



# Project Delivery and Technology

Completed the **largest offshore installation** in Malaysia for Kasawari Gas Field Development.

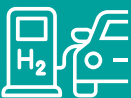


**RM3.3 billion**



realised value creation through the delivery of projects, technical and digital solutions.

Progressed deployment of our proprietary Proton Exchange Membrane (PEM) electrolyser for **hydrogen production**.



Crowdsourced over **1,500 ideas**



through the global **Race2Decarbonise** hackathon towards meeting enterprise short-term abatement target.



**Ir. M Yusri M Yusof**  
Senior Vice President\*,  
Project Delivery and Technology



With innovation being integral to the energy landscape amid accelerated global energy transition, PETRONAS' Project Delivery and Technology (PD&T) Division has been pivotal in driving our groupwide business and sustainability ambitions.

PD&T as PETRONAS' Centre of Excellence is the technology and engineering nexus offering deep expertise and innovative solutions to advance the Group's core business and growth areas.

As a safe, reliable and progressive solutions partner, PD&T recorded transformative growth while shaping and safeguarding operations across the value chain towards realising the aspirations of the enterprise and its stakeholders.

This achievement is due to the visionary leadership of Datuk Ir Bacho Pilog who led PD&T previously.

The division delivered notable milestones in line with PETRONAS' Energy Transition Strategy demonstrating passion and commitment towards making impact in the energy landscape through our expanding innovation ecosystem.

In 2023, we pushed for wider adoption of PETRONAS' proprietary solutions through commercialisation. The efforts to create value and touch lives with our technology were intensified through the formation of Group Technology and Commercialisation.

Meanwhile, the deployment of key technology and delivery of capital projects, together with our pursuit of active collaborations to foster innovation, have propelled us along the pathway to a lower carbon future.

**Note:**

\* Appointment as at 1 January 2024.

## Key Focus Areas and Results

Focus Area	What We Did in 2023	Results	Stakeholders
<b>Core Business</b>	<b>Key Strategic Value Projects</b> <ul style="list-style-type: none"> <li>Spearheaded significant advancements in key technology and capital projects.</li> </ul>	<ul style="list-style-type: none"> <li>Completed the largest offshore installation for the Kasawari Gas Field Development Project.</li> </ul>	<span style="background-color: #ffc107; border-radius: 50%; padding: 5px; margin-right: 10px;">C</span> <span style="background-color: #ffc107; border-radius: 50%; padding: 5px;">GIP</span>
	<b>Project Delivery Excellence</b> <ul style="list-style-type: none"> <li>Continued delivering projects on time, on budget, on scope.</li> </ul>	<ul style="list-style-type: none"> <li>Managed 830 projects valued at RM12.3 billion annual CAPEX.</li> </ul>	<span style="background-color: #ffc107; border-radius: 50%; padding: 5px;">C</span>
	<b>Operational Excellence</b> <ul style="list-style-type: none"> <li>Spurred innovation via digital and technology advancement to improve efficiency, productivity and operational excellence.</li> </ul>	<ul style="list-style-type: none"> <li>Piloted Malaysia's first 5G private network to enable advanced digital initiatives and optimise operational performance.</li> <li>Achieved significant enterprise value creation through AlphaLNG, for gas and LNG production, cargo scheduling, price and cost optimisation.</li> </ul>	<span style="background-color: #ffc107; border-radius: 50%; padding: 5px;">C</span>
	<b>Hydrogen Innovation</b> <ul style="list-style-type: none"> <li>Progressed in-house hydrogen technology.</li> </ul>	<ul style="list-style-type: none"> <li>Progressed deployment of PETRONAS' proprietary Proton Exchange Membrane (PEM) electrolyser for hydrogen production.</li> </ul>	<span style="background-color: #ffc107; border-radius: 50%; padding: 5px;">GIP</span>
<b>New Business</b>	<b>Strategic Carbon Capture and Storage Implementation</b> <ul style="list-style-type: none"> <li>Deployed innovative carbon capture and storage (CCS) technologies for effective carbon management.</li> </ul>	<ul style="list-style-type: none"> <li>Achieved successful Factory Acceptance Testing for Rotating Packed Bed for Integrated Cryomin Onshore Plant.</li> </ul>	<span style="background-color: #ffc107; border-radius: 50%; padding: 5px; margin-right: 10px;">C</span> <span style="background-color: #ffc107; border-radius: 50%; padding: 5px;">GIP</span>
	<b>Specialised Product Innovation</b> <ul style="list-style-type: none"> <li>Developed specialty chemicals and circular economy technology for businesses.</li> </ul>	<ul style="list-style-type: none"> <li>Achieved end-to-end R&amp;D capabilities ranging from innovative chemistry creation and technology piloting such as graphene and high performance catalysts for sustainable aviation fuel.</li> </ul>	<span style="background-color: #ffc107; border-radius: 50%; padding: 5px;">C</span>

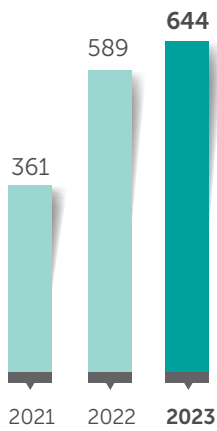
## Project Delivery and Technology

Key Focus Areas and Results			
Focus Area	What We Did in 2023	Results	Stakeholders
<b>New Business</b>	<p><b>Technology Commercialisation</b></p> <ul style="list-style-type: none"> <li>Commercialised technology and digital solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Transformed refinery waste by-products into premium materials such as graphene used for coating (ProShield+), composite and battery (ProCharge+).</li> <li>Commercialised digital solutions such as VOLANT, a unique integrated setup to facilitate high speed connectivity; and STEAR, an AI-powered logistic solution for business efficiency and GHG emissions reduction.</li> </ul>	GIP
<b>Net Zero Carbon Emissions</b>	<p><b>Enterprise Decarbonisation Focus</b></p> <ul style="list-style-type: none"> <li>Accelerated asset decarbonisation through initiatives towards flaring or venting reduction, energy efficiency and emissions accounting by leveraging technology.</li> </ul>	<ul style="list-style-type: none"> <li>Deployed Structured Energy Trending and Performance Assessment for Combustion Engine, a decarbonisation programme through fuel gas optimisation for stationary combustion; and a vent-to-flare conversion project to achieve zero routine venting at the Temana platform.</li> <li>Crowdsourced 1,500 innovative decarbonisation ideas worldwide through PETRONAS' first decarbonisation hackathon, Race2Decarbonise.</li> </ul>	C GIP
	<p><b>Methane Emission Management</b></p> <ul style="list-style-type: none"> <li>Strengthened methane emissions management in line with international principles and collaborations, including ASEAN initiatives and partnerships for methane emissions reduction.</li> </ul>	<ul style="list-style-type: none"> <li>Achieved the United Nations Environmental Programme Oil and Gas Methane Partnership 2.0 Gold Standard on methane emissions management pathway.</li> </ul>	
	<p><b>CCS Innovation</b></p> <ul style="list-style-type: none"> <li>Defined CCS hubs development and technology milestones in line with the National Energy Transition Roadmap.</li> </ul>	<ul style="list-style-type: none"> <li>Advanced the development of three CCS hubs in Malaysia.</li> <li>Achieved commercial readiness for flue gas membrane contactor.</li> </ul>	

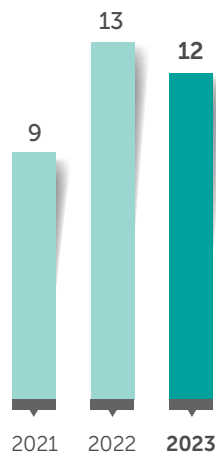
## Highlights and Achievements

### Performance Highlights for 2023

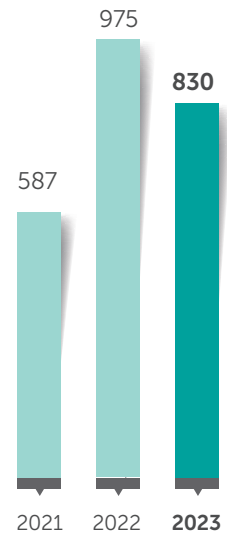
**Investment in Technology**  
(RM Mi)



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



**Number of Projects**



## Project Delivery and Technology

Challenges		
Challenge	Mitigation Action	Results
<p><b>Volatility, Uncertainty, Complexity and Ambiguity</b></p> <p>Conditions that impact the ability to deliver business commitments.</p>	<ul style="list-style-type: none"> <li>• <b>Delivery Structure Review and Agile Processes:</b> Enhanced efficiency and responsiveness through comprehensive review of our delivery structure. Enhancements included implementing agile business processes for adaptability and facilitating changes to meet commitments.</li> <li>• <b>Opportunities from Trades Agreement:</b> Capitalised on opportunities to strengthen and diversify vendor network, optimise fabricators, streamline supply chain and foster growth of local contractors' ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>• Established an optimised approach with phased planning for enhanced delivery.</li> <li>• Revised critical cross-functional work processes for data and target adaptability.</li> <li>• Collaborated on a study to understand the impact of free trade agreements groupwide.</li> <li>• Initiated a comprehensive study to enhance the project delivery ecosystem encompassing market consolidation.</li> </ul>
<p><b>Talent Development</b></p> <p>Managing capability and capacity gaps.</p>	<ul style="list-style-type: none"> <li>• <b>Talent Improvement Programme:</b> Developed a programme aimed at building a workforce with a broad range of skills and perspectives.</li> <li>• <b>Conscious Inclusion Programme:</b> Implemented a Diversity and Inclusion awareness programme; and conducted a benchmarking study on neurodiverse capability development to build skills and encourage intentional inclusion.</li> </ul>	<ul style="list-style-type: none"> <li>• Executed a comprehensive Talent Reshaping Programme.</li> <li>• Completed a conscious inclusion programme and benchmarking study to establish a capability framework and identified partner for collaboration.</li> <li>• Pilot programme for neurodivergent talents.</li> </ul>
<p><b>Cyber Security</b></p> <p>Managing exposure to cyber security threats in digital activities.</p>	<ul style="list-style-type: none"> <li>• <b>Cross-Unit Cyber Security Collaboration:</b> Strengthened collaboration for an integrated defence against cyber threats.</li> <li>• <b>Robust ICT Business Continuity Measures:</b> Implemented business continuity measures and conducted tabletop exercises for cyber security scenario evaluation.</li> </ul>	<ul style="list-style-type: none"> <li>• Deployed Enterprise Cyber Security Governance Framework in the operational technology environment.</li> <li>• Implemented Ransomware Crisis Process.</li> </ul>

Opportunities
<ul style="list-style-type: none"> <li>• <b>Technology Stewardship in Energy Transition:</b> PD&amp;T is advancing technologies required to deliver the PETRONAS Energy Transition Strategy.</li> <li>• <b>Diverse Talent Utilisation:</b> PD&amp;T will continue to develop a diverse workforce with the talents and expertise necessary to create value and unlock opportunities.</li> <li>• <b>Strategic Collaborations for Growth:</b> PD&amp;T will actively foster more significant synergies with strategic partners to propel PETRONAS' Core and New Business growth.</li> </ul>

## Our Approach to Sustainability

- **Eco-Conscious Initiatives:** Reduced single-use plastics in PD&T projects and facilities, avoiding 67 tonnes of plastic waste. Additionally, PD&T conducted 39 community and environmental conservation programmes. These social impact programmes reached 4,748 people, collected 924 kilograms of waste, released 650 turtles and planted 569 trees.
- **Social Performance Enhancement:** Improved technical capabilities and internal controls focusing on forced labour and social risk assessment for vendors and partners in PD&T’s managed projects in alignment with national regulations and plans.



For more information on our sustainability contributions, please refer to pages 108-197.

### ► Our Outlook

#### Short-Term Outlook

At PD&T, we aim to advance PETRONAS’ Core Business and New Business growth by excelling in project delivery and asset operations, providing expertise leadership, technological and engineering advancements, and sustaining and scaling up our digital ecosystem.

Our primary focus in the short term includes:

- Intensifying and accelerating decarbonisation by taking comprehensive measures to progress the energy transition.
- Ensuring that technology investments support key business growth priorities in CCS, renewable energy, hydrogen and advanced materials.
- Driving the commercialisation of matured technologies and digital solutions.

Among the key projects in our pipeline are the Kasawari Gas Field Development and the Kasawari CCS project. We will also scale up proprietary technologies and advance PETRONAS’ hydrogen plans.

#### Medium- to Long-Term Outlook

As PETRONAS’ Centre of Excellence and preferred solutions partner for the energy industry and beyond, we will continue identifying innovative solutions to maintain our competitive edge. We will leverage our expertise in project delivery, technology, technical and digital solutions, while ensuring safe and efficient operations throughout the value chain.

We will also promote, advocate and oversee enterprise decarbonisation and enterprise electrification to support PETRONAS in achieving its emissions reduction targets.

In accelerating our energy transition journey, we have fortified our Five-Year Strategic Plan 2024-2028 to drive sustainable growth, focusing on three key thrusts:

- Ensure continuous safety, reliability and efficiency improvements through distinctive technology solutions.
- Unlocking and accelerating commercialisation opportunities to generate new revenue for the Group.
- Intensifying research advancements supporting PETRONAS’ Energy Transition Strategy in the identified focus areas:
  - i) **Driving renewables:** Supporting the growth of hydrogen to fast-track the energy transition.
  - ii) **CCS:** Advancing engineering for carbon capture technologies.
  - iii) **Circular economy:** Repurposing waste into new products.
  - iv) **Advanced materials:** Strengthening asset integrity, extending service life and reducing overall carbon footprint.
  - v) **Improving decarbonisation:** Managing and reducing greenhouse gas emissions from assets.
  - vi) **Advancing specialty chemicals:** Ensuring progress in producing and utilising specialty chemicals beyond oil and gas into everyday consumer products.

Moving forward, we will continue to pursue technological and digital advancement throughout our value chain to ensure we meet the Group’s business goals and realise our Net Zero Carbon Emissions by 2050 Pathway.