extending the immersive STEM learning experience to the community.

Petrosains PlaySmart™ also offers the Maker Studio, a space for hands-on and creative activities to encourage the public to design, experiment, build and invent as they engage in Science, Technology, Engineering, Arts and Mathematics (STEAM) through coding, design thinking, prototyping and robotics.

- Petrosains PlaySmart™ was able to reach out to more than **269,000** visitors physically via its centres in Johor, Pahang, Sabah and Sarawak. Outreach programmes with local communities were held consistently through collaboration with the respective State Government and PETRONAS Regional Offices.
- Petrosains accelerated STEM learning through its Visit to School and invitation programmes, allowing for interaction with students, community and general public outside of its physical facilities while also providing STEM learning opportunities. These initiatives generated **12,707** reach in 2022.
- Petrosains PlaySmart™ is also positioned as a credible solution partner through the Inspire Together Programme, which allowed for a wider range of **20,000** reach in the communities, providing access to STEM learning and experiences to underprivileged groups.

Petrosains PlaySmart™'s extension, the Maker Studio is currently available at Petrosains' main centre in Kuala Lumpur and Petrosains PlaySmart™ in Johor, Sabah and Sarawak, with the Maker Studio Tanjung Aru, Sabah operations officially handed over to the Sabah State Library in 2022.

iii. Petrosains RBTX Challenge

The Petrosains RBTX Challenge is another effort to boost interest in STEM, allowing robotics enthusiasts to compete with their robotic creations in an open-source software

environment. The Sports and Arts Education Division, Ministry of Education, Malaysia, endorses the challenge as it aims to democratise STEM learning by providing participants, regardless of backgrounds, with unlimited open-source coding software and a diverse range of robotics equipment. Since its inception in 2018, it has attracted more than 7,000 participants of all ages.

In 2022, the programme continued to create value for Petrosains and its beneficiaries not just through traditional financial measures but also by bringing intangible value to communities, our brand image and through the creation of new innovations guided by the Malaysia Education Blueprint 2030, National Fourth Industrial Revolution (4IR) Policy thrusts, PETRONAS Education Framework, Four Sustainability Lenses, and Petrosains Strategic Framework - Progress.30.

Besides supporting the vision and aspirations of the Malaysia Education Blueprint through mastering higher order thinking skills and the ability to innovate, the challenge is also tailored to provide school students with basic designing, coding and sensor training in robotic development.

Petrosains RBTX Challenge 2022 contributed to the increased value in STEM learning for robotics enthusiasts through partnership with professional advisors from academic institutions and industry players. To prepare interested participants for the signature robotics competition, Petrosains' working team travelled across Malaysia months ahead of the competition to conduct workshops, mainly in areas such as basic designing, coding and sensor training.

- Reached out and provided training for **2,334** young people.
- Attracted 28 international teams involving **77** participants from Indonesia, Tunisia and the United States of America (USA).
- A total of **1,035** teams participated, with over **3,000** taking part in the competition and **243** teams advancing to the Grand Finals in Kuala Lumpur.

The strong participation in the Petrosains RBTX Challenge 2022 is testimony to the efforts towards democratising learning for all.

Malaysia Book of Records awarded a certificate of achievement to Petrosains for having the **Most Participants in a Robotic Interactive Learning Event** for RBTX2022.

2. Programme Duta Guru

Yayasan PETRONAS' flagship programme, *Program Duta Guru*, is a nationwide industry-linked programme conducted to strengthen the capabilities of STEM teachers serving schools with a majority of B40 students.

➤ **253** teachers completed the two-year programme and took on their roles as *Duta Guru* (Teacher Ambassadors) to increase STEM interest and competency among students in secondary schools.

empowerAkademik

We continued to reach out to students from less privileged communities through Yayasan PETRONAS' empowerAkademik programme to improve their academic performance for *Sijil Pelajaran Malaysia (SPM)* or the Malaysian Certificate of Education and enable their progression towards tertiary education. It is a comprehensive programme that takes a three-pronged approach, involving students, teachers and parents to empower the communities via the academic path to create a more balanced, inclusive society.

Supported **1,000** SPM students through the *empowerAkademik* programme.

94.7 per cent (947 students) passed SPM 2021 with **5.7 per cent** achieving 5As or more.

100 per cent (57 students) of 5A students and **94** per cent (892 students) of those that obtained 4As and below secured placements in tertiary institutions.

Community Well-being and Development – PETRONAS Uplifting Lives

We continuously reach out and extend a helping hand to our communities to help them empower themselves through skills and entrepreneurship training, access to better health and other programmes to improve their quality of life.

Memampankan Ekonomi Asas Rakyat (MEKAR) Programme

Through Yayasan PETRONAS, we uplifted the livelihoods of the B40 community in Kelantan, Kedah, Terengganu, Johor, Pahang, Perak and Sabah leveraging the MEKAR Programme. Under the programme, we provided aid under three categories:

- i. Basic necessities
We provided the communities in Pitas, Sabah and Kluang, Johor with access to water and solar power to help them improve their quality of life.
- ii. Skills and Entrepreneurship Development
We uplift the lives of B40 communities through the provision of skills and entrepreneurship development programmes. The programme which runs over two years is also embedded with a culture of innovation to help them improve their income streams. In 2022, we completed the earlier cohorts in Kedah, Perak, Kelantan, Terengganu, Pahang, Johor and Selangor.
- iii. Go-to-Market
We also helped communities improve their income generating skills with entrepreneurial training to enhance their quality of life and ensure a sustainable income stream.



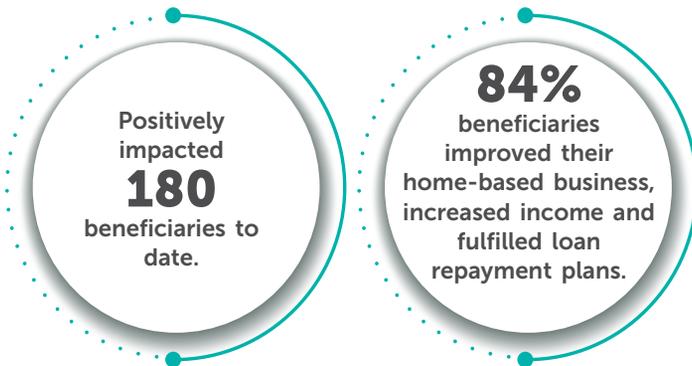
Positive Social Impact

Improving Youth Employability in Sabah

The Entrepreneurship Programme helps local entrepreneurs expand their business scale and find new market opportunities. The programme consisted of five training modules on ideation, conceptualisation, marketing strategy and business analysis which aims to equip participants with basic entrepreneurial skills. Agrobank provided information on financial management.

Working closely with the Giatmara Training Programme, we aim to upskill local youth and improve their employability. Youths from Lawas and Baram were exposed to courses such as welding and metal fabrication, automotive technology and building technology through the Towards Uplifting Lives Programme (TULiP).

- **22** participants from Lawas completed the Entrepreneurship Programme.
- **10** local youths graduated from the Giatmara Training Programme.



MyLady Assistance Scheme

Yayasan PETRONAS supported the MyLady Assistance Scheme programme to empower single mothers and women living with HIV to get out of poverty. Through this scheme, these women were given access to microcredit business loans, entrepreneurial training and peer support, to assist them with their home-based enterprises.

- **30** single mothers and women living with HIV received assistance through the MyLady Assistance Scheme.

SAGA Health Access Programme (SHAPE)

Through the Malaysia Aids Foundation (MAF) SAGA Health Access Programme (SHAPE), Yayasan PETRONAS assisted B40 patients with HIV, Thalassemia and Paediatric illness from rural Sabah to attend their treatment appointments by subsidising the high logistical costs to local hospitals or clinics.

- Assisted **180** patients under the SHAPE programme.
- **95 per cent** attendance rate (HIV beneficiaries) adhered based on scheduled appointments.

Supporting Cancer Research

Yayasan PETRONAS continued to support cancer research for the Asian population and paediatric patients by providing grants to Cancer Research Malaysia (CRM) and Hospital Canselor Tuanku Mukhriz (HCTM) in 2022. These grants will drive new research to address cancer more effectively, from prevention to detection and treatment.

Community-based Disaster Risk Management

Yayasan PETRONAS collaborated with the National Disaster Management Association Malaysia (NADIM) to introduce Community-Based Disaster Risk Management (CBDRM) training to local communities in Tumpat, Kelantan and Pekan, Pahang. Seasonal floods impacted both areas for several years.

CBDRM aims to strengthen community resilience by enhancing their capabilities and skills in pre-disaster training provided to help communities prepare for disasters to minimise its impact on their assets and lives. The training also allowed local emergency responders and agencies to forge stronger relationships.

- Equipped **200** participants, including community leaders with pre-disaster training.

Training for People with Disabilities

The Perlis Special Teens Centre (PeSTeC) under the management of the Perlis Special Children Community Rehabilitation Organisation upgraded its facilities as a result of a grant received from Yayasan PETRONAS in 2022. This further supported PeSTeC in helping special needs teenagers adapt to society by providing them with skills training and instilling a sense of independence.

Breaking the Cycle of Poverty Among Malaysia's Indigenous Communities and Extreme Poor

PETRONAS collaborates with a dedicated government department for the indigenous community (*Orang Asli*), *Jabatan Kemajuan Orang Asli* (JAKOA) and NGOs for a programme aiming to uplift the lives of *Orang Asli* across Malaysia. The programme focuses on providing access to clean energy, clean water and education.

- The programme was expanded in 2022 to include access to clean water and learning programmes.



In 2022, installing solar power systems under the programme impacted 156 Orang Asli homes across six villages. Each household benefitted from six hours of additional electricity and light per night, adding six hours of productivity which the community can spend on their daily routines such as domestic chores and other community activities. The installations have also reduced the community's energy expenses to approximately RM400 per month for each home. They previously purchased diesel fuel generator sets for their power supply.

As of 31 December 2022, more than 232,000 productivity hours were achieved from the installations and a savings of RM406,152.

The programme was expanded in 2022 to include access to clean water and learning programmes. The pilot solar-powered filtration systems were completed in Kampung Gakuyah in Bera, Pahang. Three units of the system provide clean water to 12 homes for each unit.

Access to clean water protected the community from waterborne diseases, reducing their healthcare expenses and improved the mortality rate among children. It also increased the community's awareness of personal hygiene and healthy living.

Meanwhile, a pilot learning programme was completed in Kampung Kepong in Bentong, Pahang. This programme is ready to be scaled-up further in 2023.

MERCY Malaysia

We are committed to doing our part in assisting those in need. We contributed to MERCY Malaysia to support its flood relief efforts in Pakistan and offered aid through Yayasan PETRONAS to flood-prone districts throughout Malaysia.

- Contributed **RM2.5 million** to MERCY Malaysia for flood relief assistance in Pakistan.
- Delivered **5,000** care packages worth close to RM1 million through Yayasan PETRONAS to flood prone districts in Malaysia.

SEEd.Lab Social Enterprise Programme

Through our end-to-end incubator programme, Social Enterprise Education Lab (SEEd.Lab), in partnership with Tata Consultancy Services, we tackle social pain points by building self-sustaining social enterprises that forge solutions for specific beneficiaries within communities. For the second cohort, our social enterprises address specific social challenges that exist within five domains namely Food and Agriculture, Health and Hygiene, Education and Skills, Personal and Financial Security; and Entrepreneurship in Sabah. The first of its kind in comprehensiveness in Malaysia, SEEd.Lab has enriched the lives of over 13,000 people and counting.

Yayasan PETRONAS' festive programme

- Provided more than 11,800 families and nine welfare homes with essential food supplies and festive hampers via Yayasan PETRONAS' festive programme during major festive celebrations.

Yayasan PETRONAS' Homeward programme

- Donated home medical equipment worth RM2.2 million to 965 beneficiaries under the Homeward programme by Yayasan PETRONAS, working with *Jabatan Kebajikan Masyarakat* (JKM) and *Jabatan Perkhidmatan Kebajikan Am Sabah* (JPKAS). The beneficiaries from 13 states and two federal territories (except Putrajaya) received 609 hospital beds, 44 oxygen concentrators and 312 wheelchairs.

Positive Social Impact

Environment – PETRONAS Planting Tomorrow

We recognise that achieving environmental awareness is a continuous journey that requires collective action. Therefore, we constantly work with our local communities to support environmental conservation and minimise our impact on the environment.

Environmental Conservation

Through Yayasan PETRONAS, we contributed towards carbon sequestration via tree planting activities. We did this by working with local communities in 11 states namely Kedah, Penang, Perak, Selangor, Kuala Lumpur, Melaka, Johor, Terengganu, Pahang, Sabah and Sarawak, where we provided them with the appropriate education, supported the setting-up of nurseries, participated in planting activities and monitored the survival of the trees. These actions help in improving the community’s income levels and quality of life.

- Continued to support environmental conservation under the PETRONAS Walk4Trees Challenge, a nationwide tree-planting project. A total of 61,584 trees have been planted across 11 states since this project began in September 2020.
- Three peat swamp forests in Selangor, Sabah and Pahang were rehabilitated and irrigation control management was implemented as part of fire prevention.

We conducted the mangrove conservation programme in Johor and Terengganu. In Johor, it was carried out in support of the Johor State Government’s plan to develop Sungai Johor Estuary into an ecotourism attraction by planting 14,500 mangrove trees. In Terengganu, this was part of PCG’s conservation and rehabilitation awareness programme along Sungai Kertih. The programme covers more than 14,000 square metres, with over 20,000 mangrove trees planted.

Biodiversity efforts:

- We are also doing various conservation efforts to prevent and minimise impacts to biodiversity and the ecosystem, while restoring and rehabilitating the ecosystems surrounding where we operate.

Our Upstream business planted over 15,000 trees, including mangroves, converted shipwrecks into artificial reefs, conducted coral restoration works and deployed mini *unjam*, a fish aggregating device, to provide alternative breeding grounds for marine life, especially fish. These efforts helped improve the marine ecosystem services to ensure food security, sustainable economic and coastal livelihood development (ecotourism) and shoreline protection.



Beach Cleaning Activities

We collaborated with several Non-Governmental Organisations (NGOs) and government ministries to clean up beaches. In Melaka, as part of our participation in World Clean-Up Day, we partnered with Solid Waste and Public Cleansing Management Corporation (SWCorp), the city council, *Majlis Bandaraya Melaka Bersejarah* (MBMB), and the state’s legislative assembly development and coordination committee, *Jawatankuasa Pembangunan dan Penyelarasan Dewan Undangan Negeri* (JAPERUN).

The collaborative effort saw 100.2 kilogrammes of waste collected. In Terengganu, we collaborated with a local NGO, *Geng Plastik Ija* and the state’s Department of Statistics Malaysia branch to collect 1,897 kilogrammes of waste, with 844 kilogrammes of recyclable waste materials.

Collected **100.2kg** of waste by collaborating with SWCorp, MBMB and JAPERUN in conjunction with World Clean-Up Day in Melaka.

Collected **1,897kg** of waste, including **844kg** of recyclable waste in Terengganu.

Sea Turtle Conservation in Mexico

We contributed to conservation efforts by building a larger and more protected nesting area for endangered sea turtles, increasing hatching rates by 30 per cent since 2020. In addition, we enhanced workers' living conditions, boosting morale and performance, and provided a safer, more efficient warehouse for equipment and materials storage.

240,891
turtles were released as compared to
294,660 in 2021.

Helping fishermen

- We uplift the lives of the fishermen community in Sabah, Sarawak and Terengganu with programmes tailored to their needs. These include safety awareness, educational activities focusing on the environment and contributing essential supplies and life jackets.
- The engagements, awareness sessions and outreach programmes have enhanced the community's safety awareness. This is reflected in a **60 per cent** reduction in oil rig encroachments and zero fish bombing activities.
- Additionally, the disposal of seized boats and the contribution of *unjam*, a traditional fish aggregating device, created fish breeding grounds for marine ecosystems to thrive and provided alternative fishing spots for the community

Clean water

- PETRONAS is positively impacting local communities in South Sudan, Sudan, Iraq and Indonesia by providing access to clean water. As a result, business and farming in South Sudan and Sudan have improved health and economic opportunities.
- PETRONAS also contributed water filters in Iraq and implemented a clean water programme in Indonesian schools, improving students' education and hygiene awareness.

Student Voices

The Student Voices competition provides a platform for future generations to share their ideas and solutions for some of the world's biggest challenges.

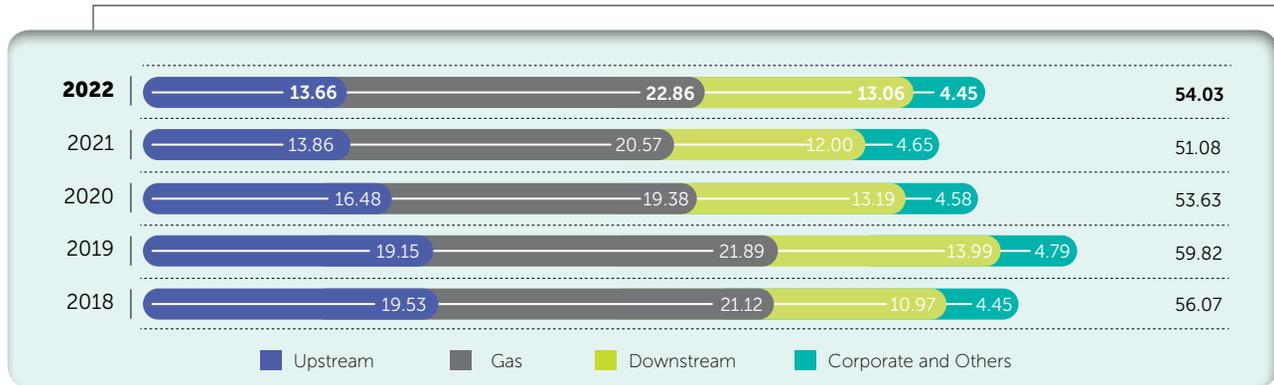
The competition aims to promote environmental protection, stronger communities and social responsibility by inspiring young contestants with educational videos on green mobility, solar energy and hydrogen. Our goal is to empower these students to become the voice for change.

In 2022, the competition saw the participation of 500 contestants from 26 schools in both online and onsite events. Since 2020, we have impacted over 200,000 beneficiaries, primarily teenagers and their families, in Shanghai and surrounding cities.

Five-Year Sustainability Key Performance Data

GHG Emissions – Operational Control

Total Greenhouse Gas (GHG) Emissions Breakdown by Business (Million tCO₂e)



Note:

CO₂e = carbon dioxide equivalent. This unit converts all other GHGs into the common denominator of CO₂e using Global Warming Potential (GWP) factors following the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (AR4).

In reviewing and improving our GHG emissions accounting methods, the total GHG emissions for operational control changed from previous disclosures due to the change of organisational boundary during re-baselining activities conducted in FY2022. Changes in scope since 2021 disclosures cover the inclusion of VESTIGO* and Iraq operations and removal of Myanmar because of divestment.

Our emissions in 2022 were higher compared to 2021 due to increased operational activities along the value chain following recovery from the COVID-19 pandemic.

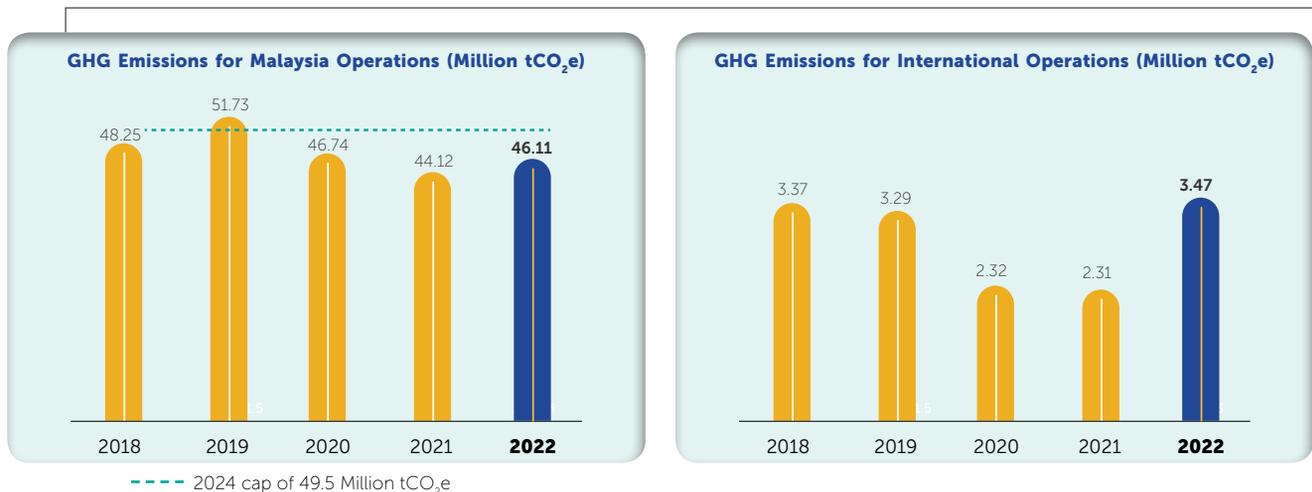
The short-term target of capping GHG emissions at 49.5 Million tCO₂e by 2024, includes the oil and gas value chain where more than 90 per cent of GHG emissions are contributed by activities in Upstream, Gas and Downstream Malaysia operations excluding Corporate and Others** activities. Furthermore, GHG emissions accounting for Corporate and Others require further refinements due to different organisational boundary used previously. Hence, subsequent analysis depicted below exclude Corporate and Others.

* VESTIGO is a wholly owned subsidiary of PETRONAS Carigali Sdn Bhd, focusing on development and production activities.

** Corporate and Others include MISC Group and KLCC Property Holdings.

GHG Emissions Breakdown by Region (Million tCO₂e)

(Excludes Corporate and Others)



In FY2022, total GHG emissions from Scope 1 and Scope 2 for Malaysia and International assets under operational control boundary is 49.58 Million tCO₂e.

In the oil and gas value chain, GHG emissions from Gas business contributed 46 per cent, followed by 28 per cent from Upstream and 26 per cent from Downstream. 96 per cent of emissions were from Scope 1 where the sources were mainly from stationary combustion, flaring and venting. Meanwhile Scope 2 only contributed to 4 per cent of Scope 1 and 2 emissions.

GHG emissions from Malaysia operations have been showing positive improvements, as it remained below the cap of 49.5 Million tCO₂e. This was contributed by ongoing investment in GHG emissions reduction efforts from FY2019 to FY2022 despite economic downturn. For international operations, total GHG emissions from Scope 1 and Scope 2 increased in FY2022 due to the increase in production from Iraq and Canada operations.

GHG Emissions Breakdown by Scope, Gases and Sources for Operational Control

(Excludes Corporate and Others)

Key Performance Indicators	2018	2019	2020	2021	2022
GHG Emissions (Million tCO ₂ e)	51.62	55.02	49.06	46.43	49.58
Breakdown by Scope					
Scope 1 (Million tCO ₂ e)	49.66	53.09	47.14	44.67	47.62
Scope 2 (Million tCO ₂ e)	1.96	1.93	1.92	1.76	1.96
Breakdown by Gas (only Scope 1)					
Carbon dioxide (CO ₂) (million tonnes)	39.65	42.57	38.40	38.71	42.15
Methane (CH ₄) (thousand tonnes)	394.33	413.51	343.49	232.23	215.40
Nitrous Oxide (N ₂ O) (thousand tonnes)	0.53	0.62	0.54	0.59	0.69
Breakdown by Sources (only Scope 1)					
Combustion (Million tCO ₂ e)	31.65	34.93	31.62	31.85	33.53
Flaring (Million tCO ₂ e)	8.98	8.37	7.16	7.33	8.33
Venting (Million tCO ₂ e)	8.28	9.20	7.53	4.81	3.74
Others (Million tCO ₂ e)	0.76	0.58	0.82	0.68	2.01

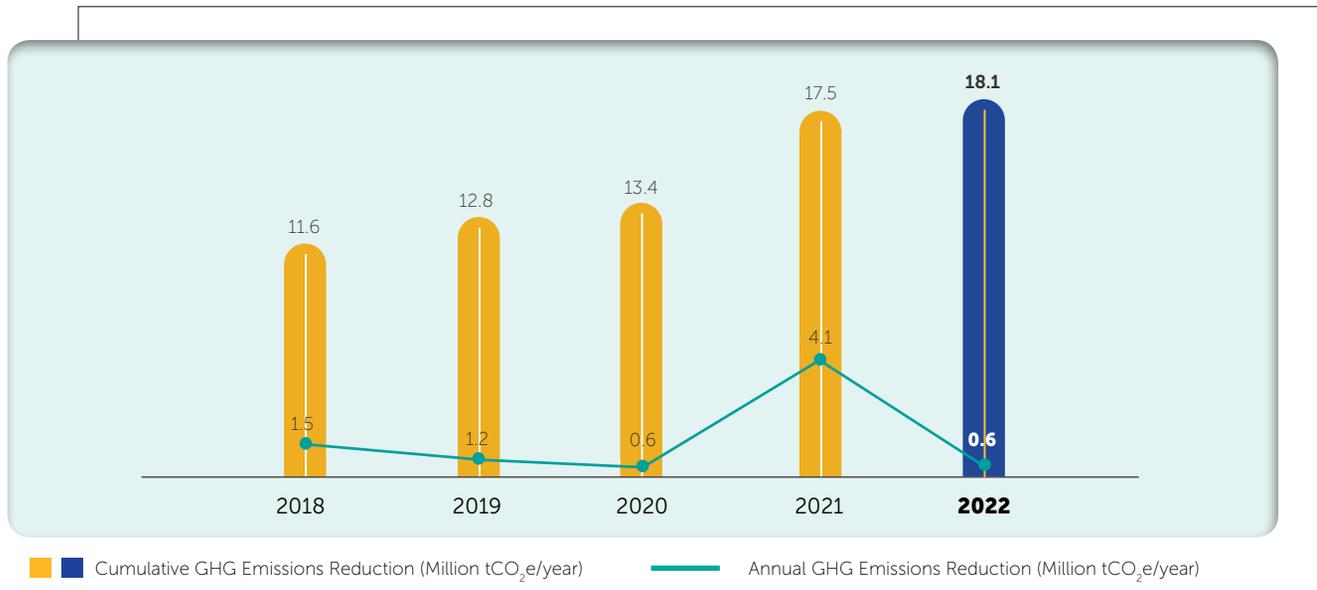
PETRONAS uses the Global Warming Potential values from the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report.

GHG Intensity by Business Segments

	2018	2019	2020	2021	2022
Upstream					
Total (tCO ₂ e/kboe)	56.75	51.39	50.30	38.93	34.57
Malaysia Assets (tCO ₂ e/kboe)	75.55	65.83	65.27	47.69	40.15
International Assets (tCO ₂ e/kboe)	21.07	19.28	14.99	19.47	23.92
Downstream					
Refineries (tCO ₂ e/bbl)	0.018	0.018	0.019	0.018	0.020
Petrochemicals (tCO ₂ e/tonnes)	0.68	0.68	0.66	0.67	0.68

Five-Year Sustainability Key Performance Data

GHG Emissions Reduction from Projects (Million tCO₂e/year)

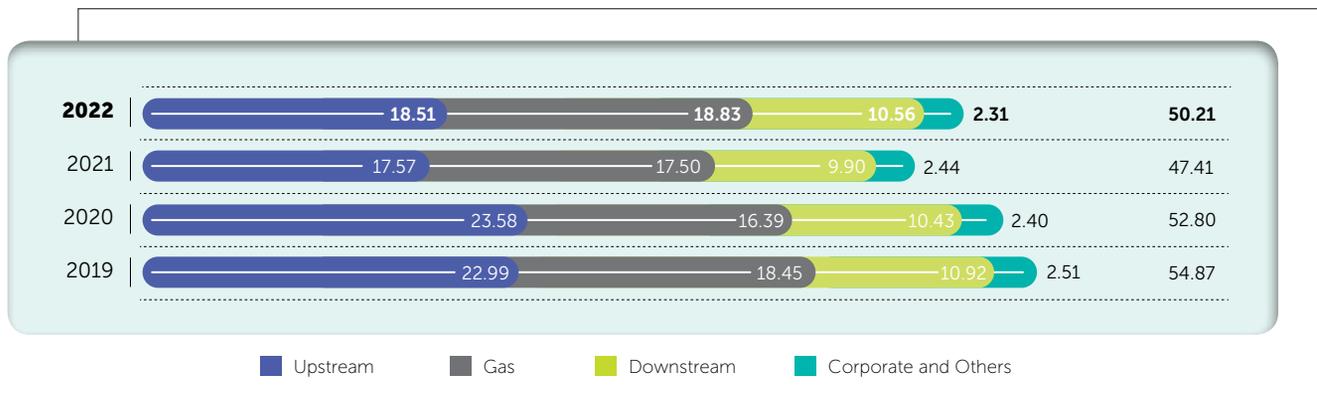


GHG emissions reduction are calculated as per ISO 14064-2: 2019 and do not reflect the year-on-year GHG emissions differences. According to ISO 14064-2, GHG projects are activities that alter the conditions of a GHG baseline and which cause GHG emissions reduction or GHG removal enhancements.

Cumulatively since 2013, we have reduced 18.1 Million tCO₂e of GHG emissions from our operations. Over the years, GHG emissions reduction was achieved through flaring and venting reduction initiatives in Upstream as well as energy efficiency improvements in Gas and Downstream businesses. Moving forward, electrification and CCS efforts will contribute more to meet our short-term and mid-term targets.

GHG Emissions – Equity Share

Total GHG Emissions Breakdown by Business (Million tCO₂e)



Equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Hence, PETRONAS has set mid-term and long-term targets by referring to FY2019 as the base year on equity share approach. The GHG emissions for FY2019 is adjusted to be 54.87 Million tCO₂e taking into consideration divestments and changes of equity ownership in Upstream business, as well as new information obtained from equity partners in Gas and Downstream businesses. In 2022, Gas business contributed the highest GHG emissions (37.50 per cent), followed by Upstream business (36.87 per cent), Downstream business (21.03 per cent), and Corporate and Others (4.60 per cent).

GHG Emissions Breakdown by Region (Million tCO₂e) (Excludes Corporate and Others)



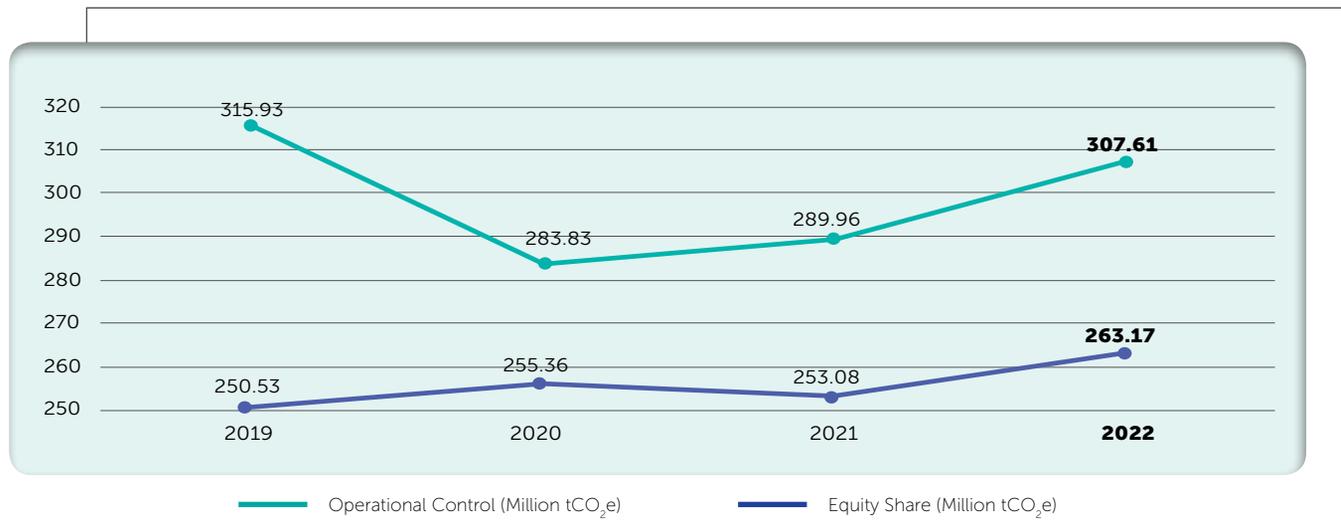
Key Performance Indicators

(Excludes Corporate and Others)

	2019	2020	2021	2022
Total GHG Emissions (Million tCO ₂ e)	52.36	50.40	44.97	47.90
- Scope 1 (Million tCO ₂ e)	50.87	48.87	43.48	46.48
- Scope 2 (Million tCO ₂ e)	1.49	1.53	1.49	1.42

In 2022, total GHG emissions under the Equity Share approach is 47.90 Million tCO₂e, excluding Corporate and Others. A reduction of 10.50 per cent from 2019 levels was recorded for Malaysia operations, while there was an increase of 6.60 per cent for international operations from 2019 levels. This was due to the increase in upstream production as well as new investments.

Scope 3 Category 11 (Million tCO₂e) by Operational Control and Equity Share approaches



PETRONAS has started to calculate and disclose Scope 3 GHG emissions for Category 11: Use of Sold Products. PETRONAS has plans to validate the Scope 3 methodology and conduct external verification in subsequent years. Under operational control and equity share approaches, Scope 3 GHG emissions show a 6.09 per cent and 3.99 per cent increase respectively compared to 2021. This is due to the increase in energy demand post-COVID 19 recovery.

Five-Year Sustainability Key Performance Data

Cumulative Renewable Energy Installed Capacity

Key Performance Indicators	2018	2019	2020	2021	2022
Total Cumulative Renewable Energy Installed Capacity (megawatt)	10	10	644	851	1,086*
Malaysia (megawatt)	10	10	19	29	81
International (megawatt)	n/a	n/a	625	822	1,005

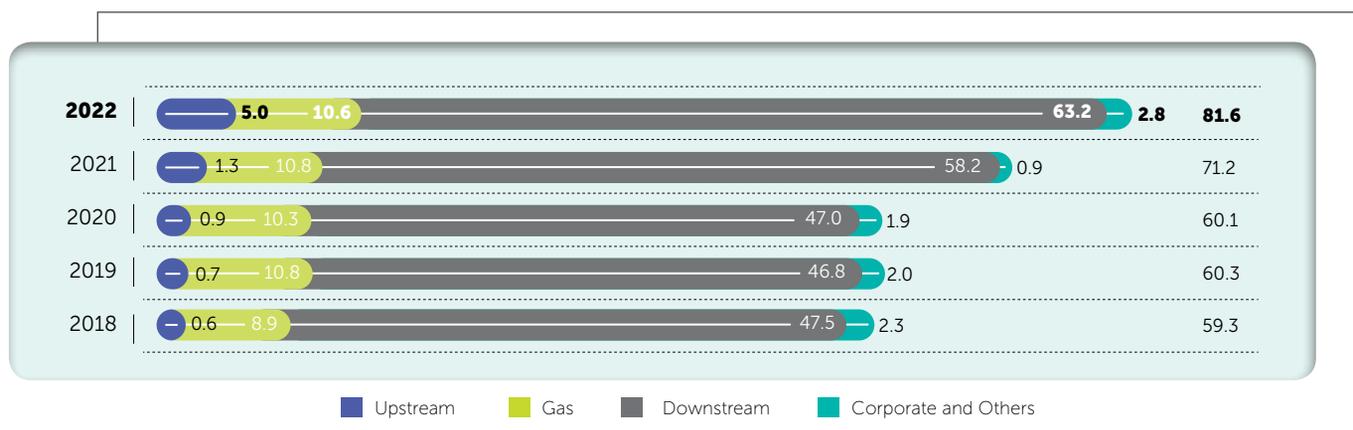
Note:

* Cumulative renewable energy capacity is 1.6GW, including installed and those under development.

Environment

Total Freshwater Withdrawal

(million cubic metres per year)



Water	2018	2019	2020	2021	2022
Total Freshwater Withdrawal (million cubic metres per year)	59.3	60.3	60.1	71.2	81.6
Malaysia (million cubic metres per year)	56.4	57.0	56.8	70.2	76.8
International (million cubic metres per year)	2.9	3.3	3.3	1.0	4.8
Discharges to Water (tonnes of hydrocarbon)	715	648	532	452	487

Air Emissions	2018	2019	2020	2021	2022
Total Sulphur Oxides Emissions (tonnes)	113,256	110,214	84,225	47,954	60,116
Total Nitrogen Oxides Emissions ¹ (tonnes)	151,519	148,446	138,035	133,962	62,790

Waste	2018	2019	2020	2021	2022
Number of Hydrocarbons Spills into the Environment over One Barrel ² (Number of cases)	7	7	5	2	2
Total Hazardous Waste Disposed (tonnes)	34,688	42,121	33,349	59,228	76,485

Note:

¹ Total nitrogen oxides emissions for 2022 stood at 62,790 tonnes from 133,962 tonnes in 2021, mainly due to omission of emission load data from ships due to ongoing review of reporting method, and revision in calculation methodology for floating Liquefied Natural Gas (LNG) and power plant.

² One barrel is equivalent to 159 litres.

Safety

Number of Fatalities

(Number of cases)



Key Performance Indicators	2018	2019	2020	2021	2022
Total man-hours worked (million hours)	466	355	273	268	292
Employees (million hours)	130	133	120	120	126
Contractors (million hours)	336	222	153	148	166
Fatal Accident Rate (FAR) (Number per 100 million man-hours)	1.29	0.56	1.47	1.12	1.37
Employees (Number per 100 million man-hours)	0.00	0.00	0.00	0.00	0.00
Contractors (Number per 100 million man-hours)	1.79	0.90	1.96	1.35	2.41
Lost Time Injury Frequency (LTIF) (Number of cases per one million man-hours)	0.09	0.11	0.10	0.14	0.13
Employees (Number of cases per one million man-hours)	0.12	0.08	0.09	0.10	0.11
Contractors (Number of cases per one million man-hours)	0.08	0.12	0.11	0.17	0.14
Total Reportable Case Frequency (TRCF) (Number of cases per one million man-hours)	0.38	0.34	0.29	0.41	0.34
Employees (Number of cases per one million man-hours)	0.32	0.28	0.27	0.28	0.26
Contractors (Number of cases per one million man-hours)	0.41	0.37	0.31	0.52	0.40
Total Recordable Occupational Illness Frequency (TROIF) (Number of cases per one million man-hours – employees)	0.22	0.23	0.39	0.24	0.32

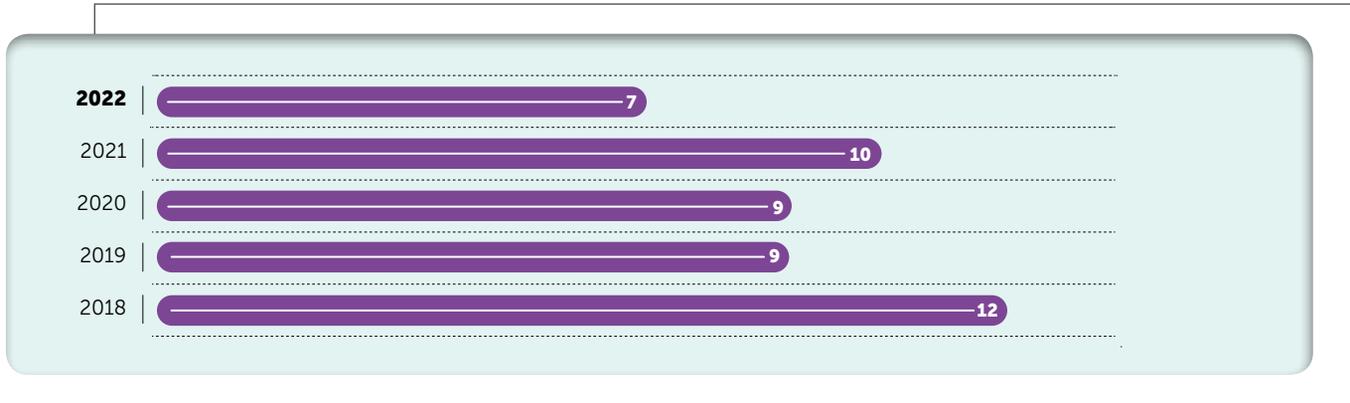
Note:

The Fatal Accident Rate (FAR) and Total Reportable Case Frequency (TRCF) for 2021 was updated due to the revision in total man-hours worked.

Five-Year Sustainability Key Performance Data

Number of Tier 1 Process Safety Events¹

(Number of cases)

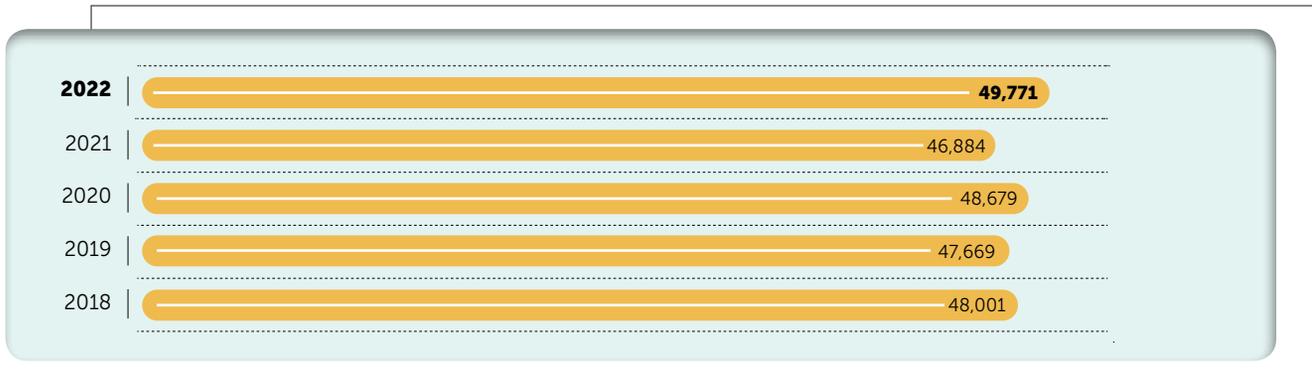


Note:

¹ A Tier 1 Process Safety Event is a Loss of Primary Containment (LOPC) with the greatest consequence as defined by API 754, Process Safety Performance Indicators for the Refining and Petrochemical Industries. It is an unplanned or uncontrolled release of any material, including nontoxic and non-flammable materials, from a process that results in one or more of the consequences as listed in the API 754.

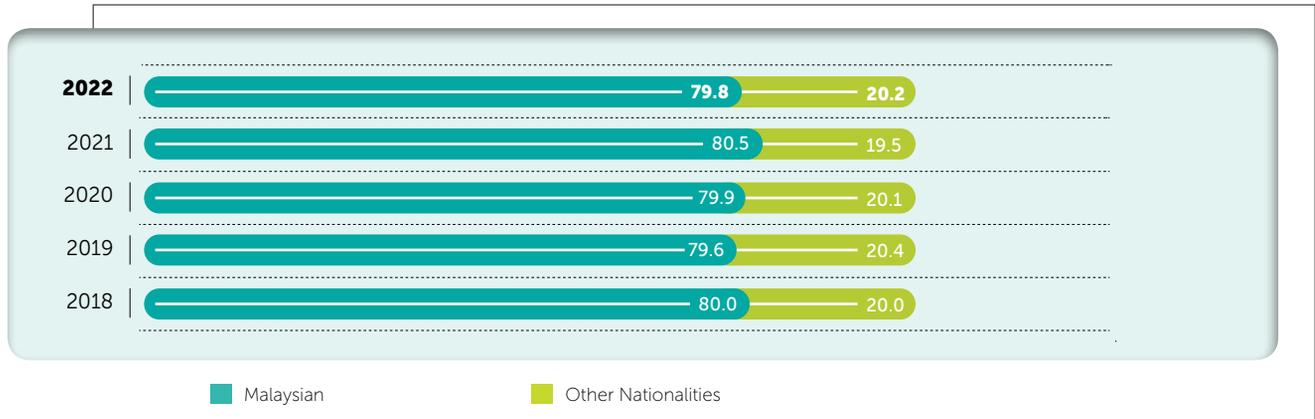
Employees

Total Number of Employees

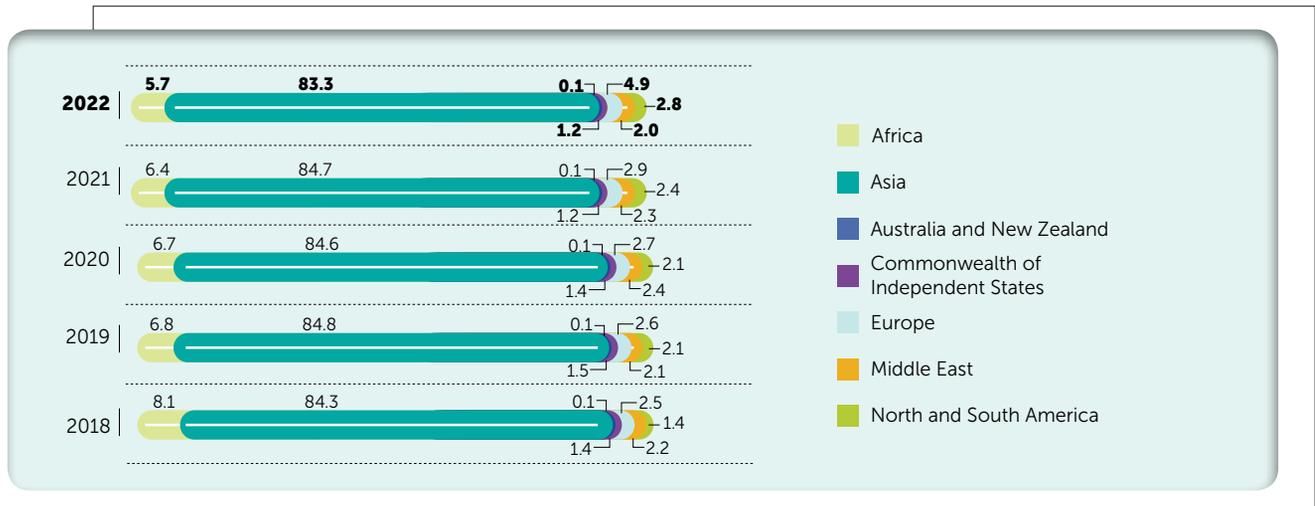


Manning for 2022 increased by 6.2 per cent as business operations started to pick up post-COVID-19 and new growth areas were pursued.

Breakdown of Employees by Nationality (%)



Breakdown of Employees by Region (%)



Five-Year Sustainability Key Performance Data

Employees

Key Performance Indicators	2018	2019	2020	2021	2022
Employment Type (%)					
Permanent	87	88	86	87	88
Contract	13	12	14	13	12
Age Group (%)					
Above 35	49	52	53	59	60
Below 35	51	48	47	41	40
Total Number of Union Members	9,949	8,420	8,476	8,353	8,929

Note:

Contract employees are given partial entitlement to benefits covering salary, leave, allowances, medical, financing and talent development.

Gender Diversity

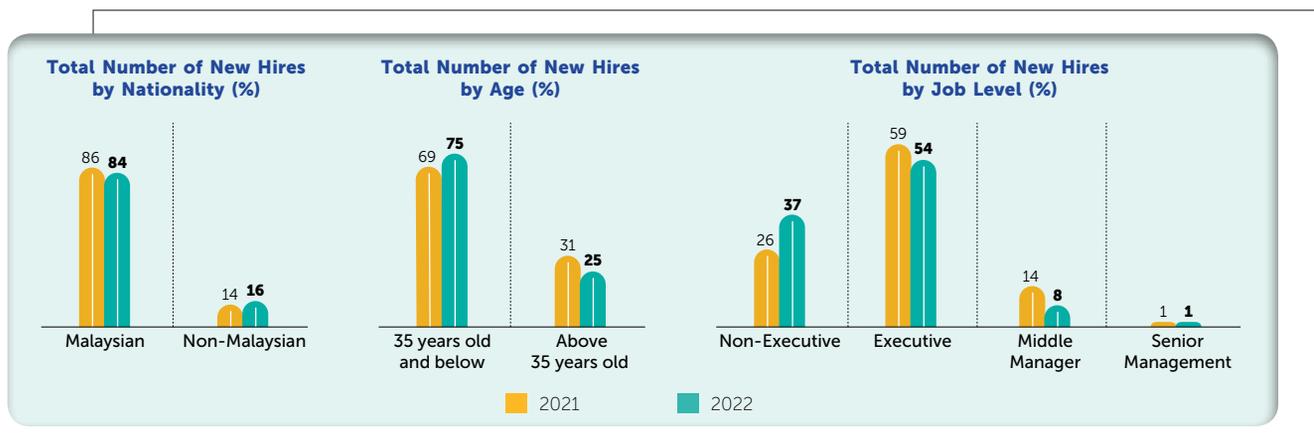
Key Performance Indicators	2018	2019	2020	2021	2022
Employees by Gender (%)					
Women	27	27	28	28	29
Men	73	73	72	72	71
Senior Management (%)					
Women	11	15	19	26	22
Men	89	85	81	74	78
Management Committee (%)					
Women	12	11	22	22	22
Men	88	89	78	78	78
Board of Directors (%)					
Women	20	14	25	30	18
Men	80	86	75	70	82
Women in Technical Positions (%)	13	14	14	14	14

Notes:

- The company continues its D&I efforts to ensure fair opportunities for management roles.
- Parental leave covers maternity and paternity leave only.
- 99% of those who took parental leave, both male and female, had returned to work.

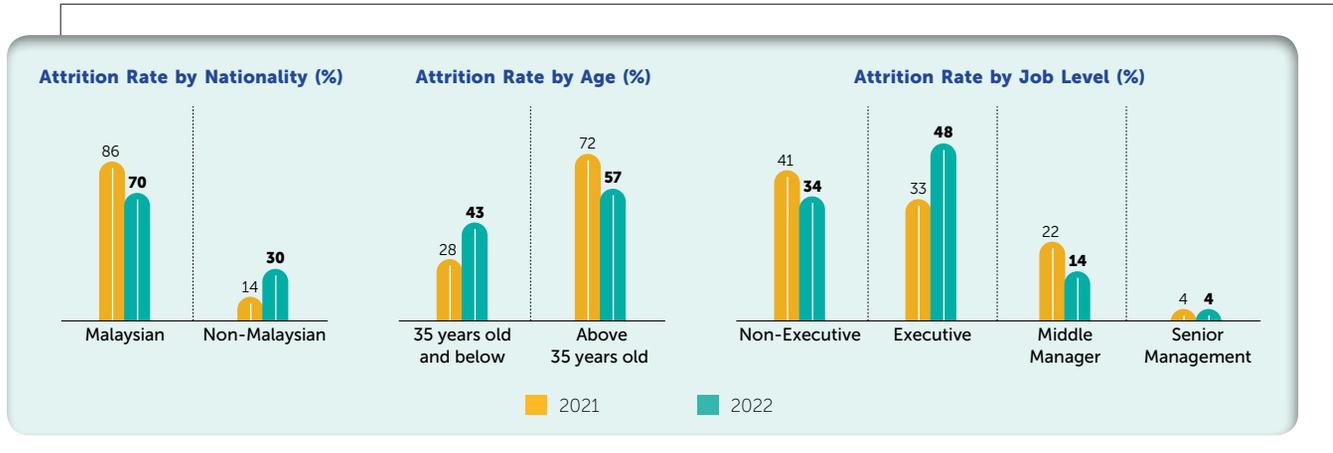
New Hires

Key Performance Indicators	2018	2019	2020	2021	2022
Total Number of New Hires (Core businesses in Malaysia)	2,512	3,498	2,160	2,172	5,210
Malaysian	2,098	2,989	2,003	1,982	4,358
Non-Malaysian	414	509	157	190	852



Employee Attrition

Key Performance Indicators	2018	2019	2020	2021	2022
Employee Attrition Rate (%)	6.5	5.5	4.9	8.4	6.6
Women	7.3	1.8	1.3	2.8	1.9
Men	6.2	3.7	3.6	5.7	4.7



Talent and Future Pipeline

Training and Development

Key Performance Indicators	2018	2019	2020	2021	2022
Training days per employee	7	7	5	4	4.9
Training investment per employee (RM)	6,649	6,543	3,588	2,386	5,433
Average total hours of training per employee (person hours)	52.8	53.6	36	30	39.1



Five-Year Sustainability Key Performance Data

Groupwide Technical Expertise

Key Performance Indicators	2018	2019	2020	2021	2022
Technical Authorities (TA)	577	340	501	601	618
Technical Professionals (TP)	941	1,028	1,173	1,281	1,384
Technical Trade Specialists (TTS)	225	240	259	262	266

Sponsorship

Key Performance Indicators	2018	2019	2020	2021	2022
Number of PETRONAS Scholars Recruited	262	206	219	220	293
Recruited by PETRONAS (%)	63	67	61	66	64
Recruited by Others (%)	37	33	39	34	7
Number of Scholarships Awarded to Malaysians	329	399	370	302	587
International Universities (%)	49	46	25	34	34
Malaysian Universities (%)	51	54	75	66	66
Number of Scholarships Awarded to Non-Malaysians at Universiti Teknologi PETRONAS	88	78	42	41	41

Note:

29 per cent of PETRONAS' scholars are currently pending placement.

Human Rights

Key Performance Indicators	2018	2019	2020	2021	2022
Number of security personnel trained in human rights policies or procedures	210	161	913	1,415	617