

## Business Review



# Upstream



**Datuk Adif Zulkifli**  
Executive Vice President and Chief  
Executive Officer, Upstream

In 2022, the world leaned on oil and gas to meet its energy needs in light of the geopolitical turmoil. This led to record high energy prices and an uptick in upstream activities against the backdrop of increased costs. And the industry responded, delivering the energy security needed in a sustainable manner.

A renewed focus on the home front rendered a string of successful exploration discoveries which grew Malaysia's resource base. We also sanctioned a slew of projects and activities to continue safeguarding the country's energy security and guaranteeing the vibrancy of its oil and gas industry. Internationally, the reshaping of our portfolio is ongoing through growth in some of the world's most prolific basins. We also undertook a series of high-grading efforts, driven by a relentless focus on value and delivering differentiated barrels.

Finally, we made great strides in decarbonisation and carbon capture and storage (CCS); sanctioning our flagship CCS project while maturing more projects in the pipeline. On the service front, we forged partnerships with leading industry players and customers across the value chain, in positioning Malaysia as a regional CCS hub.

Upstream will continue to balance our responsibility while transforming into a low-cost and low-carbon business through strategic and decisive measures, including an enhanced focus on HSE and integrity, which we consider key pillars for success.





Recorded a total daily production average of  
**2,434**  
 thousand barrels of oil equivalent (boe) per day.



**9.25**  
 Bboe Proved and Probable (2P) Reserves.

Reached final investment decision for **26** projects.



Made **9** exploration discoveries.

**10.4**   
 3-year average 1P Reserve Life Index (RLI).

Achieved first hydrocarbon for **37** projects.



**6** PSCs in Malaysia,  
**2** PSCs internationally.



Awarded **12** PSCs to Petroleum Arrangement Contractors (PACs) for Malaysian blocks via Malaysia Bid Round 2022 (MBR).



Forged **14** new partnerships across the CCS value chain.



Recorded a **14.4** per cent reduction in greenhouse gas (GHG) emissions, compared to 2021.



# Business Review

## Creating Stakeholder Value

### Stakeholder Expectations

### Value Created in 2022

#### Government

##### Malaysia

Maximise the long-term value of the country's natural resources

- Spearheaded the growth and development of Malaysia's exploration and production (EP) industry with 30 first hydrocarbons, 16 Final Investment Decisions (FIDs) and six exploration discoveries.
- Promoted Malaysia as an investment destination with the right infrastructure and attractive opportunities via the annual Malaysia Bid Round (MBR) which awarded 12 exploration Production Sharing Contracts (PSCs).
- Facilitated the growth of the gas sector within Malaysia by establishing collaborations and agreements with the Sabah and Sarawak state governments to address energy demand.
- Sanctioned the Kasawari CO<sub>2</sub> Sequestration (CCS) project to enable the monetisation of high CO<sub>2</sub> field for Malaysia's energy security.

#### International Host Authorities

Spur the development of the oil and gas industry in host nations

- Contributed to host countries through our commitment to develop new energy resources by signing agreements in Indonesia, Brazil, Congo and the United Arab Emirates and making two exploration discoveries in Brazil and one in Suriname.
- Involvement in social impact initiatives in areas we operate.

#### Petroleum Arrangement Contractors

Provide attractive opportunities and return on investments

- Signed four deepwater PSCs in Sabah, opening up more deepwater plays in the state and two PSCs in Sarawak.
- Awarded 12 PSCs for Exploration, Discovered Resource Opportunities (DRO) and Late Life Assets (LLA) as a result of the MBR 2022, with attractive fiscal and non-fiscal PSC terms designed to match the risks and rewards of the investments.

#### Partners

Enable the monetisation of oil and gas resources

- Leveraged PETRONAS' fully integrated value chain to meet customers' demands and expectations.
- Adopted innovative technical and commercial solutions to enable the monetisation of resources and prolong the economic life of fields.
- Implemented measures to lower costs and promote efficiency in operations.
- Provided opportunities to contribute towards establishing an integrated CCS value chain in Malaysia.



Creating Stakeholder Value

Stakeholder Expectations

Value Created in 2022

**Communities**

Conduct Social Impact initiatives to support community development.

- Provided access to sufficient supply of clean water, impacting close to 90,000 people in local communities in South Sudan, Sudan, Iraq and Indonesia. This has seen an improvement in the quality of health and access to sustainable economic development in South Sudan and Sudan as well as better education experience and awareness on hygiene and sanitation for school children in Indonesia and Iraq.
- Impacted more than 3,500 members of the marine community in Malaysia through Sahabat Maritim, an outreach programme in Sarawak, Sabah and Terengganu. Through safety awareness, educational activities as well as essential supplies contribution, there has been a 60 per cent reduction in fishermen encroachment and zero fish bombing activities.
- Completed entrepreneurship training for 22 local entrepreneurs from Lawas, Sarawak for them to expand their business reach and find new marketing opportunities.
- Provided financial aid to 105 Sudanese university students to complete their university education through the PETRONAS Local Universities Scholarship (PLUS). The initiative, since its inception in 2016 by PETRONAS Sudan Operations has benefitted 410 university students.
- Provided financial assistance of USD25,000 to four indigenous students from the British Columbia (BC), Canada via the Building Brighter Futures programme. PETRONAS Energy Canada Ltd has participated in two cycles of this initiative since 2020, which sees the BC government match the contribution to the students.
- Organised the PETRONAS School of Life programme to equip 300 youth with life skills training. The initiative by PETRONAS Carigali Brunei Ltd will enhance their future employability and prepare the students for the workforce in the future.
- Started a sustainable farming initiative that involves the cultivation of a 3,000 square-metre sustainable farm. This initiative by PETRONAS Nile Ltd benefits more than 100 children and caretakers with nutritious vegetables at the Juba Orphanage Home (JOH) in South Sudan.
- Contributed medical equipment and assistance to ensure essential supplies of equipment are available and affordable on a sustainable basis to hospitals in Suriname and clinics in Iraq.

**Employees**

Provide opportunities to upskill and reskill based on industry needs.

- Upskilled and reskilled employees with multiple training and development programmes customised to improve their capabilities according to their skill groups (Technical and Business).



# Business Review

## Key Focus Areas and Results

### Core Business – More Energy, Less Emissions

#### What We Did in 2022

##### Sustainable Supply

Ensured a sustainable supply of energy to stakeholders.

1. Pursued and realised material growth through the delivery of production, first hydrocarbon, FID and exploration discoveries.
2. Promoted Malaysia as an attractive investment destination to industry players through the MBR 2022
3. Focused efforts to grow the domestic energy sector

#### Results

- Achieved total daily production average of 2,434 thousand boe per day, seven per cent higher compared to 2021.
- Achieved first hydrocarbon in 37 projects; seven greenfields and 30 brownfields.
- Reached FID in 26 projects covering Malaysia (16), Indonesia (four), South Sudan (four) and Brazil (two).
- Made nine exploration discoveries covering Malaysia (six), Brazil (two) and Suriname (one).
- Received approval from Malaysian and Thailand governments to extend the Malaysia-Thailand Joint Development Area (MTJDA) PSC until 2039, ensuring energy security for both nations.
- Signed the Gas Supply Agreement extension for SK309/SK311 PSC with Sarawak state government for sustainable gas supply to the state.
- Offered 14 exploration blocks, six clusters of Discovered Resource Opportunities (DRO) and one cluster of Late Life Assets (LLA) for bidding.
- Awarded 12 Production Sharing Contracts (PSCs) through MBR 2022, including to new players in Malaysia.
- Signed six PSCs, four in Sabah and two in Sarawak.
- Signed a Heads of Agreement (HOA) with Petroleum Sarawak Bhd (PETROS) for the supply of 60 MMscfd of gas to the proposed 400 MW Combined Cycle Gas Turbine power station in Miri.

#### Portfolio Expansion and High-grading

1. Grew business portfolio as part of our global strategy with prolific growth opportunities
2. Strengthened portfolio health and value through continuous portfolio high-grading exercise

- Signed an agreement to explore and appraise Unconventional Onshore Block 1 in the United Arab Emirates.
- Won the bid for Brazil's Agua Marinha exploration block.
- Signed an agreement to farm into the Marine 20 PSC in the Republic of Congo.
- Signed an MoU and an Integrated LNG Joint Study and Development Agreement (JSDA) in Argentina.
- Initiated high-grading exercise for our assets in the Republic of South Sudan and the Republic of Chad.

**Key Focus Areas and Results**

**Core Business – More Energy, Less Emissions**

**What We Did in 2022**

**Digital and Technology**

Harnessed data to increase productivity and efficiency, driving a more informed decision-making process.

**Results**

- ✦ Digitalised geological core samples and insights via the myCORE360 programme, which led to an 80 per cent reduction in data analysis duration and better interpretation or analysis of reservoir characterisation.
- ✦ Launched an extensive EP data platform, myPROdata, which saw a 30 per cent increase in investors participation in bidding rounds and helped more than 120 investors conduct a comprehensive subsurface evaluation by leveraging over 1,100 terabytes of data.
- ✦ Piloted the Rig Mechanised Automation (RMA) at the Integrated Bekok Oil project, which has led to cost savings, carbon emission reduction via decreased drilling time and carbon footprint reduction via smaller manpower offshore.

**Health and Safety**

Fostered Generative HSE Culture at all our areas of operations.

1. Shortened the health assessment process and tracking of health parameters for all offshore staff.
2. Reduced the possibility of occurrences of major incidents through Process Safety Golden Rules (PSGR).
3. Reinforced HSE accountability and behaviour throughout Upstream business.
4. Promoted mental health awareness.

- ✦ Increased efficiency of the health assessment process by 85 per cent through digitalisation (from three weeks to three days) and provision of real time health status data for staff.
- ✦ Addressed shortage of staff offshore, facilitated clearance in a timely manner and properly monitored the well-being and health of staff.
- ✦ Effectively operationalised and increased awareness of PSGR in Malaysia and company-operated international assets by increasing visibility and awareness among targeted personnel.
- ✦ Established Accountability and Behaviour Reinforcement (ABR), including ABR Committees across Upstream business to promote accountability, ownership and nurturing the desired HSE behaviours in daily operations.
- ✦ Appointed 42 ambassadors and five facilitators under the Upstream MIND-A-CARE programme.
- ✦ 217 staff completed the i-CARE training to increase resilience.
- ✦ 4,000 staff and contractors attended mental health awareness training.

# Business Review

## Key Focus Areas and Results

### NZCE – Pathway to Zero

#### What We Did in 2022

##### Sustainability

Operational excellence and collaboration to lower overall carbon footprint.

1. Physical decarbonisation to lower overall GHG emissions
2. Provide storage for CO<sub>2</sub> from internal output
3. Position Malaysia as a CCS solutions hub

#### Results

- Recorded a 14.4 per cent reduction in GHG emissions in 2022 compared to 2021 following the execution of multiple emissions reduction projects, including achieving zero routine venting in four fields, contributing to 0.6 Million tCO<sub>2</sub>e reduction in hydrocarbon venting from our Malaysia-operated assets.
- Reduced Drilling and Completion GHG emissions by 50 per cent through better operational efficiencies, well-testing improvements and use of dual fuel vehicles at PETRONAS Energy Canada Ltd.
- Entered into a HOA with JX Nippon Oil & Gas Exploration Corporation to collaborate in developing a joint proposal to monetise the gas potential within the Bujang, Inas, Guling, Sepat and Tujoh (BIGST) fields.
- Reached the FID for the development of the Kasawari CO<sub>2</sub> Sequestration (CCS) project offshore Sarawak.
- Signed two Project Development Agreements (PDAs) with ExxonMobil to jointly pursue CCS activation projects in Malaysia, including the maturation of technical scopes for the CCS value chain and more.
- Signed 14 Memoranda of Understanding (MoUs) with like-minded industry players across the value chain.

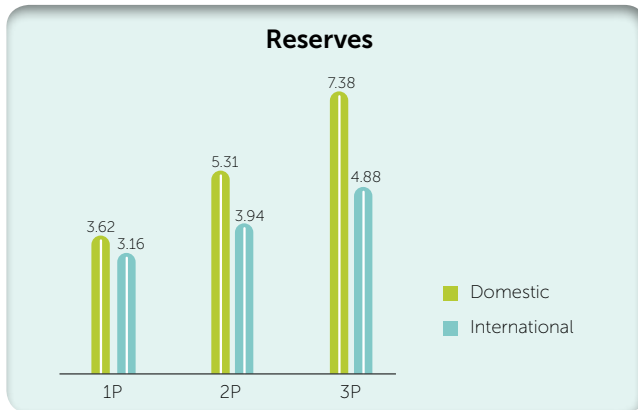


**Governance and Disclosure (Reserves and Resources)**

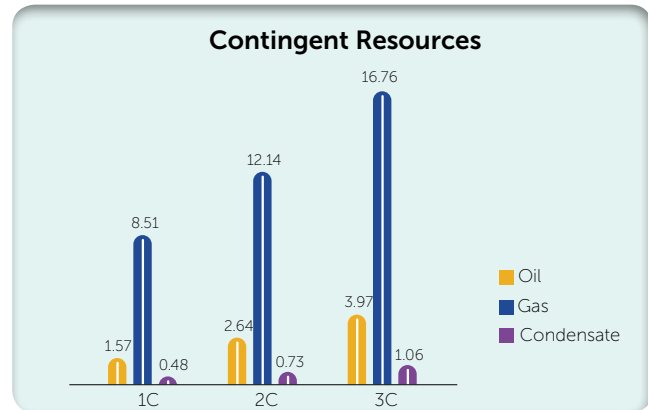
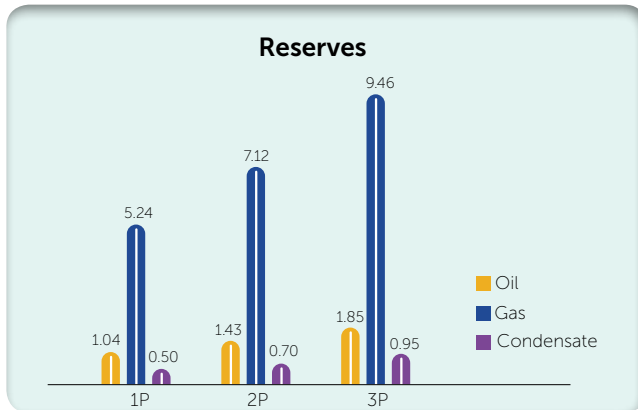
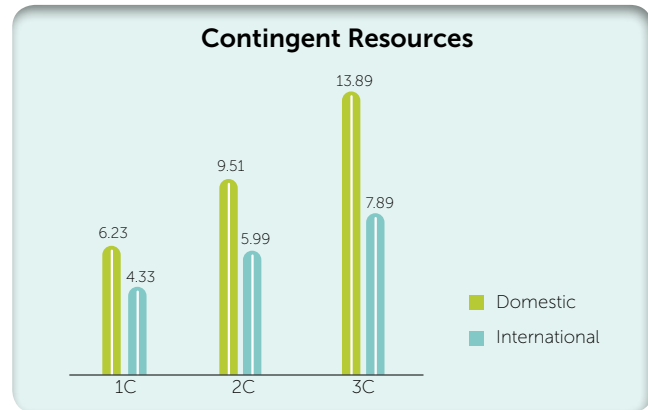
As at 1 January 2023, PETRONAS' total petroleum 2P reserves stood at 9.25 Bboe, an increase of two per cent from 2021. The improvement in reserves performance is primarily due to the healthy maturation of contingent resources to reserves. PETRONAS' total contingent resources (2C) stood at 15.50 Bboe, an increase of one per cent from 2021 as a result of nine new exploration discoveries that were made during the year that contributed 0.77 Bboe of 2C to our portfolio.

**(i) ARPR 1.1.2023 Reserves and Contingent Resources**

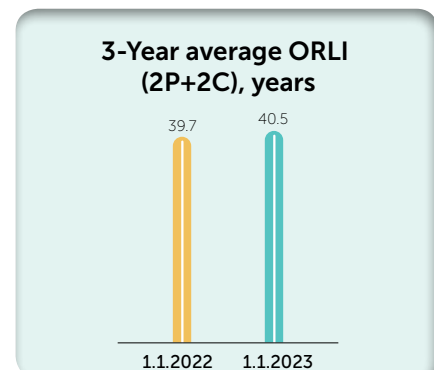
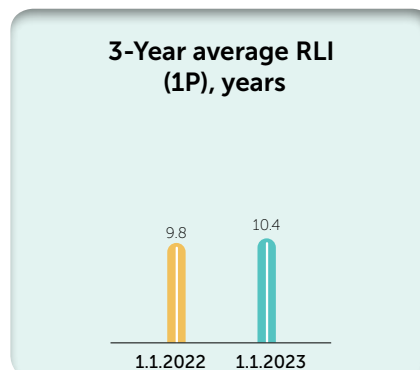
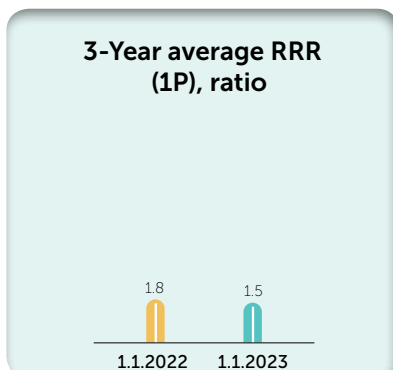
Unit: Bboe



Unit: Bboe



**(ii) Reserves and Resources Performance Indicators**



**Note:**

- (a) Gas conversion factor prior to ARPR 1.1.2022 6,000 scf = 1 boe. ARPR 1.1.2022 and beyond 5,650 scf = 1 boe.
- (b) For ARPR 1.1.2022, without the uplift due to the change in conversion factor, the 3-year average 1P RRR ratio would be 1.6.

# Business Review

## Key Risks and Challenges

### Risks and Challenges

#### Corruption Risk

Failure of employees, partners and associated third parties to comply with the PETRONAS Code of Conduct and Business Ethics (CoBE), Anti Bribery and Corruption (ABC) manual and related laws and regulations to safeguard PETRONAS' reputation.

#### Project Delivery Risk

Capital projects not being delivered on time, on budget, on scope and on volume.

#### HSE and Security Risk

Non-compliance to HSE practices causing business disruption and negative impact to reputation.

Managing new and emerging risks from security and maritime threats.

### Mitigation Strategies

Strengthened the culture of transparency and accountability among Upstream personnel which includes improved understanding of assurance processes and awareness on PETRONAS CoBE, the ABC manual and related laws and regulations and whistleblowing.

- Reviewed current project risk and assurance to ensure technical integrity.
  - Developed strict assurance implementations on project risk management practices.
  - Collaborated with host authorities, PSCs and the industry to address limited resources.
- 
- Established the Upstream Generative HSE Culture (GC) Framework and Roadmap.
  - Implemented Competency and Fatigue Management System (FMS) Monitoring (Tour of Duty).
  - Strengthened contractors' accountability and frontline site supervision for better HSE compliance.
  - Conducted continuous monitoring of our offshore assets and in close collaboration with relevant government authorities.

**Growth Opportunities**

**Opportunities**

**Our Approach**

<ul style="list-style-type: none"> <li>➤ Extract and monetise remaining oil and gas resources from the frontier and mature basins to deliver the full potential of Malaysia's resources.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Intensify exploration activities by venturing into more frontier plays and rejuvenate mature basins.</li> <li>➤ Accelerate the monetisation of discovered resources with high reserve recovery, achieving best cost efficiency while adopting data and technology as key enablers.</li> <li>➤ Maximise production and value from producing assets through high production reliability, implementation of value-based and low-carbon operation solutions.</li> <li>➤ As the host authority, offering attractive fiscal terms as well as enriched data availability and transparency to entice more players and investments.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Monetisation of high value and quality oil resources in PETRONAS Upstream's focus regions of the Americas, Middle East and Southeast Asia to generate competitive returns.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Positioning growth at strategic areas concentrated on availability of sizeable resources and infrastructure, access to markets and alignment to Environmental, Social and Governance (ESG) considerations.</li> <li>➤ Deliver more focused exploration activities driven by pace of monetisation.</li> <li>➤ Accelerate the monetisation of discovered resources and maximise value from producing assets in a low-cost and low-carbon manner.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Monetisation of world-class unconventional gas resources in Canada and potentially Argentina to deliver enterprise value upsides through integrated LNG business.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Positioning growth at strategic areas that is aligned with our Gas and LNG focus areas.</li> <li>➤ Deliver low breakeven gas supply in a low-carbon manner through development and operational excellence with digital and technology as key enablers.</li> <li>➤ Ensuring clear monetisation plan with optimum midstream positioning.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Pursue CCS solutions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Advocate the government for ecosystem development in Malaysia.</li> <li>➤ Commence discussion with interested emitters and their relevant government agencies in fulfilling regulatory requirement for cross-border CCS.</li> <li>➤ Deliver Kasawari CO<sub>2</sub> Sequestration (CCS) project offshore Sarawak successfully as the catalyst for other similar projects.</li> </ul>



# Business Review

## Outlook

### Short Term (2022-2027)

A renewed emphasis on energy security has returned the focus to developing resources at home, or which are quick to meet the pickup in demand, while driving a rebound in Upstream activities that will support economic growth.

Our short term key focus areas include:

Business Unit	Results
<p><b>Malaysia</b></p> <p>Grow to replenish resources and achieve production target in a low-cost and low-carbon manner to address energy demand while positioning CCS as a business.</p>	<ul style="list-style-type: none"> <li>➤ Revitalise Malaysia’s exploration and production (EP) landscape to ensure continued growth and make Malaysia a home for dynamic and robust investors.</li> <li>➤ Intensify exploration activities at all regions including exploration of new plays and matured areas while expediting appraisal programmes to replenish our resources.</li> <li>➤ Deliver base production by accelerating maturation and delivery of projects including the Gansar Gas Field Development (GFD), Kasawari GFD and Jerun to meet demand centres' requirements.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>➤ Deliver low-carbon production through physical decarbonisation of Upstream activities including flaring and venting reduction projects.</li> <li>➤ Enable monetisation of high CO<sub>2</sub> resources via CCS solutions including successful delivery of the Kasawari CO<sub>2</sub> Sequestration (CCS) project offshore Sarawak.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>➤ Positioning Malaysia as regional CCS solutions hub by advocating to targeted stakeholders while continuing to pursue collaborative partnerships with industry players.</li> </ul>
<p><b>International</b></p> <p>Deliver enterprise value upsides through our integrated Gas business as well as pursue and realise material growth in strategic oil focus areas in a low-cost and low-carbon manner with ESG as a key consideration.</p>	<p><b>Canada and Argentina</b></p> <ul style="list-style-type: none"> <li>➤ Pursue enterprise value upsides through the monetisation of our North Montney Joint Venture (NMJV) resources via our Integrated LNG project while also maximising value creation by monetising gas to domestic market in tandem with growing gas demand markets in North America.</li> <li>➤ Continue building our strategic position of integrated business in the region with focused efforts to potentially supply Argentina’s world-class unconventional gas resources to the potential integrated LNG project in Argentina.</li> </ul> <p><b>Brazil and Mexico</b></p> <ul style="list-style-type: none"> <li>➤ Pursue and realise material growth in Brazil and Mexico by focusing on exploration activities with a clear path to monetisation to build a value-driven portfolio. Key efforts are being put in place to realise planned resource addition in a low-cost and low-carbon manner, leveraging our synergy with partners and host authorities.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>➤ Drive value maximisation while executing low-carbon production in the likes of Sépia, Brazil and continue physical decarbonisation efforts at our assets.</li> </ul>

**Medium to Long Term (2028-2030)**

Accelerating energy transition demands decarbonisation across every step in the value chain and we are committed towards achieving this through innovation and technological deployment, working hand in hand with industry players in Malaysia and in our international operations.

Our medium to long term focus areas include:

Business Unit	Results
<p><b>Malaysia</b></p> <p>Grow to replenish resources and sustain production target in a low-cost and low-carbon manner to address energy demand while positioning CCS as a business.</p>	<ul style="list-style-type: none"> <li>➤ Ensure energy security while striving towards maximising full resource potential to grow and expedite monetisation through intensified exploration efforts, timely resource maturation and maximising recovery from producing assets.</li> <li>➤ Deliver energy security in alignment with our NZCE 2050 Pathway by prioritising continuous efforts to develop low-carbon solutions that unlock high contaminant resources while reducing emissions from our assets.</li> <li>➤ Provide storage for PETRONAS' assets as well as meet CCS demands of regional industrial sectors to position Malaysia as a regional CCS solutions hub.</li> </ul>
<p><b>International</b></p> <p>Grow to replenish resources and sustain production targets in a low-cost and low-carbon manner to address global energy demand while delivering competitive returns to our shareholders.</p>	<ul style="list-style-type: none"> <li>➤ Address global energy demand while delivering competitive returns to our shareholders by pursuing and realising opportunities with high value and high certainties of delivery in a low-cost and low-carbon manner with ESG as a key consideration.</li> <li>➤ Approach new investment opportunities in alignment with NZCE 2050 Pathway while being involved in focused efforts to decarbonise our existing assets.</li> </ul>



# Business Review



# Gas



**Adnan Zainol Abidin**  
Chief Operating Officer,  
Executive Vice President and  
Chief Executive Officer,  
Gas

In 2022, we took significant strides in our Gas business, positioning natural gas as a critical transitional fuel in response to the ever-increasing energy prices and the global shift towards lower carbon energy sources. Adhering to PETRONAS' strategy and the Net Zero Carbon Emissions by 2050 (NZCE 2050) Pathway, we bolstered our position as a one-stop centre for lower carbon energy solutions and as a trustworthy provider of natural gas by prioritising the needs of our customers.

We remained steadfast in our commitment to reduce GHG emissions throughout our natural gas value chain, implementing various initiatives and projects to achieve our carbon reduction targets. We continued to harness the potential of digitalisation and took a proactive approach in reshaping our global LNG portfolio to cater to the escalating demand for lower carbon energy solutions both domestically and internationally, given the pressing need for energy security.

Our unwavering progress was made possible by the passion and dedication of our employees, who never lost sight of our objectives. Moving forward, we are poised to embrace new opportunities and broaden our portfolio to offer more accessible and reliable lower carbon energy solutions in a just and equitable manner.







**Liquefied Natural Gas (LNG)**

focuses on exports of lower carbon energy internationally.



**Gas and Power (G&P)**

provides processed gas to customers across Malaysia and Thailand.



Achieved OEE of **96.6%** across all business segments under Gas business.



Achieved gross LNG sales of **34.2** MMT.



Delivered **405** LNG cargoes from PLC to customers across the globe.



Delivered **43** LNG cargoes from PFLNG SATU and PFLNG DUA.



Completed **2,619** Virtual Pipeline System and LNG bunkering deliveries across Malaysia.



Secured **136** MMscfd of natural gas deals.

# Business Review

## Creating Stakeholder Value

Stakeholder	Expectations	Value Created
<p><b>C</b></p> <p><b>Customers</b></p>	<p>Provide reliable, affordable and customer-centric solutions that support the energy transition toward a lower carbon future.</p>	<ul style="list-style-type: none"> <li>➤ Delivered more than 12,400 LNG cargoes cumulatively to date to customers around the world from the PETRONAS LNG Complex (PLC) since the first cargo delivery in 1983.</li> <li>➤ Delivered customer-centric solutions such as Virtual Pipeline Services (VPS) and ISO tanks to off-grid customers in Malaysia and China.</li> <li>➤ Delivered the 100<sup>th</sup> cargo from PETRONAS Floating LNG facilities.</li> <li>➤ Delivered carbon-neutral LNG as part of cleaner LNG solutions to help customers achieve their sustainability aspirations.</li> <li>➤ First in Southeast Asia to offer LNG as a cleaner marine fuel via an LNG bunkering solution.</li> </ul>
<p><b>IPG</b></p> <p><b>Government and Regulators</b></p>	<p>Ensure safe and reliable gas and power plant operations in the surrounding communities.</p> <p>Comply with the latest industry occupational health and safety standards and processes.</p>	<ul style="list-style-type: none"> <li>➤ Ensured continuous secure and reliable delivery of natural gas throughout Peninsular Malaysia with zero domestic gas supply interruptions.</li> <li>➤ Achieved full compliance to industry regulations with mitigations in place such as Occupational Safety and Health Assessment (OSHA), Environmental Quality Act (EQA) and Factories and Machinery Act (FMA) across all operating units.</li> </ul>
<p><b>CN</b></p> <p><b>Communities</b></p>	<p>Introduce initiatives that positively impact the environment and community at large.</p>	<ul style="list-style-type: none"> <li>➤ Installed solar systems and lighting to off-grid <i>Orang Asli</i> communities via Rays of Hope, a Gas business Signature Social Impact project which saw 156 <i>Orang Asli</i> homes across six villages gain access to energy. This initiative has resulted in an additional six hours of light per night as well as a total savings of approximately RM400,000 by switching from diesel to solar.</li> <li>➤ Conducted social outreach initiatives focusing on education, environment, and community outreach, including:                         <ul style="list-style-type: none"> <li>– Community outreach programmes under PETRONAS Sentuhan Kasih.</li> <li>– Mangrove conservation and replanting at Sungai Latoh, Pasir Gudang, Johor.</li> </ul> </li> </ul>
<p><b>IE</b></p> <p><b>Employees</b></p>	<p>Embed sustainable practices into the culture and practices of the organisation.</p>	<ul style="list-style-type: none"> <li>➤ Scaled up the implementation of Zero Single-Use of Plastic Programme, to encourage usage of sustainable materials such as recyclable food packaging and glass bottles to replace plastic food packaging.</li> </ul>

**Key Focus Areas and Results**

**Core Business – More Energy, Less Emissions**

**What We Did in 2022**

**Results**

Sustained world-class operational excellence and grew core business through new LNG supply deals.

- Achieved a high OEE of 96.6 per cent across all business segments under Gas business.
- Achieved Gross LNG sales of 34.2 MMT.

Provided reliable LNG supply and optimised global portfolio to mitigate production shortfalls.

- Delivered 405 LNG cargoes from PLC in Bintulu to customers across the globe.
- Delivered 43 LNG cargoes from PFLNG SATU and PFLNG DUA.
- Mitigated production shortfalls from the Force Majeure declaration on Sabah-Sarawak Gas Pipeline (SSGP) with no supply disruptions faced by impacted customers.

Advocated for greater natural gas use and grew domestic gas sales.

- Secured 136 MMscfd of natural gas deals with non-power customers across Malaysia.

Innovated customised solutions to meet customers' energy demands while pursuing small-scale solutions in Southeast Asia to enhance accessibility to natural gas.

- Completed 2,619 VPS and LNG bunkering deliveries across Malaysia.
- Delivered LNG to smaller-scale and off-grid customers in China via LNG in ISO tanks.

Scaled up Digital Transformation (DX) programmes to enable remote digital operations and improvements in operational efficiencies and safety.

- Launched the Segamat Unified Operation Centre (UOC) to support remote digital operations at Regasification Terminal in Sungai Udang (RGTSU), Regasification Terminal Pengerang (RGTP) and Gas Transmission (GT).
- The first in Malaysia to receive Beyond Visual Line of Sight (BVLOS) permit approval for use of nested drones to deter intrusion and encroachment of Peninsular Gas Utilisation (PGU) right of way.
- Implemented four Machine Learning models through the UP-GREAT strategic initiative that improved plant operations and process safety.
- Rolled out Malaysia's first 5G pervasive network at RGTSU, enabling reliable and stable high-speed connectivity for the Segamat UOC.
- Obtained greater visibility across the entire integrated value chain via continuous improvement of the Gas Business Operations Dashboard (GO Dashboard).

# Business Review

## Key Focus Areas and Results

### NZCE – Pathway to Zero

#### What We Did in 2022

Progressed efforts to reduce carbon footprint of assets through electrification and decarbonisation projects.

Prioritised sustainability across operations by taking responsible, tangible actions.

#### Results

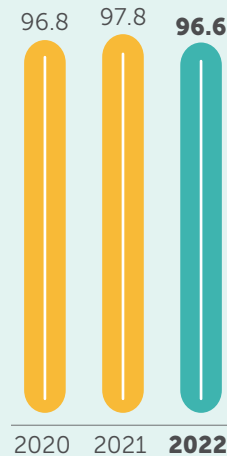
- Malaysia LNG Sdn Bhd signed a Power Purchase Agreement with Syarikat SESCO Bhd, a subsidiary of Sarawak Energy, for 90 MW of hydroelectric power import to PLC in Bintulu. The import of renewable energy will reduce approximately 0.5 Million tCO<sub>2</sub>e of GHG emissions per year by 2025.
- Reduced a total of 189 ktCO<sub>2</sub>e of GHG emissions via operational efficiency efforts such as utilities real time optimiser, ship vapour recovery and gas turbine efficiency efforts.
- Achieved more than 0.3 Million tCO<sub>2</sub>e cumulative GHG reductions as at 31 December 2022, with more than 0.8 Million tCO<sub>2</sub>e further planned until 2027. These collaborative efforts with PETRONAS Delivery and Technology will explore enhancements in environmental compliance and operational efficiency efforts such as steam optimisation and activator upgrades.

## Performance Highlights

**Overall LNG Sales**  
(MMT)



**Overall OEE for Gas**  
(%)





Risks and Challenges

Risks and Challenges

**Supply Risk**

Sustainability of feedstock supply coupled with unreliable plant performance impacting LNG production.

**Demand Risk**

Difficulty in balancing the complexity of Peninsular Malaysia's gas demands and higher gas costs which impacted Gas business profitability.

**Growth Risk**

Challenges to expand supply nodes and entry into new markets.

Mitigation Strategies

- Strategic level discussions and continuous collaborations internally and at enterprise level to expedite gas supply.
- Stakeholder and customer management to maintain good reputation and relationship (courtesy call and management visits).
- Enhancement of maintenance plan to increase LNG plant reliability and productivity.
- Increased rigour and frequency of inspection and rectification plan at the LNG plant.
- Continuous optimisation of marketing efforts.

- Actively manage feedgas demand, especially from Power sector customers.
- Optimisation of gas supply from the Gas Processing Plant in Kerteh.
- Continuous contract negotiations on price and volume offtake with all customers.
- Continuous engagement with the government to advocate for market parity price for Power sector.

- Proper due diligence process and evaluation of risk appetite prior to investment.
- Exploration of attractive commercial terms, while continuously monitoring key exposures to ensure revenue certainty.





## Business Review

### Growth Opportunities

#### Opportunities

Growing global demand for LNG in line with the energy transition towards lower carbon energy sources

Increased focus on energy security and GHG emissions reduction

Rising demand for natural gas in Malaysia with the phasing out of coal-fired plants for electricity and power generation

#### Our Approach

Grow global supply portfolio and production capacity through new LNG projects:

- Signed a Sales and Purchase Agreement (SPA) with Venture Global LNG for 1 MTPA of LNG supply for 20 years.
- FID for Southeast Asia's first nearshore LNG facility located in Sabah, in December 2022. Upon completion, the facility adds another 2.0 MTPA of LNG supply to our production portfolio.
- Achieved FID for a 52 MW power plant to supply power to Sabah's first nearshore LNG facility in Sipitang via a 20 year power supply agreement.
- Signed an MoU with Argentina's largest integrated oil and gas company, YPF S.A, to pursue collaboration in Argentina in an integrated LNG project and other areas, including upstream oil, petrochemicals and clean energy solutions. The integrated LNG project would encompass upstream gas production, dedicated pipeline and infrastructure development, LNG production as well as marketing and shipping.

Establish strategic partnerships with key partners with continued focus on decarbonising our LNG value chain:

- Signed a Memorandum of Cooperation (MoC) with Japan's Ministry of Economy Trade & Industry (METI) to strengthen energy security in Asia and develop a cooperative LNG framework that covers investments, reduction in GHG emissions and promote the development of a flexible and liquid LNG market to manage market disruptions.
- Pursue the use of renewable energy and electrification of our LNG assets to reduce GHG emissions.
- Advocate for LNG as a cleaner marine fuel through LNG Bunkering solutions in support of IMO 2020 regulations.

Strengthen the business' position to meet growing domestic demand for lower carbon energy:

- Pursue power generation opportunities in Peninsular Malaysia, Sabah and the region; integrated utilities solutions for power and utilities at new industrial zones in Malaysia through PETRONAS Gas Berhad (PGB).



Outlook

**Short Term (2022-2027)**

In response to the continuing elevated prices and the energy trilemma, we will continue to sharpen our focus on strengthening our position as a one-stop centre for lower carbon energy solutions across our value chain, embracing innovation and new technology solutions.

Our short term key focus areas include:

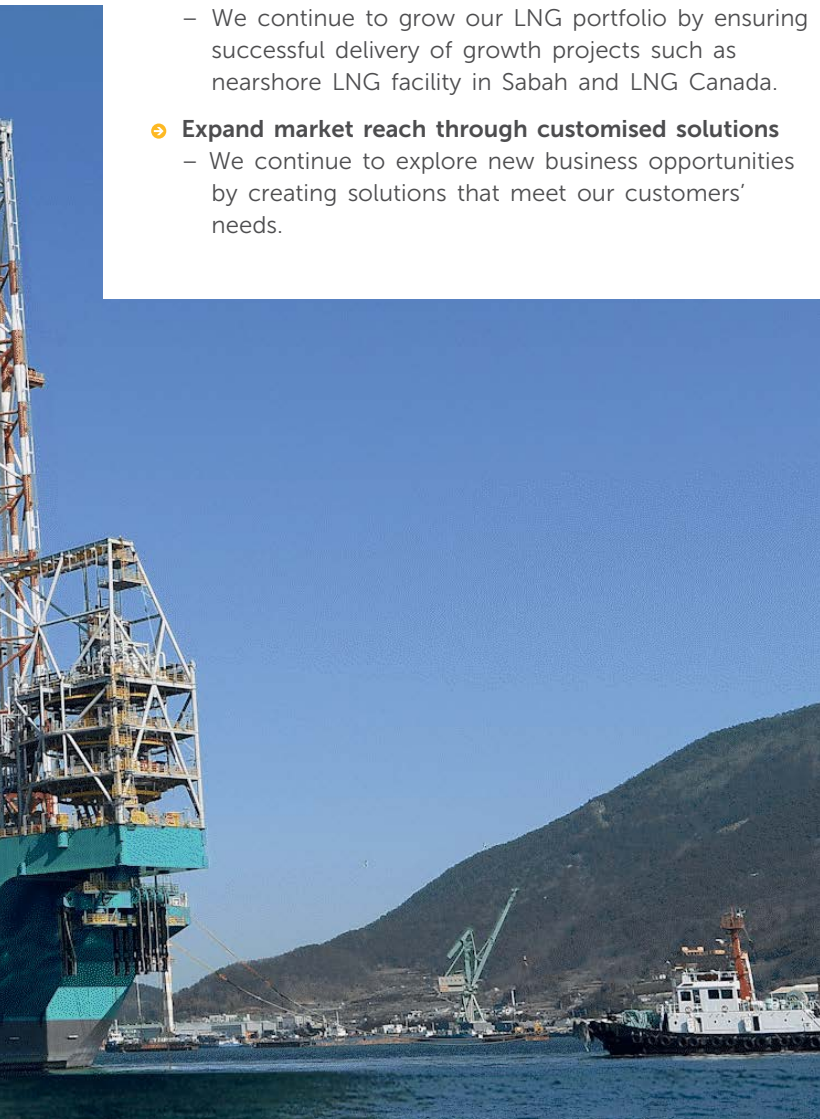
- **Maximise value from our existing assets**
  - We strive to consistently be in the top quartile operational performance to gain intrinsic value via asset optimisation and extrinsic value through dynamic hedging, while strengthening our focus on HSSE.
- **Expand our supply nodes**
  - We continue to grow our LNG portfolio by ensuring successful delivery of growth projects such as nearshore LNG facility in Sabah and LNG Canada.
- **Expand market reach through customised solutions**
  - We continue to explore new business opportunities by creating solutions that meet our customers' needs.

**Medium to Long Term**

Gas and LNG demand are sustained in most energy transition scenarios supported by robust prices which underpin new investments and future growth. Natural gas and LNG are set to see resilient demand as countries continue to pursue their industrialisation agendas, especially for the chemical and industrial sectors. Oil and gas companies are also expected to continue expanding their gas portfolios, given the increase in gas consumption and strict emission goals in the future.

Our medium and long term focus are:

- **Maximise and grow LNG portfolio globally**
  - With the expected increase in global demand for LNG, we seek to maintain market leadership by leveraging our global LNG portfolio, world-class operations and customer-centric solutions. We will also pursue expansion of our supply nodes to meet growing demand especially in Asia and Europe.
- **Optimise and sustain position in domestic gas sales**
  - As Malaysia's leading gas infrastructure and centralised utilities company, we play a vital role in the nation's energy security. We are committed in ensuring our assets are available, reliable and operating at optimum levels, ready to serve the needs of the nation and continue to advocate for gas and power market liberalisation.
- **Extend into adjacent gas value pools**
  - With rapid growth in gas to power generation within Malaysia and regionally, we continue to look for opportunities to grow our power generation business. Beyond that, we will explore step-out opportunities brought forth by the energy transition.
- **Explore solutions to reduce emissions**
  - To future-proof our business, we have already taken steps to decarbonise our operations through various abatement solutions.



## Business Review



# Downstream



**Datuk Sazali Hamzah**  
Executive Vice President  
and Chief Executive Officer,  
Downstream

Downstream revealed its strongest financial performance for the last 10 years in 2022, despite challenges on multiple fronts, riding on the continued economic recovery post-COVID19.

The success was attributed to the strategic measures we took to remain competitive, which include strengthening our core business and exploring growth potential of cleaner solutions as we advance towards achieving Net Zero Carbon Emission by 2050 (NZCE 2050) Pathway.

We remain relentless and focused in driving operational excellence and maximising our resources across the value chain and have benefitted from innovation solutions and investment in digital solutions over the years. Our solutions were redesigned to be more sustainable and customer-centric, bolstering our adaptability in the volatile industry with a potential development of a greenfield biorefinery and co-processing at the existing facilities and accelerated transition into circular economy. We have also expanded our offerings to include higher-margin products from the chemical business value chain, as well as non-fuel offerings as part of our efforts to future-proof our business.

My appreciation goes to all our teams and individuals who remain steadfast in delivering value safely, reliably, and efficiently. Moving forward, we will continue to ramp-up our efforts to increase overall efficiency while continuously charting future growth by driving long-term value creation and meeting the world's energy demands responsibly.



**89.0%**

petrochemical plant utilisation (Nexant).



**PETRONAS, Eni S.p.A (Eni) and Euglena Co. Ltd. (Euglena)**

announced its feasibility study to develop and operate a biorefinery plant in Pengerang Integrated Complex to supply sustainable solutions including Sustainable Aviation Fuel for aircraft and Hydrogenated Vegetable Oil (HVO/ Renewable Diesel) for on-road vehicles.



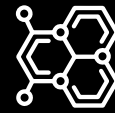
**24.9**

billion litres of overall marketing sales volume.



**85.9%**

Overall Equipment Effectiveness.



**New lube oil additives manufacturing facility in Echt, Netherlands**

by BRB International, a wholly-owned subsidiary of PCG, to expand specialty portfolio and product offerings in meeting growing demands.



**Acquisition of Perstorp in line with PCG's strategic diversification**

into the specialty chemicals industry to capture new growth opportunities.



# Business Review

## Creating Stakeholder Value

### Stakeholder Expectations

### Value Created in 2022

#### Shareholder

Deliver profits and dividends

- Delivered a total dividend of RM4.04 billion from PETRONAS Chemicals Group Berhad (PCG) and PETRONAS Dagangan Berhad (PDB).

#### Customers

Introduce sustainable and innovative products

- Launched Café Mesra in July 2022 and since then, we have opened more than 40 outlets at PETRONAS stations and beyond the station network to improve accessibility for customers.
- Introduced on-demand auto services on the Setel app\* to enable users to renew road tax or purchase insurance including takaful directly from the app and be rewarded with Mesra points.
- Explored and expanded partnerships primarily with Gentari and other partners to install EV charging stations as well as leveraged Setel for customers' seamless end-to-end charging experience.
- Became a strategic lubricants partner for Tata Motors' commercial vehicles, providing high-quality oil at Tata Motor's authorised workshops across India.

**Note:**

\* Setel is a Malaysian mobile platform introduced in July 2018, designed to provide a seamless experience and inclusive mobility for motorists. The app offers services such as fuelling, parking, EV charging, motor insurance, road tax, auto assistance, and general purchases, and connects customers to PETRONAS petrol stations, retail partners, and online merchants.

#### Communities

Enrich the lives of people in our operational areas

- Made cash contributions of RM1.87 million in 2022 to the Social Enterprise Education Lab (SEEd.Lab), an end-to-end incubator programme, to support the building of self-sustaining social enterprises that forge solutions for specific beneficiaries within communities. Beyond monetary contribution, we also dedicated 21,837 voluntary manhours to implement various initiatives including business and leadership mentorship, market testing and commercialisation to ensure the programme's success. The first of its kind in comprehensiveness in Malaysia, powered by PETRONAS and Tata Consultancy Services, SEEd.Lab has enriched the lives of over 13,000 people and counting, as well as generated a combined Public Relations value of close to RM230,000, largely earned organically since its establishment.
- Reached over 300,000 stakeholders, including students and the community through the circulation of "Plastic, Sustainability and You" education module across schools in Malaysia, as well as Be Green programme to educate the public on responsible waste management.
- Implemented PCG's mangrove conservation and rehabilitation initiatives in collaboration with Sahabat Bakau and Malaysian Nature Society (MNS), with 3,550 trees planted in 2022, whilst generating extra income opportunities for the community.
- Implemented a mangrove conservation programme in Pulau Tanjung Surat, Johor through a collaboration between PETRONAS Refinery and Petrochemicals Corporation Sdn Bhd (PRPC), Pengerang Terminals (Two) Sdn Bhd and PCG with 14,500 mangrove trees planted covering 3.8 acres for reforestation of mangrove degraded area as at December 2022, empowering surrounding local villagers through extra income opportunities.



**Creating Stakeholder Value**

**Stakeholder Expectations**

**Value Created in 2022**

**Communities**

Enrich the lives of people in our operational areas

- PETRONAS collaborated with the Johor Petroleum Development Corporation Berhad (JPDC) and Koperasi Pengerang Jaya Johor Berhad (KOPPEJA), to develop a technical upskilling programme for the local community. Through the programme known as Skills in Oil and Gas (SOGA) for Pengerang Integrated Complex (PIC) or SOGA PIC, 80 local farmers and fishermen were hired by Turnaround Main Mechanical and Maintenance Mechanical Static contractor companies and sub-contractors, to carry out PIC operational works.
- PETRONAS also worked closely with several local cooperatives within Pengerang such as Koperasi Jaya Teluk Ramunia (KOJAYA), Koperasi Permuafakatan Lepau Berhad (KOLEPAU), and Koperasi Kampung Pengerang Johor Berhad (KOPERANG) to provide them with job opportunities. This includes operating cafeterias, handling landscaping works and providing general supplies for projects in PIC.

**Employees**

Create a better working environment

- Enhanced Agile practices through new training modules, coaching enablement and Agile Enterprise team setup.
- Developed the PETRONAS Working Backwards initiative in collaboration with Amazon Web Services (AWS) to enhance innovation capabilities.

**Creating Stakeholder Value**

**Stakeholder Expectations**

**Value Created in 2022**

**Government and Regulations**

Improve governance and industry standards compliance

- Ensured compliance with the highest international standards to build trust with our partners, ensure our license to operate and drive global expansion.
- PCG achieved recognition as one of the Top 10 companies in the chemicals industry for Dow Jones Sustainability Indices (DJSI).
- Achieved top quartile performance for PDB and PCG's outstanding Environmental, Social and Governance (ESG) attributes, based on FTSE4Good Bursa Malaysia Index.

## Business Review

### Key Focus Areas and Results

#### Core Business – More Energy, Less Emissions

##### What We Did in 2022

- Sustained safe, stable, and efficient operations across all operating units, while meeting energy security needs
- Maximised value via optimising cost-to-serve and pricing excellence
- Expanded product offerings to capture additional value
- Explored opportunities to expand into higher-margin products from the chemical business value chain
- Applied data science and machine learning to accelerate digital transformation to improve plants' efficiency

##### Results

- The entire operations recorded stable performance with an Overall Equipment Effectiveness (OEE) of 85.9 per cent.
- PCG recorded plant utilisation of 89 per cent for its Malaysian operations.
- Achieved overall marketing sales volume of 24.9 billion litres, a 17 per cent increase from 2021.
- Recorded a 28 per cent increase in sales volume from PDB.
- Achieved a 6 per cent increase in sales volume from Engen.
- Recorded petrochemical sales volume of 8.3 million tonnes per annum, a 1.2 per cent increase from 2021.
- Launched a PETRONAS Syntium with CoolTech+™ hybrid range that delivers up to three per cent better fuel economy and lower emissions.
- Partnered with Titan LNG through our marine solutions arm, PETRONAS Marine to deliver ship-to-ship transfer LNG bunkering to Very Large Crude Carrier (VLCC) Yuan Rui Yang. The refuelling of the world's first LNG-fuelled VLCC took place in the port of Pasir Gudang, Malaysia using the Avenir Advantage – PETRONAS' long term-chartered barge.
- Acquired a 113 kilo-tonnes per annum Maleic Anhydride plant located in Gebeng, Kuantan.
- Deployed and implemented Plant Facing Analytics across Downstream plants with gains in cost avoidance and optimisation in operations.
- Deployed PIVOT Descriptive Analytics to 15 downstream plants, which improved 11 per cent of Process Cycle Efficiency (PCE) and automated monthly performance reporting.

#### New Business – Capturing New Growth Opportunities

- Charted our course into biofuels
  - Ongoing development of a greenfield biorefinery as well as co-processing at existing facilities. The biorefinery will be positioned to produce Sustainable Aviation Fuel (SAF) with operational flexibility to generate Hydrogenated Vegetable Oil (HVO) or renewable diesel with expected commencement in 2025. By 2027, it is anticipated that SAF will be produced at our current facilities through co-processing. In the interim, Phase 1 of co-processing will produce SAF by the end of 2023 (before further expansion under Phase 2 in 2027), giving PDB and PETCO volume to trade and sell SAF in the domestic and export markets, respectively.
  - In June 2022, PDB in partnership with PETCO Trading (UK) Ltd, PETRONAS' marketing and trading arm based in Europe and Neste fuelled the first Malaysia Airlines passenger flight using SAF, travelling from Kuala Lumpur to Singapore. The SAF is produced from 100 per cent renewable waste and residue raw materials, such as animal fat waste.
  - PETRONAS will continue to be the Title and Technical Partner with Mercedes-AMG PETRONAS Formula One Team from the 2026 season onwards, signalling our commitment towards a sustainable future with the use of 100 per cent advanced sustainable fuel for next-generation power units. With our extensive experience in formulating the Fluid Technology Solutions™ for the team, we have the capacity and capability to perfect the technology to produce and supply this fuel to the F1 team.

**Key Focus Areas and Results**

**New Business – Capturing New Growth Opportunities**

**What We Did in 2022**

**Results**

➤ Strengthened position in specialty chemicals to future-proof business and capture new growth opportunities

➤ Completed the acquisition of Perstorp Group, a global leader in sustainable specialty chemicals, bringing PCG closer to realising its mid-term goal of 30 per cent additional revenue from non-traditional business by 2030. With Perstorp Group’s revenue now contributing to the Group, we achieved a significant increase of 26 per cent in revenue, from RM23.0 billion to RM29.0 billion in 2022.

➤ Expanded our presence in Echt, Netherlands with the launch of BRB International BV’s (BRB) new lube oil additives manufacturing facility to meet evolving customer demand in the region.

➤ Accelerated the transition towards a circular economy

➤ Signed an MoU with KDEB Waste Management, One Biosys Sdn Bhd, Alam Flora Environmental Solutions Sdn Bhd and E-Idaman to obtain plastic waste which will be reprocessed to produce circular polymers for food packaging, healthcare and industrial applications, in addition to identifying potential for waste segregation facilities development in Malaysia.

➤ Signed an MoU with ExxonMobil to assess the potential for large-scale implementation of advanced plastic recycling technology at a PETRONAS-owned facility.

➤ Improved access to green mobility

➤ In keeping with PDB’s commitment to our approach to sustainability and enhancing customer experience, PDB is actively exploring collaborations with prominent players in the electric vehicle industry. In this pursuit, PDB entered into two tripartite Memoranda of Understanding (MoU) with Gentari Green Mobility Sdn Bhd, EP Blueshark Sdn Bhd, Blueshark Holding Limited and Handal Indah Sdn Bhd for the installation of battery swap stations for electric two-wheelers and charging infrastructure for electric buses at PETRONAS stations.

➤ Launched the first EV charging hub at PETRONAS Station Bandar Baru Ayer Hitam along the North-South Expressway. Its strategic location makes it well-positioned for multiple EV users travelling south- or north-bound to access charging facilities simultaneously.

➤ Continued innovating next-generation e-fluids with the PETRONAS Iona range after we took a pioneering step in the industry to introduce a range of automobile fluids for electric vehicles.

➤ PRPC signed an MoU with Gentari to collaborate on the deployment of a zero emissions vehicle fleet supported by EV charging points, and explore the potential for hydrogen fuel cell vehicles in PIC, in line with PETRONAS’ groupwide decarbonisation efforts.

**NZCE – Pathway to Zero**

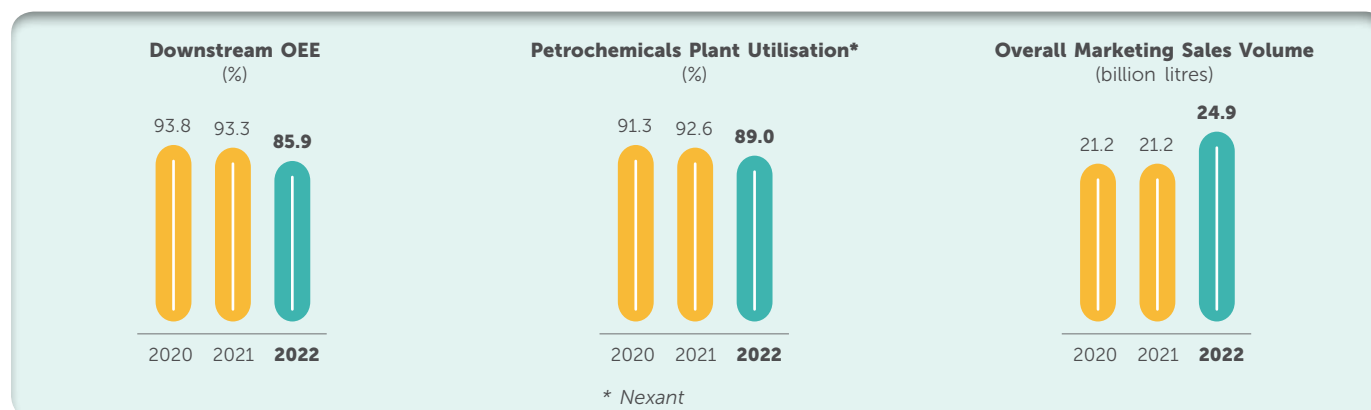
➤ Achieved GHG emissions reductions from our operations

➤ Ramped up efforts to reduce GHG emissions from our operations through several key Scope 1 and 2 reduction initiatives, such as conversion to high performance catalyst, implementing Single/Zero Boiler Operations, electricity use from renewable sources (solar) and implementation of energy efficiency measures (e.g. enhancement of steam trap management and condensate heat integration).

## Business Review

### Operational Highlights

We have maintained stable OEE and petrochemicals plant utilisation (Nexant) for the past three years. Retail and Commercial segments meanwhile boosted overall marketing sales volume on the back of economic recovery.



### Key Risks and Challenges

#### Risks and Challenges

- Supply disruptions and volatility in commodity prices due to geopolitical tensions and the COVID-19 pandemic.
- Growing attention on climate change following an increasing number of natural disasters.
- Government policies and commitment by industry players are still developing in managing the energy trilemma (affordability, security, sustainability).
- Evolving customer preferences, especially increasing demand for sustainably-produced products and offerings, impacted petrochemical and fuel demand.

#### Mitigation Strategies

- Accelerated growth into non-traditional businesses by adopting the Agile methodology and dynamic business planning while preserving core business via digitalisation.
- Implemented sustainability initiatives in line with our NCZE 2050 Pathway, focusing on operational emissions reduction and business growth opportunities in the low-carbon economy.
- Diversified from traditional businesses to future-proof the business against volatility in the commodity markets while meeting stakeholders' demand for sustainable and affordable products, as follows:
  - Advanced biofuels
  - Lubricants for EV
  - Non-fuel business at retail stations and beyond
  - Specialty chemicals and circular products

### Growth Opportunities

#### Opportunities

- Rising demand for innovative energy solutions

#### Our Approach

- Continued expansion and diversification into derivatives, specialty chemicals and solutions through mergers and acquisitions to solidify our position in the specialty chemicals industry and future-proof the business.
- Strengthened presence in the biofuels space through planned greenfield bio-refinery and co-processing at existing facilities by 2025 and 2027 respectively, leveraging advance technology to produce sustainable fuel, including SAF and HVO or renewable diesel. In the interim, Phase 1 of co-processing (before further expansion in 2027 under Phase 2) will produce SAF by the end of 2023 to provide volume that will enable to PDB and PETCO to trade and sell in the domestic and export market respectively.

## Growth Opportunities

### Opportunities

- Recovery in the retail market increased demand for non-fuel products and offerings
- Improve access to green mobility

### Our Approach

- Enhanced and expanded our non-fuel portfolio including Café Mesra in the domestic market to increase retail market share and future-proof the business.
- Increased innovative and customer-centric solutions by growing the Setel ecosystem to enable greater customer convenience.
- Amplify collaborations with industry players, primarily Gentari, to accelerate the roll-out of EV charging infrastructure in Malaysia.
- Continued innovation in next-generation e-fluids under the PETRONAS Iona range, making us one of the early adopters in the industry to introduce a range of automobile fluids for electric vehicles.

## Outlook

### Short Term (2022-2027)

The Downstream business will continue to move forward together with the rest of the Group as a more agile organisation in the market, guided by the PETRONAS Energy Transition Strategy. The business is already fronting some of the most advanced solutions in the industry and will continue innovating to offer lower carbon solutions. At the same time, Downstream will continue to be on the lookout for opportunities to scale, collaborating with relevant stakeholders to shape forward-looking energy policies that contribute towards the energy transition.

We will continue to leverage digital technology, advanced infrastructure and robust strategies to maximise production, drive portfolio expansion, capture new offerings in the non-fuel segment and enhance sales and marketing, with a strong emphasis on simplification, resource optimisation and waste reduction.

We are also well-positioned to deliver safer and cleaner solutions to our customers at competitive prices, reinforcing our role as a reliable energy partner. Our short-term key focus areas include:

- Strengthen presence in the derivatives and specialty chemicals business;
- Collaborate with key stakeholders through circular economy initiatives to drive growth in the New Plastics Economy, in line with our approach to sustainability;
- Establish pathways into biofuels production through greenfield biorefinery and co-processing in existing facilities;
- Facilitate PIC's growth and maximise its potential as THE Regional Petrochemical Park;
- Expand the Setel ecosystem to create seamless and frictionless customer experience through new features;

- Expand Café Mesra outlets in and beyond PETRONAS stations' network, including standalone kiosks in Malaysia in 2023;
- Explore partnerships in the EV and sustainable energy space in support of Malaysia's aspiration to be a low-carbon nation by 2040;
- Continue innovating next-generation fluids for EV with the PETRONAS Iona range; and
- Expand PETRONAS AutoExpert network to support Small and Medium Enterprises (SMEs), which in turn will help further grow the local economy.

In addition, we will continue to improve our safety performance to achieve "Zero is possible", including zero fatality and best-in-class lost time injury frequency, as the protection of our people and assets remain a high priority.

### Medium to Long Term

The global energy mix is expected to see a greater shift towards cleaner and more affordable energy over the long term. We are future-proofing the Downstream business by optimising our value chain to remain competitive and relevant. Towards this end, we are driving strong momentum, accelerating actions and strengthening our commitment to realise our NZCE 2050 Pathway and climate goals set out under the Paris Agreement.

As we move into a more sustainable energy future, it is imperative that we strive to reduce GHG emissions from our operating units at pace to ensure our customers have safer, reliable, cost-optimised and emissions-abated energy solutions. Our main priority is to remain in step with the societies we serve, and address energy transition in a just and responsible manner.



## Business Review



# Project Delivery and Technology



**Datuk Bacho Pulong**  
Senior Vice President,  
Project Delivery and Technology

The journey towards achieving net zero carbon emissions has created more innovation, collaboration and inclusivity opportunities. PD&T focuses on delivering secure and affordable energy solutions through the operational excellence of our core activities, underpinned by innovation and data, while delivering our projects safely on time, within budget and scope. We also accelerated growth efforts, ensured we had the right talent and did what we could to protect our environment.

PD&T's functions increased significantly over the past year as we moved into new areas to realise our NZCE 2050 Pathway. We fortified our expertise in project management, technical expertise, technology research and development and digitalisation. We pushed the needle on developments in several key growth areas across our value chain namely carbon capture and storage (CCS), specialty chemicals, hydrogen, renewables, advanced materials and circular economy. At the same time, we focused on building our talents in these non-traditional sectors, a critical component in realising our NZCE 2050 Pathway. We continued our journey to facilitate a just transition, building an innovation ecosystem where we strengthened our collaborations with stakeholders and partners. We developed and deployed our proprietary technology and digital solutions to accelerate decarbonisation across and beyond the energy landscape at scale and pace.





**975** projects worth  
**RM12.63**  
billion.



**RM5.1**  
billion value realised  
through enterprise  
and business digital  
solutions.



PD&T managed projects recorded  
over **37 million** man-hours with  
a Full Time Equivalent of **12,800**  
personnel at the work site. **13**  
projects were executed according to  
On Time, On Budget, On Scope  
(OTOBOS), while **11** were completed  
ahead of schedule.

**RM4.23 million** in  
value creation via the  
establishment of PETRONAS'  
Groupwide 5G Enterprise  
Price Agreement with  
Telekom Malaysia. This is  
Malaysia's **first 5G**  
**Enterprise** Network and  
a first for Southeast Asia's oil  
and gas industry.

PD&T workforce  
**4,966**  
in **13**  
countries.



Delivered  
**450kW**  
electrolyser to Malaysia's  
first multi-fuel station and  
secured sales following  
market launch of  
Proton Membrane  
(PEM) Electrolyser.



Achieved over  
**RM150** million  
from the commercialisation  
of technology and digital  
solutions.

Trained  
**28,032**  
employees (**63%** of the  
workforce) in digital  
competencies and  
skills at the PETRONAS  
Digital Academy.

# Business Review

## Creating Stakeholder Value

Stakeholder	Expectations	Value Created
<p><b>C</b></p> <p><b>Customers</b></p>	<p>Introduce sustainable and innovative products and solutions.</p>	<ul style="list-style-type: none"> <li>Managed a total of 975 projects worth RM12.63 billion.</li> <li>Achieved over RM150 million in revenue from technology and digital solutions' commercialisation, including the supply of PETRONAS proprietary electrolyser technology for hydrogen production multi-fuel stations in Sarawak, as well as the deployment of technology products in remote and autonomous operation, production chemicals and production enhancement, asset integrity and health and beauty aid.</li> <li>Generated RM879 million in value by converging engineering and digital domains through innovative approaches and technologies under the ARIES Project, highlighting the power of interdisciplinary collaboration in driving growth and success.</li> </ul>
<p><b>IPG</b></p> <p><b>Industry Partners</b></p>	<p>Elevate industry capabilities and shape industry standards via multilateral knowledge sharing.</p> <p>Create opportunities to collaborate on the latest technologies for application in other industries and broader purposes.</p> <p>Unlock growth in non-traditional businesses to support our business and sustainability targets with Sarawak as a launching pad.</p>	<ul style="list-style-type: none"> <li>More than 20 Malaysian contractors participated in projects to drive project delivery transformation following our collaboration with the Malaysian Oil, Gas and Energy Services Council (MOGSC).</li> <li>Supported Sarawak's adoption of hydrogen and renewable oil as alternative fuels through collaboration between PETRONAS Technology Ventures Sdn Bhd (PTVSB) and SEDC Energy.</li> <li>Accelerated technical and decarbonisation efforts via joint ventures with other industry players.</li> <li>Signed an MoU with Tenaga Nasional Berhad (TNB) to collaboratively study the development of a green hydrogen ecosystem and CCS technology.</li> <li>Established Artificial Intelligence Centre of Excellence (AI CoE) with initial partners Baker Hughes, Boston Consulting Group and Microsoft to drive the advancement of AI solutions.</li> <li>Collaborated with Accenture and Amazon Web Services (AWS) to explore commercialisation opportunities for a cloud-based logistics solution and services platform, STEAR.</li> </ul>
<p><b>ET</b></p> <p><b>Employees and Talent</b></p>	<p>Create a future-ready workforce with embedded digital competencies to augment organisational capability, accelerate adoption and realise value.</p> <p>Introduce training and capability development opportunities for PD&amp;T's talents and higher learning institutions.</p>	<ul style="list-style-type: none"> <li>Curated programmes to strengthen digital literacy among local graduates to meet the demands of current and future job markets via BeDigital Bootcamp.</li> <li>Collaborated with 20 higher learning institutions in Malaysia under the Collaboration with Higher Education Strategic Initiatives (CHES).</li> <li>Raised social consciousness among students and interns via the University of Malaya (UM) Odyssey Hackfest.</li> </ul>



## Key Focus Areas and Results

### Core Business – More Energy, Less Emissions

#### What We Did in 2022

- Delivered projects safely and ahead of schedule despite COVID-19 challenges.
- Delivered more value to the Group through cost reduction, operational efficiency and cash generation.
- Improved efficiency, enhanced productivity and strengthened operational resilience via digital transformation and technical solutions.
- Achieved progress on key technology projects.
- Improved workforce digital competency through Digital Academy and Citizen Analytics.
- Increased resilience and automation through scalability.
- Leveraged the Internet of Things (IoT) to monitor plants and facilities remotely.
- Utilised a maturity model framework and data analysis to develop a future-ready strategic workforce.
- Reshaping talents with a broad-based approach encompassing the concepts of systemic thinking, sustainability, carbon sensitivity and a value-driven mindset.
- Developing an empowered, enabled and agile talent pipeline to drive business results and future growth.
- Pursued industry-academia collaborations for talent development and innovation advancement.

#### Results

- PD&T's managed projects recorded over 37 million man-hours with a Full Time Equivalent of 12,800 personnel at the work site. Regrettably we recorded a fatality at one of our projects, mainly due to the intensity and complexity of project-related activities despite increased HSE risk preventive measures. Following this, we intensified HSE efforts by forming a Pre-emptive Intervention Taskforce to execute measures based on data analytics (Artificial Intelligence Incident Risk Analytics), key findings from the investigation and personnel's feedback.
- Executed 13 projects according to On Time, On Budget, On Scope (OTOBOS) and completed 11 projects ahead of schedule.
- Installed and piloted two units of 250 m<sup>3</sup> Flexible Subsea Storage and integrated to floating host platforms with potential RM500 million cost saving compared to average new build floating storage and offloading (FSO) unit.
- RM5.1 billion value realised through enterprise and business digital solutions driven by cash generation, cost saving, cost avoidance and efficiency enhancement levers, for example:
  - Realised cost savings on logistics spend for Upstream business through STEAR.
  - In-house digital solution enabled LNG business to plan for third party cost avoidance while adhering to contractual obligations.
- Digital Twin Enterprise Optimisation Centre delivers molecular transparency across the value chain and brings together digital twins of all business sectors.
- Remote Autonomous Operation (RAO) piloted at Institut Teknologi Petroleum PETRONAS to accelerate the implementation of this technology at plants.
- The industry has recognised PETRONAS' tech-digital solutions at Asian Downstream Awards, Asian Oil & Gas Awards, IDC Future Enterprise Awards, Databricks Data Team Awards and Malaysia Technology Excellence Awards.
- Realised RM4.23 million in value creation from establishing the PETRONAS Groupwide 5G Enterprise Price Agreement with Telekom Malaysia. It is Malaysia's first 5G Enterprise Network and a first for Southeast Asia's oil and gas industry.
- Reached a managed maturity in cyber security with capabilities to ensure a secure ecosystem and defend against threats.
- Enterprise Data Hub (EDH), a centralised and unified data store, has liberalised data to cater to enterprise and business-specific needs.
- PETRONAS data now resides in Cloud, allowing for flexibility and scalability. This resulted in better collaboration, reduced costs and improved data security.
- Upskilled close to 30,000 PETRONAS employees through our Digital Academy to future-proof the organisation with a digital-ready workforce. In analytics, developed 850 dashboards and 150 machine-learning modules via the Citizen Analytics programme under Digital Academy.

# Business Review

## Key Focus Areas and Results

### Core Business – More Energy, Less Emissions

#### What We Did in 2022

#### Results

- Elevated industry-level capabilities through expertise exchange across disciplines between technical professionals, businesses and strategic partners within and beyond PETRONAS via Technical Professional Forum.
- Worked closely with 20 local universities under the Collaboration with Higher Education Strategic Initiatives (CHES) programme to drive progress in technical areas that support energy sustainability via industry-academia knowledge sharing and human capital development.
- Expanded academic network collaborations with more than 10 foreign universities in research and talent development, including establishing PETRONAS global technology centres in Malaysia, the United Kingdom and Norway.
- Approximately 400 women employees participated in the Code Without Barriers programme with Microsoft to promote gender diversity and upskill women talent in Data and AI.
  - 107 completed the self-learning modules curated by Microsoft.
  - 38 were certified in Microsoft Azure Data Fundamentals.



**Key Focus Areas and Results**

**New Business – Capturing New Growth Opportunities**

**What We Did in 2022**

- Intensified innovation to drive long term sustainability in key focus areas:
  - CCS
  - specialty chemicals
  - hydrogen
  - renewables
  - advanced materials
  - circular economy.
- Forged industry-wide partnerships to accelerate technology and digital transformation, talent development, knowledge transfer, solutions adoption and improve market penetration.
- Pursued new revenue streams through technology and digital products to drive competitive advantage.
- Elevated sustainability-driven competencies such as circular economy and waste management in driving operational excellence amid climate concerns.
- Identified new capabilities for talent development to support PETRONAS' ventures into growth businesses and ensure proper career transition for talents identified for redeployment.

**Results**

- Commercialised and marketed proprietary solutions to drive holistic cross-industry efforts towards decarbonisation and sustainability.
- Launched PETRONAS' Advanced Proton Exchange Membrane (PEM) Electrolyser, secured sales and established a new market for our electrolyser.
- Delivered 450kW electrolyser to Malaysia's first multi-fuel station and secured sales following the market launch of PEM Electrolyser.
- Partnered with industry players along the supply chain to create the right ecosystem and widen hydrogen adoption.
- Delivered 1kg/day Coke-to-Graphene (CtG) production unit reactor.
- Signed a Sales and Purchase Agreement with a paint manufacturer to use graphene-based paint additive with a contract value of USD1.6 million as market entry.
- Integrated Bio Hub Facilities completed the Front End Engineering Design for its pilot plant, marking a milestone in specialty surfactants development to capitalise on the demand for higher quality personal care, hygiene and beauty products.
- Delivered bio-polymer (from waste biomass) coated fertiliser prototype capable of reducing fertiliser application frequency and overall fertilising cost, with potential bioplastic applications in medicine, cosmetics, packaging and consumer goods.
- Deployed plastic bitumen road paving trials in collaboration with the Malaysian Public Works Department, utilising 790 kg of plastic waste for every 1km lay.
- Obtained acceptance from Sabah's Department of Fisheries for our Master Reefing Plan to improve future local seafood sources and reduce dependency on imported sources.

**NZCE – Pathway to Zero**

**What We Did in 2022**

- Accelerated the decarbonisation of our assets.
- Strengthened emissions accounting in fulfilling PETRONAS' pledges to international ESG reporting.
- Leveraged technologies to reduce environmental footprints and HSSE risks.
- Embedded sustainability technical know-how in our capability inventory.

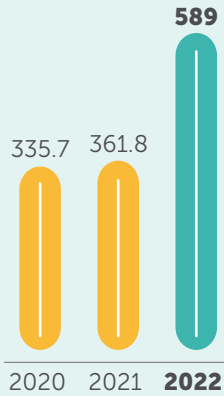
**Results**

- Established the Enterprise Decarbonisation unit to intensify and accelerate strategic groupwide decarbonisation encompassing multiple programmes across Upstream, Downstream and Gas assets.
- Progressively deployed the following:
  - Improvement of fuel gas utilisation baseline and forecasting.
  - iCON GHG modelling for enterprise transparency and granularity of emission data.
  - Methane emissions accounting and forecasting.
- Organised the Race2Decarbonise hackathon to spur ideation and crowdsource innovative solutions, the first to be conducted by an oil and gas company worldwide.
- Achieved first steel cut milestone for our Offshore Low-Speed Wind Turbine project.
- Bio-MEG pilot plant became the first GPM360-certified green project.
- Conducted the first field deployment of floating solar PV technology for open sea application at Pulau Redang and Tok Jembal, Terengganu.

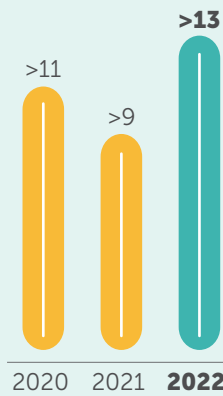
# Business Review

## Performance Highlights

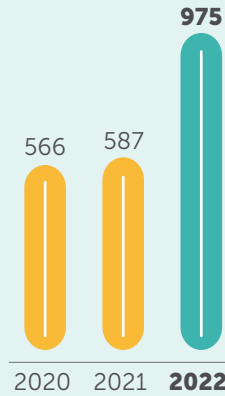
**Investment in Technology**  
(RM Mil)  
– Technology Delivery and R&D Budget



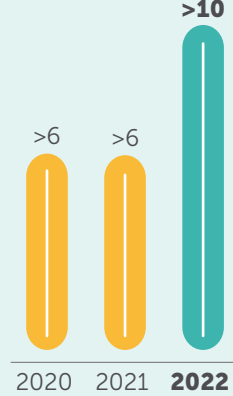
**Portfolio size (including CAPEX and OPEX)**  
(RM Bil)



**Number of Projects**



**Value Creation**  
(RM Bil)



## Risks and Challenges

### Risks

- ▶ Sporadic global resurgence of COVID-19 and geopolitics disrupt the supply chain, impacting pace and cost.
- ▶ Shortage of critical talents to drive the non-traditional business sector to achieve targets.
- ▶ Gaps in agility towards meeting innovation requirements and lacking pace in adopting best practices will affect PETRONAS' competitive edge and diminution in projected returns.
- ▶ Shortcomings in innovation can leave current physical and intellectual assets obsolete and lack of cyber defence leaves assets vulnerable to attacks.

### Mitigation Strategies

- ▶ Diversified suppliers based in vulnerable COVID-19 locations and identified alternative reliable supply points.
- ▶ Strengthened Crisis Management and Business Continuity Plans in meeting post-pandemic challenges.
- ▶ Identified and secured niche talents externally while developing employees with relevant skills in non-traditional business areas.
- ▶ Strengthened competitive advantage with in-house technology solutions meeting business needs and aspirations, guided by the PETRONAS Technology Management System (PTMS).
- ▶ Established a robust Intellectual Property (IP) Policy at enterprise level to protect our innovations and provide an orchestrated systematic approach to managing technology IPs effectively.
- ▶ Continuously strengthened Cyber Security governance through various measures including the enforcement of the PETRONAS Enterprise Cyber Security Framework, PETRONAS Cyber Security Incident Response Procedure and Cyber Security Ransomware Crisis Management.

**Risks and Challenges**

**Risks**

**Mitigation Strategies**

- Exchange knowledge on best practices and intelligence in the energy sector among the cybersecurity community.
- Continued talent capability advancement through upskilling and best-in-class recruitment policy.

**Growth Opportunities**

**Opportunities**

There is rising demand for digital and technology commercialisation.

Increasing trends in global innovation for decarbonisation to meet emissions capping targets.

Shape industry trends to improve human capability development/ talent pipeline.

**Our Approach**

- Achieved more than RM150 million in revenue, a five-fold increase compared to 2021.
- Conducted crowdsourcing and open innovation to identify decarbonisation solutions through Race2Decarbonise global hackathon to accelerate progress towards NZCE 2050 Pathway.
- Shaped International Oil and Gas Producers (IOGP) and Malaysian standards by leveraging our Technical Professionals.
- 50 per cent of our BeDigital Bootcamp participants secured employment offers from PETRONAS and our partners.
- Launched PETRONAS Career Resides in You (CARRY) Youth Outreach to increase awareness of the multitude of career opportunities within the energy industry.



## Business Review

### Our Approach to Sustainability

What We Did	Results
Intensified Technology Innovation.	<ul style="list-style-type: none"> <li>➤ Unlocked floating solar photovoltaic (PV) technology for the first open sea field deployment at Pulau Redang and Tok Jembal, Terengganu.</li> <li>➤ Established a joint framework with PETRONAS Chemicals Group (PCG) to develop Nitrile Butadiene Latex (NBL) technology capabilities.</li> </ul>
Accelerated progress of NZCE 2050 pathway.	<ul style="list-style-type: none"> <li>➤ Intensified and accelerated enterprise-wide decarbonisation through streamlined initiatives.</li> <li>➤ First-ever Race2Decarbonise aims to supplement the carbon abatement mission to cap emissions from Malaysian operations at 49.5 Million tCO<sub>2</sub>e by 2024.</li> <li>➤ Delivered PETRONAS' New Leadership Centre project                             <ul style="list-style-type: none"> <li>– Recorded the highest Green Building Index (GBI) score of 96/100.</li> <li>– Targeted to achieve the lowest Building Energy Index (BEI) in Malaysia at 62.61 kWh/m<sup>2</sup>/year.</li> </ul> </li> <li>➤ Entered into a collaboration with Tenaga Nasional Berhad (TNB) to drive innovative solutions towards decarbonisation in supporting Malaysia's aspiration to be a carbon-neutral nation by 2050.</li> <li>➤ PETRONAS Technical Services Sdn Bhd (PTSSB) collaborated with Green Project Management to jointly work on sustainability in project management focusing on capability building, processes and practices.</li> </ul>
Supported the nation's human capital development and digital economy initiatives.	<ul style="list-style-type: none"> <li>➤ Strengthened local graduates' digital literacy via BeDigital Bootcamp, organised by PETRONAS' Digital Academy.</li> <li>➤ Established the Sabah-PETRONAS Human Capital Development Agenda (HCDA) to build a sustainable talent pipeline for the state and the country.</li> <li>➤ Increased career awareness within the energy industry among youths via PETRONAS Career Resides in You (CARRY) Youth Outreach Programme.</li> </ul>



## Outlook

### Short Term (2023-2027)

PD&T will continue to advance PETRONAS' core business through Project Delivery Excellence, Asset Operational Excellence, expertise leadership and advancements in technology and engineering, as well as sustain and scale up our digital ecosystem.

Our short-term key focus areas include:

- Drive, intensify and accelerate decarbonisation efforts through all-around measures to support energy transition.
- Ensure technology investments support key business growth priorities in CCS, renewable energy, hydrogen and advanced materials.
- Intensify commercialisation of matured technologies and digital solutions.
- Establish an Artificial Intelligence Centre of Excellence (AI CoE) to accelerate the advancement in AI solutions that support energy delivery, operational efficiency and sustainability through collaboration with a network of global partners.

### Medium to Long Term

As PETRONAS' CoE and solutions partner of choice for the energy industry and beyond, PD&T will continue to identify innovative solutions to maintain its competitive edge, leveraging its expertise in project delivery, technology, technical and digital solutions, while ensuring safe and efficient operations throughout the value chain. PD&T will also drive, advocate and monitor enterprise decarbonisation to support PETRONAS in meeting its emissions reduction targets.

In accelerating towards a just energy transition, PD&T has fortified its Five-Year Strategic Plan (2023-2027) to drive sustainable growth, focusing on three key thrusts:

- Ensure continuous improvements in safety, reliability and efficiency through distinctive digital and technology solutions.
- Unlock and accelerate commercialisation opportunities to generate new revenue for the Group.
- Intensify research advancements and business ventures in the identified focus areas:
  - Circular economy: Repurpose waste into new products
  - Advanced materials: Strengthen asset integrity, extend service life and reduce overall carbon footprint
  - Improve decarbonisation: Manage and reduce GHG emissions from assets
  - Drive renewables: Support the growth of hydrogen to fast-track the energy transition
  - Advance specialty chemicals: Ensure progress in producing and utilising specialty chemicals beyond oil and gas into everyday consumer products.

Moving forward, we will continue to pursue technology and digital advances throughout our value chain to ensure we meet the Group's business goals and realise our NZCE 2050 pathway.

## Business Review



# Gentari



**Sushil Purohit**

Chief Executive Officer, Gentari

The energy transition is rapidly gaining momentum with greater push coming from multiple stakeholders including governments, activists, investors, local stakeholders, employees and customers.

In our effort to rank among the world's leading clean energy companies, Gentari has made significant progress with a series of initiatives and collaborations across our core portfolio, since our official launch only recently in September 2022. In 2022, we achieved 1.6 GW of global renewable energy capacity in operations and under development, entered into new partnerships to support the growth of the hydrogen industry and strengthened our green mobility footprint in Malaysia, India and regionally to explore potential developments in Thailand and Indonesia.



Signed MoU with Thailand's Evolt Technology in January 2023, marking inaugural foray into regional EV infrastructure development in Southeast Asia.



Entered into an agreement to acquire **WIRSOL Energy,** marking maiden entry into Australia's renewable energy market.



**1.6 GW** of global renewable energy capacity in operations and under development.

**13** MoUs for hydrogen collaboration with international partners and customers. In November 2022, delivered first cargo of low carbon ammonia from Malaysia to Thailand.

In Malaysia, became largest DC Network Operator and first to offer equitable kWh pricing. Delivered

**151** charge points, Southeast Asia's first public **350kW** super charger at X Park Malaysia in Sunway Serene charging hub, the first hub to be licensed by Malaysia's Energy Commission.

In India, delivered 382 three-wheel EVs, 161 charge points, and clocked in

**2 million** clean kilometers.





## Business Review

CORE PILLARS	MISSION	AMBITION
<b>Renewable Energy</b>	To be a Leading Next Generation Utility-Scale Renewable Energy Developer	➤ Build out 30 to 40 GW of renewable energy capacity by 2030.
<b>Hydrogen</b>	To be a Scale Clean Hydrogen Producer and Go-to Industry Partner	➤ Supply up to 1.2 mtpa of hydrogen by 2030.
<b>Green Mobility</b>	To be Asia Pacific's Preferred Green Mobility Solutions Provider	➤ Capture 10 per cent market share (around 25,000 charging points) across key markets in Asia Pacific by 2030.

### Creating Stakeholder Value

Gentari	
Stakeholder Expectations	Value Created in 2022
<p><b>Customers</b></p> <p>Deliver clean energy solutions to help customers in their decarbonisation journey.</p>	<p><b>Results</b></p> <ul style="list-style-type: none"> <li>➤ Achieved global renewable energy capacity of 1.6 GW in operations and under development and also played a critical role in PETRONAS' decarbonisation efforts towards its NZCE 2050 Pathway.</li> <li>➤ Collaborated with international partners in Malaysia, India and the Middle East as well as customers in East Asia to advance hydrogen development.</li> <li>➤ Strengthened the EV ecosystem in India and Malaysia through the growth of our EV charging network, expansion of our EV fleet operations, as well as through ongoing strategic partnerships both in Malaysia and regionally.</li> </ul>
<p><b>Government</b></p> <p>Provide solutions to meet emissions reduction targets, contribute towards shaping policies and economic frameworks to catalyse a clean energy industry, stimulate economic growth in the clean energy space.</p>	<ul style="list-style-type: none"> <li>➤ Proactively engaged with key stakeholders to introduce key priorities for Malaysia, including increasing the supply of green electrons, growing green hydrogen investments and expanding EV adoption in Malaysia.</li> </ul>
<p><b>Partners</b></p> <p>Opportunities to collaborate in the clean energy space.</p>	<ul style="list-style-type: none"> <li>➤ Entered various key industrial collaborations in all three verticals – renewable energy, hydrogen and green mobility.</li> </ul>
<p><b>Employees</b></p> <p>Create employment opportunities in a dynamic workplace.</p>	<ul style="list-style-type: none"> <li>➤ Introduced new employment opportunities to nurture talent and develop competencies in renewable energy, hydrogen and green mobility.</li> </ul>



**Key Focus Areas and Results**

**Gentari**

**Key Focus Areas**

- Pursued and achieved progress in growing our focus areas of renewable energy, hydrogen and green mobility.

*Renewable Energy*

- Achieved 1.6 GW of renewable energy capacity in operations and under development
- In India, Amplus successfully commissioned an Open Access project (56.5 MW) in Uttar Pradesh and achieved Final Investment Decision for the ISTS Solar Rajasthan Project (363.4 MW).
- In Malaysia, Gentari delivered the country's largest single rooftop solar installation (7.4 MW) at Universiti Teknologi PETRONAS and the largest self-consumption, ground-mounted solar installation (40 MW) at the Pengerang Integrated Complex.
- In Australia, Gentari entered into an agreement in December 2022 to acquire WIRSOL Energy, a leading renewable energy solutions provider which marks Gentari's maiden entry into the Australian renewable energy market. The full completion of this acquisition was achieved in February 2023.

*Hydrogen*

- Gentari is developing blue and green hydrogen facilities in Malaysia, Canada and India with credible local partners and offtakers.
- In November 2022, the first cargo of low carbon ammonia from Malaysia was delivered to Thailand.
- The first production of green hydrogen is expected in 2025 and efforts to further diversify production nodes to the Middle East, Americas and Australia are in progress.
- Gentari's hydrogen collaborations are in various stages of development in Malaysia, India, East Asia and the Middle East. These cover initiatives to explore the development of green hydrogen projects and its transportation, advocacy on policy and regulations to support the hydrogen industry and studies on a low carbon ammonia supply chain, among others.

*Green Mobility*

- In India, Gentari's Vehicle-as-a-Service (VaaS) offering has delivered a total of 382 three-wheelers and 161 charge points, that had clocked in 2 million clean kilometers,
- In Malaysia, Gentari became the largest DC Network Operator and the first to offer equitable kWh pricing. Gentari has installed a total of 151 charge points, established Southeast Asia's biggest EV charging hub in Suria KLCC and launched Southeast Asia's first public 350kW super charger at X Park Malaysia in Sunway Serene charging hub. The hub is also the first in Malaysia to receive the Energy Commission's inaugural Energy Commission's Electric Vehicle Charging System (EVCS) license. With this license, Gentari is also the first charge point operator to offer an equitable kWh pricing mechanism for EV charging in Malaysia.
- Gentari has also initiated several partnerships with PETRONAS Group, Original Equipment Manufacturers (OEM), property developers and bus operators to support the EV ecosystem development covering both infrastructure development and vehicles. Gentari continues to advocate and support new policy development and is a key voice in Malaysia's EV Taskforce as well as a key member of the Zero Emission Vehicle Association (ZEVA).
- Gentari signed an MoU with Thailand's Evolt Technology Company Limited, marking its inaugural foray into regional EV infrastructure development in Southeast Asia, in line with its aspirations to expand across key markets in Asia Pacific.



# Business Review

## Outlook

### Gentari

We are committed to delivering clean energy solutions and contribute towards achieving a net zero future. Gentari will continue to collaborate with customers, partners and stakeholders to create the right ecosystem for growth in the clean energy space. We will also invest in the people, capabilities and technologies required to develop and deploy leading-edge innovations that will amplify our growth in the areas of renewable energy, hydrogen and green mobility.

Our short-term strategic focus areas include:

#### Renewable Energy

- Grow Commercial and Industrial (C&I) projects in Asia Pacific.
- Expand utility-scale solar and wind in Malaysia and Asia Pacific to support the green hydrogen aspiration.
- Embark on offshore wind within Asia Pacific and the European Union.
- Develop round-the-clock energy storage capability to ensure reliability of energy supply.

### Hydrogen

- Develop hydrogen projects in Malaysia, Canada and other competitive geographies.
- Provide solutions for customers in Asia Pacific and other key markets, especially among early adopters.
- Expand our global footprint through partnerships.
- Venture across the hydrogen value chain, leveraging the right technologies.
- Advocate for policies and regulations that support the growth of the hydrogen industry.

### Green Mobility

- Expand charging points across Asia Pacific, starting with Malaysia and India, before scaling to adjacent markets of Thailand and Indonesia.
- Establish a Vehicle-as-a-Service (VaaS) fleet position in Malaysia, India and Asia Pacific.
- Grow value-added services for customers, namely retail, advertising, digital platforms and others.



# Other Businesses



PETRONAS' non-core businesses made remarkable progress in 2022, delivering strong results that contributed to the company's overall financial performance.

At MISC, the company has been busy developing new income streams in renewable energy and waste-to-value solutions. MISC secured over USD1.1 billion in long term contracts, expanded its supplier base and successfully raised USD1.0 billion in funding under the USD3.0 billion Global Medium Term Notes programme. With new maritime regulations pushing for global decarbonisation, MISC responded by investing in green asset classes like dual-fuel and low-carbon emission vessels, positioning themselves as a key player in the Green Economy.

KLCCP Stapled Group saw a sustainable recovery with an impressive 9.5 per cent increase in retail sales and new tenants joining the fold. Our retail, Suria KLCC and the retail podium of Menara 3 PETRONAS recorded its highest tenant sales, almost doubled last year's and even surpassed pre-COVID levels in 2019 by 9.5 per cent. KLCCP Stapled Group's Mandarin Oriental, Kuala Lumpur tripled its occupancy levels, signalling a promising future for the business. KLCC Group as a whole also achieved a commendable 119 out of 169 sustainability targets, showcasing its commitment to a better future.



# Business Review

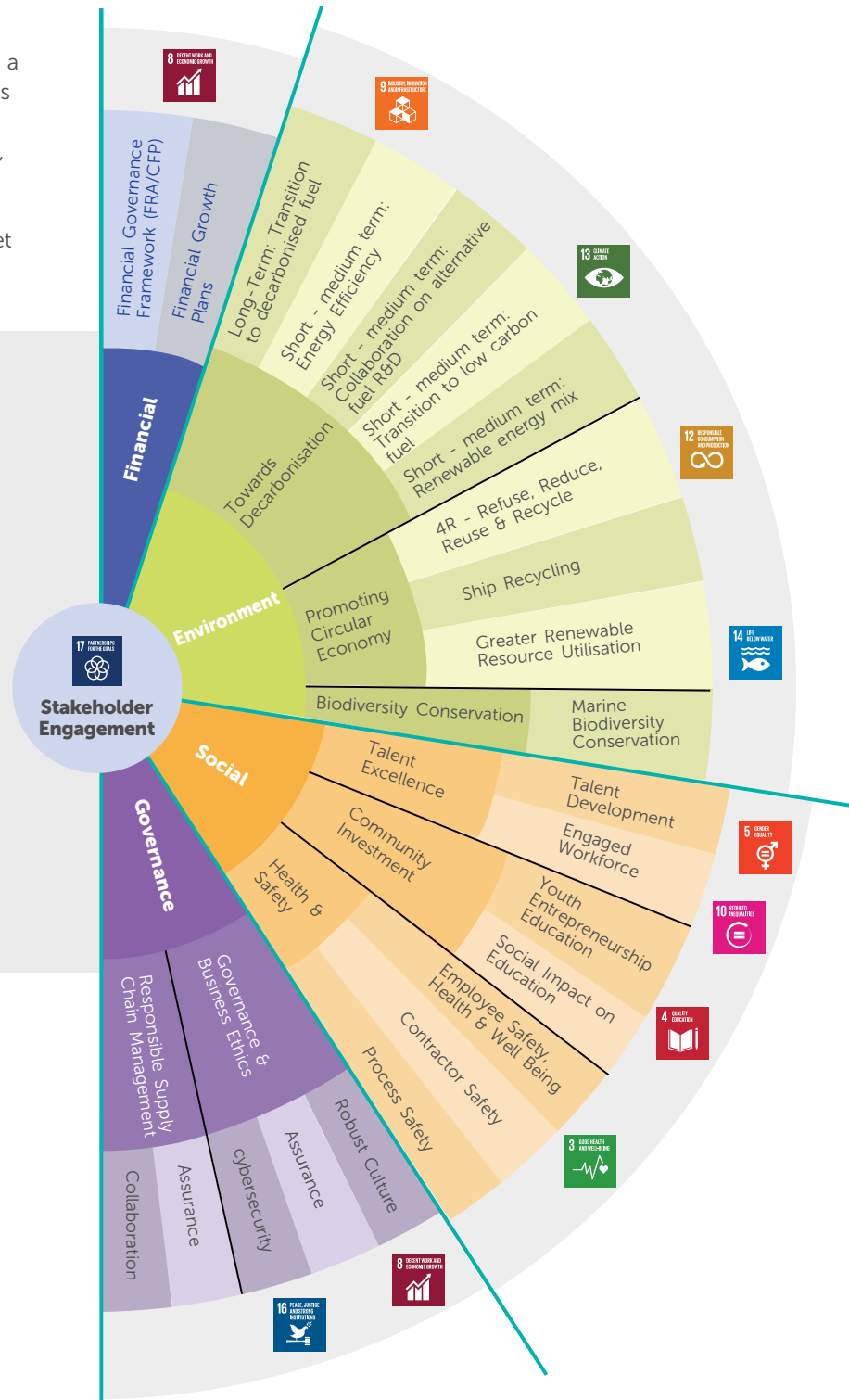
## Maritime and Logistics

MISC is a subsidiary company and key solutions provider to PETRONAS. It is a global leader in energy-related maritime solutions, with over 50 years of experience and a modern fleet of more than 100 owned and chartered vessels and assets, backed by a workforce of 9,300 employees worldwide. Its vessels and assets include LNG and Ethane carriers, Petroleum and Product vessels, FPSs and LNG FSUs, with a total capacity of over 13 million deadweight tonnage (dwt) MISC is committed to providing sustainable maritime transportation solutions to meet the world's energy needs and contribute to the PETRONAS NZCE 2050 Pathway.

**MISC Group is steadfast in growing its businesses to become one of the world's most sustainable energy-related maritime solutions and services provider.**

**Our sustainability mission is to deliver long-term stakeholder value by operating safely, sustainably and responsibly to sustain positive impacts for the environment and society.**

MISC Group's Sustainability Strategy aligns with the United Nations' Sustainable Development Goals (SDGs) by prioritising 11 key goals in line with the Company's business practices and sustainability framework.





**Our Climate Commitment**

Net Zero Greenhouse Gas Emissions by 2050

50% reduction in GHG intensity emissions by 2030 compared with 2008 base year

**Net Zero GHG Commitment**

MISC Group is committed to achieving net zero GHG emissions by 2050



We are committed to the Global Maritime Forum's mission to shape the future of global seaborne trade to increase sustainable long term economic development and well-being.



Getting to Zero Coalition is a global alliance committed to develop commercially viable deep sea zero emission vessels powered by zero emission fuels into operation by 2030.



A partner to The Castor Initiative, a multi-stakeholder global coalition that is committed to jointly developing commercially viable deep-sea zero-emission vessels (ZEV) fuelled by ammonia by 2030.



Made a strategic investment into Daphne Technology alongside Shell Ventures, Trafigura and Saudi Aramco Energy Ventures, marking our entry into R&D for GHG abatement technologies aligned with our ongoing decarbonisation initiatives.



MISC has set up a dedicated New Energy and Decarbonisation (NE&D) team.

# Business Review

Financial	Environment	Social	Governance	Stakeholder Engagement
<p><b>Achieve Growth in Predictable and Recurring Sources of Cashflow</b></p> <ul style="list-style-type: none"> <li>Owned 11 dual-fuel low-carbon vessels (including 3 vessels under construction).</li> <li>Secured a USD527 million 11-year Sustainability Linked Loan (SLL) to finance the delivery of its six large ethane carriers (VLEC).</li> <li>Internal Carbon Pricing (Shadow Price) at USD50/tonne.</li> </ul>	<p><b>Towards Decarbonisation</b></p> <ul style="list-style-type: none"> <li>Developed Material Scope 3 Inventory.</li> <li>17 per cent reduction in GHG intensity.</li> <li>Total GHG: 4.2 Million tCO<sub>2</sub>e.</li> <li>Signed two MoUs to build 2 VLCCs and 2 Aframax zero-emissions by 2025 and 2026.</li> </ul> <p><b>Promoting Circular Economy</b></p> <ul style="list-style-type: none"> <li>Initiated Ship Recycling Yard Assurance Programme.</li> <li>99 per cent hazardous waste recycled.</li> </ul> <p><b>Biodiversity Conservation</b></p> <ul style="list-style-type: none"> <li>Developed MISC Group Heart of the Ocean (HOTO) Guidelines.</li> <li>Sponsored RM200,000 for UMT-MMS Sea Turtle Conservation Initiative.</li> <li>Launched Employee Participation Programme for reef surveys and capacity building at Mersing Island and UMT-MMS Sea Turtle Conservation Programme.</li> <li>32 reef sites surveyed and 3 reef sites rehabilitated.</li> <li>2,181 turtle nests conserved, with 78 per cent turtle hatching success.</li> </ul>	<p><b>Health and Safety</b></p> <ul style="list-style-type: none"> <li>47 per cent improvement in LTIF compared to 2021 (2021: 0.15).</li> <li>64 per cent improvement in TRCF compared 2021 (2021: 0.39).</li> <li>14 HSE Management System Assurance completed.</li> <li>135,929 UCUA raised.</li> <li>42 Management walkabouts conducted.</li> </ul> <p><b>Talent Excellence</b></p> <ul style="list-style-type: none"> <li>Enhanced Leadership Pathway and Functional Curriculum to fulfil current and future development needs.</li> <li>Continued with FlexWork (optimise work-life integration and maximise work efficiency).</li> <li>Introduced FlexCareer (introducing contingent workforce).</li> <li>94 per cent high performance talent retention.</li> <li>Maintained successor ratio of 2:1.</li> </ul> <p><b>Community Investment</b></p> <ul style="list-style-type: none"> <li>RM24.2 million channelled in sponsorship for ALAM cadets.</li> </ul>	<p><b>Values, Assurance and Business Ethics</b></p> <ul style="list-style-type: none"> <li>42 per cent women Board members.</li> <li>Implemented Compliance and Ethics Survey 2022 Management Scorecard FY2022.</li> <li>Recertification of ISO 37001:2016 Anti-Bribery Management System.</li> <li>Carried out annual review of MISC Group Bribery and Corruption Risk Assessment 2022.</li> <li>Zero human rights grievance reports.</li> <li>Zero major cybersecurity breach.</li> </ul> <p><b>Responsible Supply Chain Management</b></p> <ul style="list-style-type: none"> <li>Completed ESG self-assessment on 20 critical suppliers.</li> <li>104 suppliers/vendors attended the Annual CoBE, ESG and HSE Training for MISC Group Third Parties 2022.</li> </ul>	<p><b>Create Value through Trusted Stakeholder Relationships</b></p> <ul style="list-style-type: none"> <li>Remains as a listed constituent in the Dow Jones Sustainability Index (Emerging Market) for two consecutive years and FTSE4Good Index for nine consecutive years.</li> <li>MISC is the only Malaysian transportation sector company and one of the three Malaysian companies listed in DJSI Emerging Market Index globally.</li> <li>Included in the S&amp;P Global Sustainability Yearbook 2023 as a Sustainability Yearbook Member for the first time.</li> <li>197 engagements with customers, investors and financial institutions on our approach to sustainability completed.</li> </ul>

## Outlook

- We expect the market to remain challenging this year. The ongoing geopolitical tension in Europe continues to influence economic development and trade as we cope with high inflation and increasing interest rate environment.
- Closer to our industry, the strengthening of regulations in relation to emissions will require a radical approach and closer collaboration by the industry players to ensure compliance.
- Notwithstanding the continued challenging outlook, 2023 is filled with opportunities for MISC. We see ourselves shifting gears both in terms of the execution of current projects and advancement towards achieving our 2050 objectives whilst being selective on strategic client positioning, strong recurring cash flows and cleaner energy solutions.

**Property**

KLCCP Stapled Group, comprising KLCC Property Holdings Berhad and KLCC REIT, constituting 32 per cent of the Malaysian REIT industry, is a subsidiary of PETRONAS that owns and manages top-quality assets. KLCCP Stapled Group's iconic and high quality assets generate additional revenue streams for PETRONAS and help diversify its business portfolio beyond oil and gas. KLCCP Stapled Group is also charting the course towards sustainability, moving its properties in alignment with PETRONAS' NZCE 2050 Pathway.

**Sustainability Highlights**

**Our Sustainability Framework**

UN2030 Agenda Critical Dimensions	KLCCP Stapled Group Material Sustainability Matters	Four Sustainability Lenses
<b>Prosperity</b>	<ul style="list-style-type: none"> <li>Financial Sustainability</li> <li>Customer and Talent Management</li> <li>Corporate Social Responsibility</li> <li>Supply Chain Management</li> </ul>	<b>Continued Value Creation</b>
<b>Planet</b>	<ul style="list-style-type: none"> <li>Climate Change and Energy Management</li> <li>Environment Management</li> </ul>	<b>Safeguard the Environment</b>
<b>People</b>	<ul style="list-style-type: none"> <li>Health, Safety and Security</li> <li>Human Capital Development</li> <li>Human Rights</li> <li>Labour Standard and Practices</li> </ul>	<b>Positive Social Impact</b>
<b>Peace</b>	<ul style="list-style-type: none"> <li>Business Ethics Corporate Governance</li> <li>Cyber Security and Data privacy</li> </ul>	<b>Responsible Governance</b>

5-Year Sustainability Roadmap (2019-2023)

- Building a Smart, Safe and Sustainable KLCC Precinct
- Building an Agile, Inclusive, and Sustainable Workforce
- Combating Climate Change and Reducing Environmental Impact

**Prioritised 5 SDGs:**

**Our Contribution to the UN Sustainable Development Goals in 2022**

- Released our first UNGC Communication on Progress (CoP) to show our endorsement of the 10 UNGC Principles on Human Rights, Labour, Environment and Anti-Corruption
- Our achievement in 2022 supported 9 UNSDGs and 15 SDG Targets

# Business Review

## Sustainability Achievements 2022

Planet	People	Peace	Prosperity
<ul style="list-style-type: none"> <li>Green Building Index (GBI) Malaysia certification for Twin Towers (Gold) and Menara 3 (Silver)</li> <li>37 per cent reduction in GHG emissions (from 2015 base year)</li> <li>52 per cent hotel waste were diverted from landfill</li> <li>30 per cent reduction in water consumption (from 2015 base year)</li> <li>100 per cent elimination of Single-Use Plastics from Mandarin Oriental, Kuala Lumpur</li> <li>KLCC is the largest EV hub in Malaysia (57 charging points)</li> <li>Refined our GHG emission data based on the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (2004)</li> </ul>	<ul style="list-style-type: none"> <li>Spent RM16.4 million on employee learning and development</li> <li>Zero fatalities since 2015</li> <li>Introduced #YouMatter to destigmatise mental health</li> <li>Enhanced employee benefits, progression criteria, succession planning and high performance talent pool</li> <li>Upgraded the Integrated Security Operations Centre (ISOC) as the central nerve, supported by New Security Operating Model (NSOM).</li> <li>Installed facial recognition services for improved security and contactless access at the Twin Towers</li> </ul>	<ul style="list-style-type: none"> <li>Submitted our first Communication on Progress (CoP) to the UNGC.</li> <li>Zero bribery and corruption cases.</li> <li>Achieved 42 per cent women composition on the Board, 41 per cent women in senior management and 38 per cent of total workforce.</li> <li>Achieved ISO37001:2016: Anti Bribery Management System Standards for three companies.</li> <li>Strengthened cyber security via the Enterprise Cyber Security Governance Framework.</li> </ul>	<ul style="list-style-type: none"> <li>Out of our RM1.4 billion revenue, RM17.0 million was distributed to communities while RM15 million went to our rental assistance for tenants.</li> <li>Practised ethical and transparent procurement and supply chain practices.</li> <li>Built trust and loyalty with customers and tenants.</li> </ul>

### Outlook

We will continue to drive sustainable growth by focusing on:

- Attractive tenancy terms and incentives to attract tenants whilst continuing to drive stable growth in offices.
- Innovative marketing programmes to bring more quality traffic into the mall to drive sales for its retail partners.
- World-class hospitality services to enhance our brand, capitalise on tourism returns and gain a competitive edge.
- Charting an NZCE 2050 Pathway with a 25 per cent reduction target by 2030 and Task Force on Climate Related Financial Disclosures (TCFD) assessment in 2023.

Our aim is to become a solutions partner for a sustainable future.