



**PETRONAS**



# **N**avigating sustainable journey

SUSTAINABILITY REPORT 2022

**PETRONAS GAS BERHAD**

198301006447 (101671-H)



## **Navigating Sustainable Journey**

We continue to upscale our skillsets, operational excellence, technological innovation and solutions across the Sustainability Lenses in an effective, resourceful and responsible manner. As we pursue relentlessly to enhance our leadership position on the ESG front, we are navigating our sustainable journey towards a net zero carbon future.

# About This Report

At PETRONAS Gas Berhad (PGB or the Group), we advocate transparency to stakeholders, and we are honoured to present this report as the primary source of information on our Group's financial and non-financial performance for 2022. It forms part of our reporting suite which comprises:



INTEGRATED REPORT	GOVERNANCE & FINANCIAL REPORT	SUSTAINABILITY REPORT
<p>Our Integrated Report is the primary report to our stakeholders, showcasing our value creation proposition and delivery.</p>	<p>Our Governance and Financial Report provides our comprehensive approach towards protection of value in our activities, together with our financial performance for the year.</p>	<p>Our Sustainability Report details our efforts and commitment towards creating a sustainable business, positioned for long term success.</p>

**REGULATIONS COMPLIED**

- Bursa Malaysia Main Market Listing Requirements
- Companies Act 2016
- Malaysian Code on Corporate Governance 2021
- Corporate Governance (4<sup>th</sup> Edition) issued by Bursa Malaysia
- Malaysian Financial Reporting Standards
- International Financial Reporting Standards

**SCOPE AND BOUNDARY OF REPORTING**

This report covers the primary activities of the Group, our business segments and our subsidiaries as well as joint venture operations, with the aim to address the information requirement of long term investors. We also present information relevant to the way we create value for other key stakeholders, including our employees, customers, government agencies and authorities, suppliers and communities.

This report covers the period from 1 January to 31 December 2022, unless otherwise stated.

**APPROVAL BY THE BOARD**  
 PGB Board of Directors (Board) acknowledges its responsibility in ensuring the integrity of this Integrated Report, which in the Board's opinion address all the issues that are material to the Group's ability to create value and fairly presents the integrated performance of PGB Group. This report has been prepared in accordance with the Value Reporting Foundation's Integrated Reporting Framework.

**ADNAN ZAINOL ABIDIN**  
 Chairman

**ABDUL AZIZ OTHMAN**  
 Managing Director/Chief Executive Officer



Scan this QR code with your smart device to access our Integrated Report suite.

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## ABOUT OUR SUSTAINABILITY REPORT

The PGB Group’s mandate is to create a sustainable business that is positioned for long-term success. As we focus our efforts on realising our economic ambitions and creating long-term value for our shareholders, we are focussed on balancing this aspiration with good environmental, societal and governance considerations. As a responsible corporate citizen, we believe in taking accountability for the impact of our operations on our business ecosystem, society and the environment, as well as being held answerable for our actions. To this end, we continue to proactively manage our commitment to sustainable development on the Value Creation as well as Environmental, Social and Governance (ESG) fronts.

This Sustainability Report (Report) serves as a tool to highlight the key Value Creation and ESG initiatives undertaken by the Company for the year under review. It aims to communicate how we are progressively assessing and finetuning our sustainability agenda in order to achieve our business goals.

### OUR REPORTING PRINCIPLES

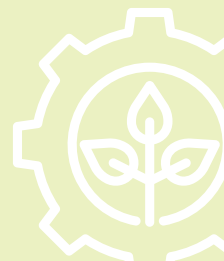
The information in this Report covers the sustainability efforts undertaken by PGB and our subsidiaries throughout the 12-month period covering 1 January to 31 December 2022. We focus on our operations in Malaysia. Insights and feedback from our various stakeholders have been compiled to help us identify, prioritise and address material sustainability issues in our business strategy. We endeavour to report issues that are material to PGB and our stakeholders, as determined through analyses of a wide variety of sources such as Government and PETRONAS policies, benchmarking results, internal documents comprising enterprise risk, internal auditor reports and surveys, as well as media reports and stakeholder engagement sessions.

We acknowledge that there is room for improvement in our disclosures, and are committed to monitoring and reporting on our sustainability activities in a progressive manner each successive year.

### FEEDBACK

We value all feedback and welcome any comments on our reporting. Please direct them to:

Sustainability Reporting Team  
 PETRONAS Gas Berhad  
 Level 50, Tower 1, PETRONAS Twin Towers  
 Kuala Lumpur City Centre  
 50088 Kuala Lumpur  
 Malaysia  
 or email: [pgbstratcomms@petronas.com](mailto:pgbstratcomms@petronas.com)



**FOREWORD BY THE CHAIRMAN OF THE BOARD RISK COMMITTEE**

**Dear Valued Stakeholders,**

It is my privilege to present this foreword for PETRONAS Gas Berhad’s (PGB, the Group or the Company) Sustainability Report 2022 in my capacity as the Chairman of the Board Risk Committee (BRC). This Sustainability Report (Report) serves as one of the media through which we communicate PGB’s key Value Creation and Environmental, Social and Governance (ESG) initiatives in our efforts to create a more sustainable business positioned for long-term success. It encapsulates the finer details of how the Group is progressively assessing and finetuning its sustainability agenda in order to achieve its business goals.



**DATUK YEOW KIAN CHAI**  
Chairman  
Board Risk Committee

I am pleased to report that the agenda of sustainability continues to be embedded in greater measure within PGB. At the sustainability governance level, the BRC and Sustainability Working Committee (SWC) continue to make good inroads in our mandate to oversee sustainability governance across PGB.

Today, the BRC has oversight for the Group’s risk management framework, policies, and practices as well as ESG, compliance and sustainability matters. Meanwhile, the SWC is tasked with developing, reviewing, and executing all approved sustainability development initiatives as well as communicating the outcomes to the relevant internal and external stakeholders in a transparent manner. The SWC, in essence, serves as the change agent for ensuring all related sustainability improvement initiatives and activities are implemented in a timely and effective manner in compliance with regulatory requirements.

The SWC is monitored by a Risk Compliance Committee (RCC), chaired by PGB’s Managing Director/Chief Executive Officer (MD/CEO), with members comprising representatives from all functional lines across the business units.

Over the course of 2022, we continued to bolster the Group’s sustainability governance framework through measures such as the following:

- A PGB Sustainability Focal Person was appointed in the first quarter to serve in an advisory role on PGB’s overall sustainability development activities;
- A working-level SWC was officially formed on 1 June 2022 comprising committee members from all across the Group. Today, this is facilitating more robust and better quality data gathering as well as improved buy-in from our assets on the Group’s sustainability agenda as they are now directly engaged in sustainability developments;
- The PGB Sustainability Blueprint was developed with specific sustainability goals, lenses, ambitions, result areas, initiatives, and targets to address and balance out the current operating environment/business portfolio with the sustainability agenda/ecosystem moving forward. The blueprint will be reviewed as and when necessary to reflect changing business environment and regulatory requirements to ensure PGB continues to stay its course in meeting the set objectives and compliance; and
- Sustainability updates were introduced as a permanent agenda item at BRC and RCC committee meetings to ensure effective check and balance between the committees’ efforts, leadership’s focus as well as the Group’s appetite and direction.

As a result of these measures, the agenda of sustainability is now being cascaded down and implemented across the Group in a more effective and streamlined manner. At the same time, I am delighted to report that on the back of our people’s diligent efforts and better reporting and disclosures, PGB’s rating on the FTSE4Good Bursa Malaysia Index (Index) rose from 2.8 to 3.7 points in 2022. Our position as a constituent of the Index too has been reinforced even as our Climate Change score has risen from 1 to 3.

Moving forward, PGB will continue to align with the PETRONAS Group’s sustainability commitments, namely the Net Zero Carbon Emissions 2050 (NZCE 2050) pathway, the Greenhouse Gas (GHG) Protocol, and the Oil & Gas Methane Partnership (OGMP 2.0) Framework. Following the rollout of our new Sustainability Blueprint and the specific elements within it that we are bringing into play, we are confident that our aspiration to reduce our carbon footprint while undertaking resource and waste management efficiently will come to fruition as per the blueprint. This is already evident in the year-on-year improvements we are making on the GHG emissions as well as water and energy reduction fronts.

The introduction of the new PGB Strategic Agenda (2023-2030) too will hold us in good stead. Recognising that sustainable development in all aspects of the business value chain is integral to our long-term success, we are leveraging four strategic thrusts or pillars that will serve as PGB’s Winning Formula, namely Growth, Commercial Excellence, Project Excellence, and Operational Excellence. These four pillars will guide us in our efforts to lay strong foundations for a robust and fundamentally resilient business that can respond quickly to operational and marketplace changes.

In closing, I wish to congratulate the team at PGB for another excellent year of progressing sustainably. A special note of thanks to the SWC and all involved for the excellent work done in developing the PGB Sustainability Blueprint. Together with our Strategic Agenda, the building blocks are in place for the Group’s sustainable success. I humbly request that all our stakeholders continue to lend PGB their unwavering support as we fervently pursue sustainable progress, meet stakeholder expectations, and create value in a responsible manner.

Even as we have extended the content framework and incorporated more detailed disclosures in our Sustainability Report 2022, we trust you will find this an engaging read. Thank you for your kind support.

**DATUK YEOW KIAN CHAI**  
Chairman  
Board Risk Committee



The year in review saw the Group demonstrating its commitment to prioritising the agenda of sustainability by rolling out existing Value Creation and ESG-related initiatives as well as introducing new ones. We also made good progress by way of expanding our understanding of sustainability matters, bolstering our sustainability governance framework, as well as restrategising our sustainability focus and initiatives.



**ABDUL AZIZ OTHMAN**  
Managing Director/Chief Executive Officer

**Dear Valued Stakeholders,**

As PGB goes about the business of supporting PETRONAS in its role as the custodian of the nation’s natural gas resources, we remain deeply committed to upholding responsible business practices that drive sustainable growth, create tangible stakeholder value, and safeguard the Group’s long-term prospects. I am pleased to present PGB’s Sustainability Report 2022 (Report) which underscores our Value Creation as well as Environmental, Social and Governance (ESG) efforts as we continue to embed sustainable practices into our operations.

This Report aims to encapsulate the positive impact that we made in 2022 against the year’s volatile market and high-cost environment. Despite having to contend with market headwinds, we not only stepped up to the plate to ensure a steady, secure, and environmentally friendly gas supply to the nation and our customers, but also made strong strides forward in the way of our sustainability endeavours.

The year in review saw the Group demonstrating its commitment to prioritising the agenda of sustainability by rolling out existing Value Creation and ESG-related initiatives as well as introducing new ones. We also made good progress by way of expanding our understanding of sustainability matters, bolstering our sustainability governance framework, as well as restrategising our sustainability focus and initiatives. These, among the other details of our sustainability endeavours, are spelled out in this year’s Report.

**OUR APPROACH TO SUSTAINABILITY**

We view sustainable development as a business imperative and acknowledge that we have a responsibility to balance out our economic ambitions with positive ESG considerations. To this end, we have lined up our Sustainability Strategy with the PETRONAS Group's Sustainability Agenda and four strategic Sustainability Lenses. Our mandate is to address the Agenda and Lenses in a continual manner by considering the matters that are most material to us and contemplating the net positive impact of our activities on our stakeholders. At the same time, we are focusing our efforts on progressive value generation for all those who have contributed to our success.

In all that we undertake, we are governed by our Statement of Purpose – "A Progressive Energy and Solutions Partner Enriching Lives for a Sustainable Future" – while our business strategy is guided by a world-class structure and policies that correspond to Bursa Malaysia Securities Berhad's (Bursa Malaysia) requirements, the PETRONAS Corporate Sustainability Framework (PCSF), and the PETRONAS Sustainable Management Guidelines (PSMG).

Our disclosures in this Report too are guided by local and international statutory and reporting frameworks, particularly Bursa Malaysia's Sustainability Reporting Guide (3<sup>rd</sup> Edition), the updated FTSE4Good Bursa Malaysia (F4GBM) Index ESG assessment indicators, and the reporting requirements of organisations such as the International Petroleum Industry Environmental Conservation Association (IPIECA) and the Global Reporting Initiative (GRI).

In framing our sustainability approach, we are also ensuring a high degree of alignment with the United Nations Sustainable Development Goals (UN SDGs) which serve as a "blueprint to achieve a better and more sustainable future for all" by 2030. Today, we are aligned with seven of the 17 SDGs that are most relevant to the PGB Group's Sustainability Agenda.

To ensure sustainability is integrated in greater measure throughout the Group, we continue to strengthen our sustainability governance structure. Today, the Board Risk Committee (BRC) and Sustainability Working Committee (SWC), who have oversight for PGB's sustainability governance, are responsible for weighing up the Group's sustainability considerations and ensuring that all sustainability strategies, priorities, targets and outcomes, are communicated effectively to internal and external stakeholders. With sustainability being driven from the top down in a more strategic and structured manner, the agenda of sustainability is making good headway across PGB. The appointment of a PGB Sustainability Focal Person in an advisory role further underscores the Group's commitment to prioritising sustainable development.

In line with our commitment in our 2021 Report to introduce a Sustainability Blueprint, we went on to establish a holistic blueprint in 2022 which covers our sustainability goals, lenses, ambitions, result areas, initiatives, and targets. All of these elements are aligned with and support PETRONAS's Statement of Purpose, the PETRONAS Sustainability Agenda, and the relevant UN SDGs. They also align with PETRONAS' Net Zero Carbon Emissions by 2050 (NZCE 2050) pathway, the Oil & Gas Methane Partnership (OGMP 2.0) Framework, the GHG Protocol and the standards of global rating agencies. To ensure clear demarcation and objective execution of our sustainability endeavours, we continue to adopt the Four Sustainability Lenses i.e., Continued Value Creation, Safeguard the Environment, Positive Social Impact and Responsible Governance.

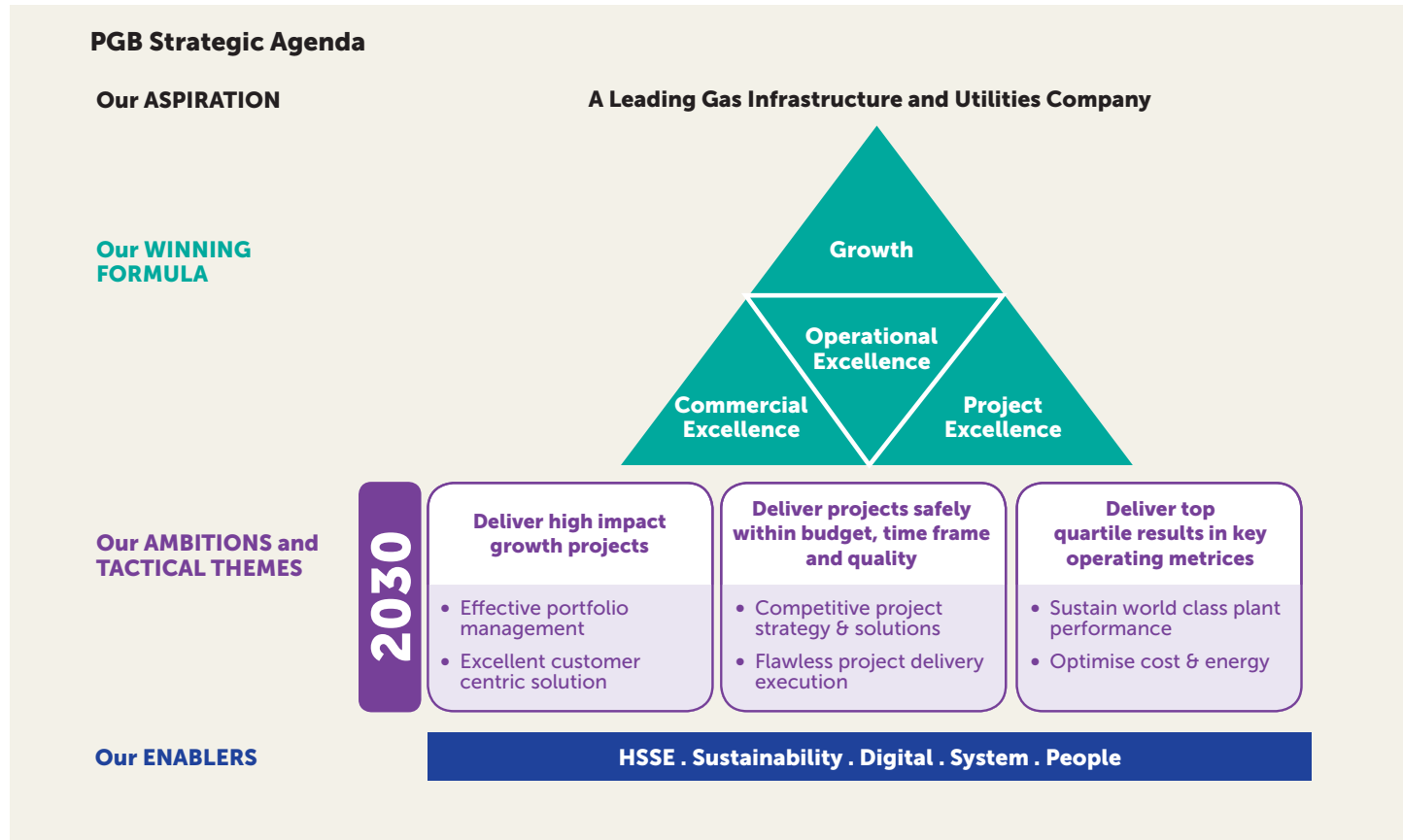
*The finer details of PGB's Sustainability Blueprint can be found in the section titled "Our Sustainability Strategy" within this Report.*



**A NEW STRATEGIC AGENDA**

Throughout 2022, we continued to implement our 2019-2022 strategic roadmap, namely R2 Game Plan 301Q99 Pushing Forward, bringing it to a close by the year's end. With clear goals set via strategic thrusts on the asset, system and process, as well as people and culture fronts, the R2 Game Plan helped us derive value amounting to RM123.08 million in 2022. Over the four-year period from 2019 to 2022, the R2 Game Plan helped us attain cumulative value amounting to RM427.5 million, exceeding the initial target of RM182 million over four years.

With the R2 Game Plan having come to an end, PGB has embarked on its new Strategic Agenda which is to run from 2023 to 2030.



Recognising that sustainable development in all aspects of the business value chain is integral to our long-term success, we are leveraging four strategic thrusts or pillars that will serve as PGB's Winning Formula, namely Growth, Commercial Excellence, Project Excellence, and Operational Excellence. These four pillars will guide us in our efforts to lay strong foundations for a robust and fundamentally resilient business that can respond quickly to operational and marketplace changes.

These four pillars will be supported by several Ambitions and Tactical Themes, and these in turn will be supplemented by Enablers comprising the elements of Health, Safety, Security and the Environment (HSSE), Sustainability, Digital, as well as People and Systems. All these elements will help ensure that the four pillars are well-oiled enough so that we can attain good momentum as we aspire to fulfil our Strategic Agenda.

*For more details on PGB's R2 Game Plan and our new Strategic Agenda, please refer to the "Message from the MD/CEO" in PGB's standalone Integrated Annual Report 2022.*

**FOCUSED ON CONTINUED VALUE CREATION**

The vital role that PGB continues to play as the nation's leading gas infrastructure and centralised utilities company cannot be stressed. To ensure the nation's gas supply security, we are carrying on the crucial work of building and maintaining the infrastructure to support different sources of gas supply. Our well-equipped regasification terminals in Sungai Udang and Pengerang accommodate LNG imports to meet increasing domestic demand, while our extensive Peninsular Gas Utilisation (PGU) pipeline network connects our customers to our regasification facilities.

To serve small-scale and off-grid customers who are located away from the PGU pipeline network, we provide the infrastructure for LNG truck loading at Regasification Terminal Pengerang (RGTP) thereby facilitating the delivery of LNG via trucks fitted with cryogenic tanks to them. Our regasification terminals also provide gassing-up and cooling-down (GUCD) services as well as the infrastructure for re-load services in support of PETRONAS' LNG Bunkering Vessel (LBV), which in turn promotes greater use of LNG in the marine industry.

To ensure a sustained level of returns to our shareholders, we continue to ensure that all our assets are available, reliable and operating at their optimum. In 2022, we sustained our superior operational performance across all our plants and facilities by operating safely, reliably, and efficiently. As a result, on top of steady revenue from our long-term contracts, we are able to derive revenue from capacity payments from the Gas Processing segment's Performance-Based Structure, and sales from the Utilities segment.

On the regulated business front, we have been adopting innovative digital technologies such as those employed at the Regasification Terminal Sg Udang (RGTSU) Digital Transformation (RGTSU-DX) project to facilitate remote operations of our regasification terminals. PETRONAS' Unified Operations Centre (UOC) at PGB is another novel digital initiative whereby machine learning and remote troubleshooting solutions are being tapped to enable offsite predictive monitoring and rapid analysis, among other things. The recent completion of digital transformation initiatives at Regasification Terminal Pengerang i.e., the RGTP-DX project, underscores how quickly PGB's digital operations ecosystem is expanding. All in all, these New Ways of Working (NWOW) are doing much to improve employee safety, reduce exposure to offshore hazards, lower operating costs, ensure timely operations and incident management, as well as create sustainable value for the Group. We are also tapping digital solutions such as virtual fencing and nested drones to ensure the safety and integrity of our right-of-way (ROW) PGU pipeline network.

Several ongoing growth projects are expected to be completed in 2023. These include the off-gas rerouting project at Gas Processing Kertih, the lateral gas pipelines to Pulau Indah and Banting, as well as the Utilities connection to PCC Oxyalkylates Malaysia Sdn Bhd in Terengganu. The recent addition of the 52 MW power plant project in Sipitang, Sabah to our growth project portfolio also augurs well

for us. There are also opportunities to support Gentari, PETRONAS' renewable energy arm, which is focused on renewable energy and hydrogen monetisation, through potentially transporting hydrogen via pipelines to its customers. For all new projects that we are considering, we will first ensure we undertake a carbon footprint assessment.

*The finer details of our value creation efforts can be found in the "Focused on Continued Value Creation" section within this Report and the "Message from the MD/CEO in PGB's standalone Integrated Annual Report 2022."*



**COMMITTED TO SAFEGUARDING THE ENVIRONMENT**

Today's businesses are having to contend with a host of environmental challenges like never before. From a rise in climate change issues, to increased pollution and waste mismanagement, to the depletion of natural resources and biodiversity, as well as heightened regulatory requirements, companies are having to take stock of environmental considerations as they go about their day-to-day activities.

PGB is committed to playing its part as a responsible steward of the resources we have been entrusted with as we view this as both a moral obligation and a business advantage. We are very aware of the impact of greenhouse gas (GHG) emissions from our operations and are continuously undertaking the necessary mitigation measures to reduce our carbon footprint. At the same time, we are taking the necessary measures to ensure that natural resources are used in a sustainable manner throughout our operations, products and overall business.

In 2022, the SWC and other parties collaborated to produce PGB's Climate Change Risk Management Framework which aligns with PETRONAS' NZCE 2050 pathway. This holistic framework serves as the overarching guide for managing our carbon footprint in our existing and growing operations. It also spells out how we are to mitigate and adapt to the associated climate change risks, as well as highlights new areas of opportunity. Not only has the published framework led to us raising our current levels of sustainability disclosures and meeting the rising expectations of stakeholders, it has reinforced our sustainability position and improved our rating on the F4GBM Index. More information on this framework and our carbon reduction initiatives dating as far back as 2000, can be found on our website.

PGB's pollution and resource management efforts are guided by the PGB Health, Safety and Environment (HSE) Policy and PETRONAS HSE MCF (Mandatory Control Framework). These two references accord the highest priority to the health and safety of our workforce as well as the protection of our assets, stakeholders, communities and the environment. Our HSE policy also spells out the guiding principles for managing risks and hazards relevant to PGB's business operations.

To ensure we remain relevant to the marketplace, PGB continues to adhere to the requirements of the ISO 14001:2015 Environmental Management System. Through responsible GHG emissions management, we are helping to mitigate global climate change as well as improving our operational costs and efficiencies. PGB has been tasked with achieving a target cap of 5 million metric tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) by 2024. I am pleased to report that we have already met the set limit and continue to sustain the good momentum gained by leveraging a holistic Operational Excellence (OE) programme which encompasses components such as flare reduction, energy efficiency and improved plant reliability activities.

PGB is committed to creating an energy culture by implementing an energy efficiency improvement programme under the ambit of our Energy and Loss Management System (ELMS). Our goal was to achieve first quartile energy performance by 2022 with an energy index of 97.5 and the ELMS initiative enabled us to meet this target. The Energy Index (EI) data for the Gas Transmission and Regasification (GTR) Division between 2018 and 2022 shows a significant and continued reduction from an EI rating of 104.9 in 2018 to 86.3 in 2022.

As part of our commitment to minimising waste generation from our operations, we are implementing the Waste Hierarchy concept that focuses on the 4R principles of Recover, Recycle, Reuse, and Reduce. In 2022, a total of 985.7 MT or equivalent to 64% of total hazardous waste was recovered by 4R activities at prescribed premises thereby exceeding the target of 56% set for 2022. To ensure resources are being used sustainably, we continue to deploy innovative operations and technologies to safeguard the environment.

Recognising how important it is to incorporate water conservation practices into our decision-making processes and operational management activities, we have aligned our water management efforts with PETRONAS' Guidelines on Water Practices (WAPS) as well as the Wastewater Management and Water Management PETRONAS Technical Standard (PTS). These guidelines are helping us to ensure that water is used in an optimal manner throughout our operations and that we minimise the impact of our water discharge on surrounding water bodies.

Moving forward, we intend to continue strengthening our environmental practices, strategies, KPIs, policies and various measures by leveraging innovation and industry best practices to safeguard the environment for future generations.





### ENSURING POSITIVE SOCIAL IMPACT

Being a conscientious corporate citizen, we acknowledge our responsibility to look after the safety and well-being of PGB's employees, business partners, and the communities in which we operate. Through inculcating a culture of self-learning and the appreciation of timely feedback on issues, we are steadfastly working to raise the bar on our performance and foster a more innate sense of responsibility amongst our people.

PGB's Generative HSSE Culture as well as HSSE strategies and management activities underscore our efforts to truly care for the safety and well-being of people. This culture aims to replicate transparency and mindfulness amongst our employees, contractors and business associates by embedding very high safety standards into all aspects of our systems and processes. We do not tolerate any compromise, and at times, we even go beyond compliance in an effort to not just uphold but exceed these standards. By implementing high process safety benchmarks across our organisation, our Leadership Team continues to make a conscious effort to create a sense of personal accountability among all our employees and contractors by persuading them to embrace HSSE as individuals as much as it is a collective responsibility.

In 2022, several new initiatives and enhancements were rolled out to safely and effectively manage turnaround and shutdown activities. As a result, there were zero HSSE incidents in 2022 in relation to turnaround activities at RGTSU, Gas Processing Plant 3 (GPP3) and GPP4, which led to the achievement of 550,908 total safe manhours. However, in the area of contractor performance, we deeply regret to report that we registered one fatality and loss time injury. To prevent such recurrences, the lessons learned are being communicated across the Group with more attention being placed on high-risk activities. At the same time, regular in-depth audits are being implemented across all project sites.

The Group continues to undertake socio-economic development through business sustenance activities as well as through our focus on developing the potential of our employees, partners, and communities. To build a pool of competent talent for technical positions at our assets, we made a commitment in 2021 to sponsor a minimum of 15 trainees each year as part of the Institut Teknologi Petroleum PETRONAS (INSTEP) Technical Energy Enrichment Programme (TEP). To date, we have made a total investment of RM8.5 million in the education of 58 students, 14 of whom have been hired as TEP trainees. This programme has proven to be beneficial to both PGB and the community, and we intend to increase the number of participants in the coming years.

PGB remains committed to ensuring the well-being of communities as we venture forth. Our community engagement approach adopts the three pillars of Yayasan PETRONAS' Corporate Social Responsibility (CSR) Framework, namely Education, Community

Well-being and Development, and the Environment. Collaborations and partnerships are crucial to our work and our strength is in the dedication of our team to create sustainable community solutions through ongoing, long-term interventions. We encourage our employees to participate in CSR programmes and volunteer their time and effort. Our employees are also encouraged to organise and facilitate their own voluntary charitable events by leveraging the myCareerX system developed by PETRONAS HRM.

Among the community initiatives that we continue to roll out are the Sentuhan Kasih PETRONAS programme. This is an avenue for PGB and Yayasan PETRONAS to work with communities to cater to their basic needs during major festive celebrations in Malaysia. We also continue to strengthen ties with communities through our ongoing collaboration with the Malaysian Nature Society to plant mangrove saplings at Sungai Latoh in Johor. In 2022, we planted an additional 2,000 saplings, bringing the total to 9,625 trees planted since the programme's inception. The finer details of these activities can be found in the Positive Social Impact section within this Report.

This year, we have restructured our content reporting structure for the "Ensuring Positive Social Impact" section to reflect the good practices we are already implementing on the Human Rights and Labour Standards fronts. The fact that these two topics are among the sustainability topics incorporated in the permanent agenda deliberated at the BRC meetings on a quarterly basis, underpins their importance. Moreover, we have established a grievance mechanism for employees, contract personnel and any party involved in providing services to PGB as well as dedicated procedures addressing grievances for individuals and communities impacted by our business activities. These procedures also address salient industry or business-specific human rights issues.

### UPHOLDING RESPONSIBLE GOVERNANCE

We acknowledge that good governance translates into good business, and so we are deeply committed to upholding strong ethical and governance practices across the length and breadth of our business.

On 1 June 2020, the Corporate Liability Provision within the Malaysian Anti-Corruption Commission (MACC) Act 2009 Amendment (May 2018) came into effect. This stipulates that an organisation's top management is equally liable for any corruption committed by persons associated with the organisation, unless the organisation can show that they have adequate procedures in place to prevent corruption. In line with this, we have taken several measures to ensure the highest level of accountability and good governance is prevalent within the Group. This includes the creation of a portal whereby our employees can find MACC Act-related highlights, news, and reference materials, as well as a whistleblowing channel.

In 2022, we conducted a series of workplace-related integrity awareness and education programmes that aligned with the PETRONAS Code of Conduct and Business Ethics (CoBE). All members of the leadership team, namely my fellow Directors, all General Managers and above, as well as myself, renewed our commitment to uphold the PETRONAS Integrity Pledge which aims to ensure that PGB and its subsidiaries do not indulge in corrupt acts. Several key personnel also went on to complete the MACC's Certified Integrity Officer course and became integrity focals as part of ongoing efforts to promote good governance in all the Group's dealings.

By stringently adhering to the Group's CoBE and Anti-Bribery and Corruption Policy (ABC), the relevant legal and regulatory requirements, as well as by encouraging ethical behaviour among our employees, we are proactively doing our part to ensure that compliance and oversight matters are managed effectively.

When it comes to investment-related matters, strategies and decisions, the Investment Steering Committee (ISC), which I chair, plays an important role. Our investment guidelines include a multitude of sustainability-related criteria which come into play during the investment deliberation process to ensure our business decisions align with our sustainability agenda.

### TOWARDS LONG-TERM, SUSTAINABLE GROWTH

As nations continue to fast-track the transition to renewable energy sources, the case for gas as a cleaner transition fuel is becoming increasingly clear. Given PGB's core competencies and our world-class operational track record, we remain well-primed to grow and enhance our infrastructure while exploring and pursuing growth opportunities that will contribute significantly to Malaysia's transition to a cleaner future.

As we maintain a laser-focused approach on driving sustainable development, we will work to continuously improve energy consumption at all our assets as well as sustain plant and equipment reliability. At the same time, we will explore investments that will strengthen our position in the green energy generation space. This includes tapping hydrogen as a partial fossil fuel replacement at Utilities Gebeng for a start, and considering investments in electricity and steam generation through our cogeneration activities.

In support of our sustainability endeavours and to ensure a balanced business strategy is in place, we will tap the PGB Sustainability Blueprint which addresses all the essential elements within PGB's four Sustainability Lenses. Seeing that this holistic roadmap lines up with PETRONAS' Sustainability Agenda, seven of the UN SDGs, the FTSE4Good Bursa Malaysia criteria, PETRONAS' NZCE 2050 pathway, and the OGMP 2.0 Framework, we are confident that it will effectively point out how we are to achieve our sustainability ambitions.

Moving forward into 2023, our internal and external stakeholders can look forward to many more initiatives and programmes as we ramp up efforts to embed effective sustainability practices and inculcate a robust sustainability culture across PGB. As PGB readies itself to manoeuvre through the complexities of the marketplace, we will ascertain that our internal structures and capabilities are adequately resourced and well-primed. This will help us to address all risks and opportunities that may come our way in a timely and effective manner.

Moving forward, the agenda of sustainability will continue to serve as a central feature of PGB's overall business strategy. We plan to make the best use of our existing sustainability initiatives and practices while remaining open and flexible to new ones. As we build upon the good momentum gained from our existing value creation and ESG activities, I call upon all our stakeholders and partners to lend us their staunch support. We also look forward to your constructive input on the wide range of issues before us, so that together, we can prudently navigate the ever-evolving market landscape in which we operate.

Rest assured, PGB will endeavour to maximise value creation for the benefit of all our stakeholders. To maintain our growth momentum and strengthen the Group's position, we will continue to align ourselves with PETRONAS's NZCE 2050 pathway and position ourselves to embrace a low-carbon energy future. These among other measures will ensure we maintain our license to operate for the long term.

Thank you for your kind support.

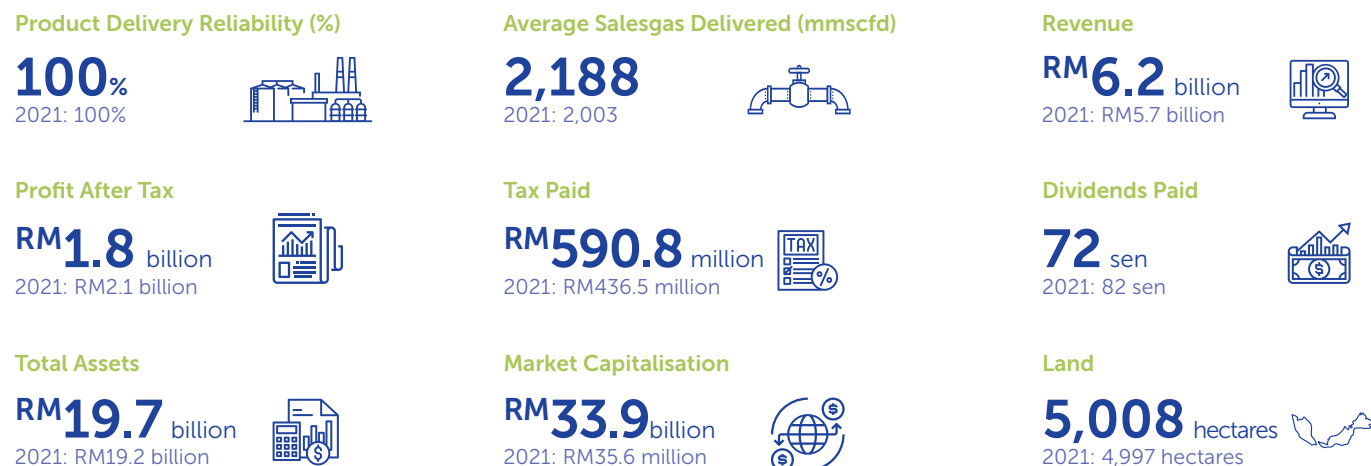
**ABDUL AZIZ OTHMAN**  
Managing Director/Chief Executive Officer

# OUR SUSTAINABILITY ACHIEVEMENTS

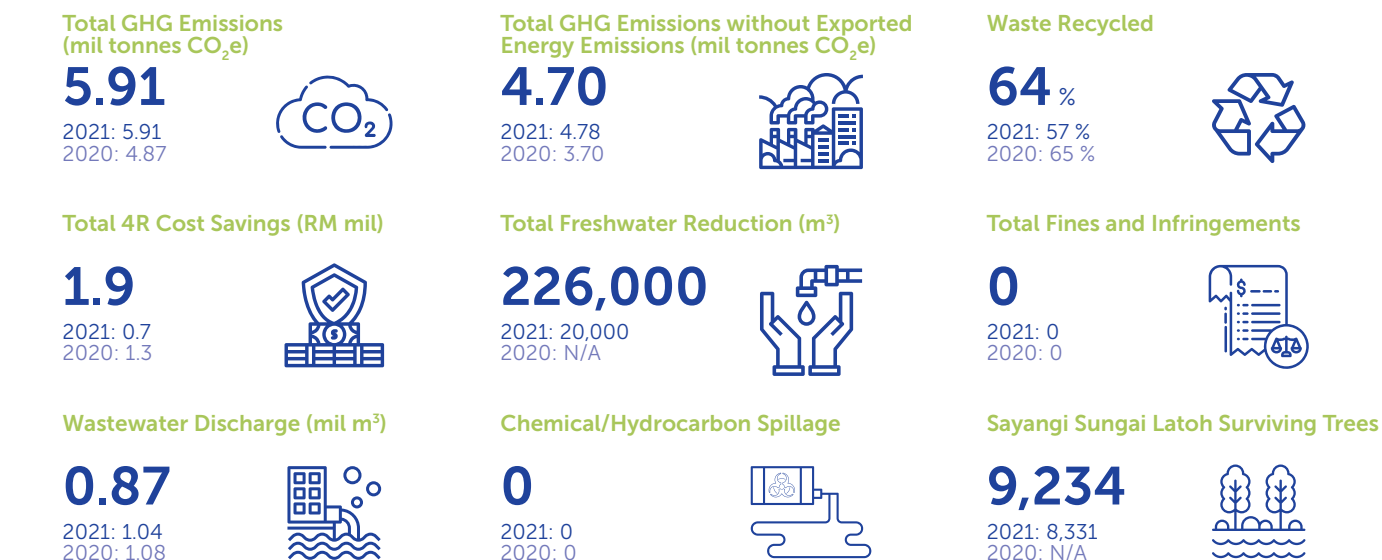
The year 2022 saw the respective teams within PGB deliver strong performances on the Value Creation and ESG fronts. The highlights of 2022's key sustainability achievements are spelled out below.

## SUSTAINABILITY SCORECARD

### CONTINUED VALUE CREATION



### SAFEGUARD THE ENVIRONMENT



## POSITIVE SOCIAL IMPACT

### WORKFORCE DIVERSITY



### HSSE



### Amount of Time Spent on Employee Development Training



### Type of Training

- HSE • Technical • Business Excellence • Leadership • Functional

### Major LOPC



### Major Fire



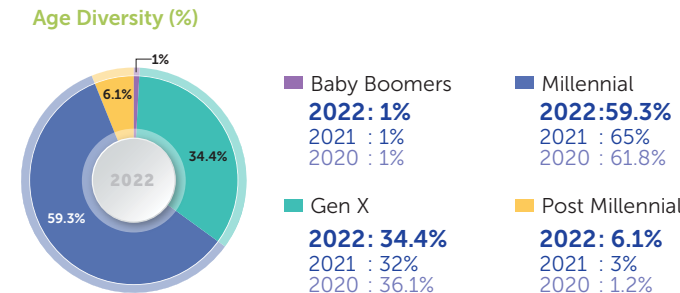
### Nationality



### Disability



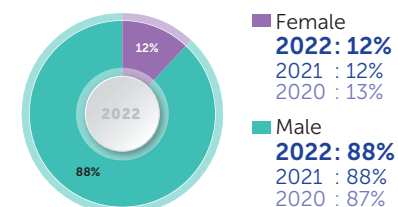
### Age Diversity



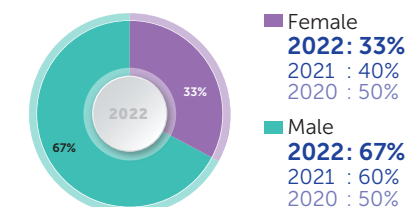
Note: Baby Boomers (1965 and before), Gen X (1966 - 1979), Millennials (1980 - 1994) and Post Millennials (1995 and after).

### Workforce Diversity

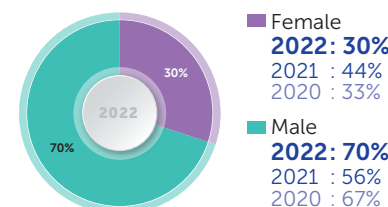
#### Distribution by Gender (%)



#### Board of Directors (%)



#### Leadership Team (%)



# OUR SUSTAINABILITY PERFORMANCE

## CORPORATE SOCIAL RESPONSIBILITY

- Collaboration with the Social Security Organisation (PERKESO) to educate 60 local hawkers at Sungai Ular, Kuantan on the benefits of the Self-Employment Social Security Scheme (SKSPS).
- Distribution of food hampers under the *Sentuhan Kasih CNY 2022* initiative to selected families at Pasir Gudang in preparation for the Chinese New Year festivities.
- Contributions under the *Sentuhan Kasih Aidilfitri 2022* initiative to 700 families in the communities surrounding PGB's key operations during the fasting month.
- Rolled out of an educational programme by the PETRONAS Young Professionals Club for 40 students from the local community at Kemasik, Kemaman Terengganu.
- Collaboration with SK Kong-Kong Laut on Mangrove Rehabilitation and Conservation Programme for 100 students and 20 teachers.



## RECOGNISED FOR EXCELLENCE

PGB continues to receive a host of awards and accolades from prominent national and international organisations for our distinctive HSSE practices and initiatives, as well as the implementation of our Health, Safety and Environment Management System (HSEMS) in 2022. We are honoured and humbled by these achievements and resolve to maintain high benchmarks of excellence.

## Gas Processing

### MSOSH OSH Award 2022

Grand awards for GPK, GPS, TSET & UG

### PETRONAS Making Impossible Possible Awards & Convention (MIPAC) 2022

- GOLD Award (I AM OE Category) (The Green Team)
- TOP 3 Best Replication Award (EXCITE Team)
- Best Sustainability Award (The Green Team)
- OE Pushing Boundary Award (GPK)
- Best HSE Award (The Settler)
- SILVER Award (I AM OE Category) (The Settler)
- HSE Zero is Possible Award (UG)

### PETRONAS First Attempt In Learning F.A.I.L. Forum 3<sup>rd</sup> Edition 2022

- Most Contributing OPU's Based on Submission (PGB GPU)
- Fan Favourites (TOP 10)
- Best Practices From the Lesson Learnt (Past F.A.I.L Forum)
- Judges Selection (TOP 10)
- TOP 5 OPU for F.A.I.L Forum Best Supporters (PGB GPU)

### 2022 International Convention on Quality Control Circles (ICQCC) Jakarta, Indonesia

GOLD Award (Sudomo Quality Medal Awards) (EXCITE Team)

### NCOSH Award 2020/2021

One award for Storage Category (TSET)

### Chief Government Security Office (CGSO) Award

Anugerah Penarafan Bintang Sasaran Penting 2021 (GPS)



## Gas Transportation

### MSOSH OSH Award 2022

- Grand Award for Shah Alam RO
- Gold Merit for Segamat Operation Centre and Gurun RO

### PETRONAS Making Impossible Possible Awards & Convention (MIPAC) 2022

- Winners Champion League IDA Platinum – (DAS Team)
- Winners Champion League IDA Gold – (DAS Team)
- Winners Champion League IDA Silver – (iMIND Team)
- Top 6 Best OPU – (GTR)
- OE Pushing Boundaries Award – (GT)
- Top 5 Virtual Showcase – (DAS)
- Best Physical Booth – (Jerung Tengah Team)
- Top 20 Individual IDA

### PETRONAS First Attempt In Learning F.A.I.L. Forum 3<sup>rd</sup> Edition 2022

- Top 10 Judges' Selection – HIPO Incident at KP22 NPS 8 Butane PGU 1 Pipeline (PGB GTR - PCI)
- Top 10 Fans' Selection –
  - Pipeline Hot Tapping Operation Failure (PGB GTR - STHN OPN)
  - HIPO Incident at KP22 NPS 8 Butane PGU 1 Pipeline (PGB GTR - PCI)
  - SCS Station B Air Compressor K-003A Contactor Burnt (PGB GTR - STHN OPN)
- Top 5 Best Supporters (OPU/Assets) – PGB GTR
- Most Contributing OPU's Based on Submission – PGB GTR

## Regasification

### MSOSH OSH Award 2022

Grand Award for RGTSU and RGTP

### PETRONAS Making Impossible Possible Awards & Convention (MIPAC) 2022

- HSE Zero is Possible Award – RGTSU
- HSE Zero Is Possible Award – RGTP

### MiSHA\* National Excellence Awards on OSH Principle of Prevention (PoP) 2022

- Platinum Awards on Principle of Prevention - RGTSU
- Excellence Emergency Response Team Award - RGTSU

### PETRONAS First Attempt In Learning F.A.I.L. Forum 3<sup>rd</sup> Edition 2022

Top 10 Fans' Selection – Delay in Completion of Main LNG Truck Loading Facility (PGB HO & RGTP)

## Utilities

### PETRONAS Making Impossible Possible Awards & Convention (MIPAC) 2022

- SILVER Award (I AM OE Category) - The Settler
- Best HSE Award (The Settler Team)
- HSE Zero is Possible Award (UG)



# Who We Are

Malaysia's Leading Gas Infrastructure and Centralised Utilities company and one of the largest companies on the local exchange in terms of market capitalisation, with core businesses in Gas Processing, Gas Transportation, Regasification and Utilities

## Statement of Purpose

A Progressive Energy and Solutions Partner Enriching Lives for a Sustainable Future

## Shared Values



Loyalty



Integrity



Professionalism



Cohesiveness

## How We Differentiate Ourselves

Our Profitable and Balanced Business Portfolio



Our Integrated Gas Infrastructure and Utilities Facilities



Our Operational Excellence & Reliable Product Delivery at Competitive Cost



Our High-Performing People



## PETRONAS Cultural Beliefs



**Customer Focused**

I deliver solutions from the customer lens



**Innovate Now**

I challenge norms and push boundaries



**Be Enterprising**

I seek opportunities and make them happen



**Speak Up**

I express my views openly



**Courage to Act**

I take action to progress with pace

BUSINESS UNITS AND HIGHLIGHTS

# GAS PROCESSING

Process PETRONAS' upstream natural gas from offshore Peninsular Malaysia into salesgas, ethane, propane and butane

REVENUE  
RM **1.8** billion  
GROSS PROFIT  
RM **892** million

# GAS TRANSPORTATION

Transport salesgas, ethane, propane & butane to end-customers through Peninsular Gas Utilisation (PGU) pipeline network

REVENUE  
RM **1.2** billion  
GROSS PROFIT  
RM **564** million

# UTILITIES

Produce, market and supply electricity, steam, industrial gases and other utility products to various petrochemical businesses and third parties in Kertih and Gebeng

REVENUE  
RM **1.8** billion  
GROSS PROFIT  
RM **141** million

# REGASIFICATION

Receive capacity users' imported Liquefied Natural Gas (LNG), store it in LNG Regasification Terminal Sungai Udang's (RGTSU) floating storage units and LNG Regasification Terminal Pengerang's (RGTP) storage tanks and convert the LNG to salesgas. Ancillary services offered include LNG Truck Loading facility at RGTP and LNG Reloading service at RGTSU & RGTP

REVENUE  
RM **1.4** billion  
GROSS PROFIT  
RM **751** million

**OUR PRESENCE**

**2**  
Gas Processing Complexes

**2**  
Utilities Complexes

**2**  
LNG Regasification Terminals

**2,623** KM  
Overall Pipeline Length

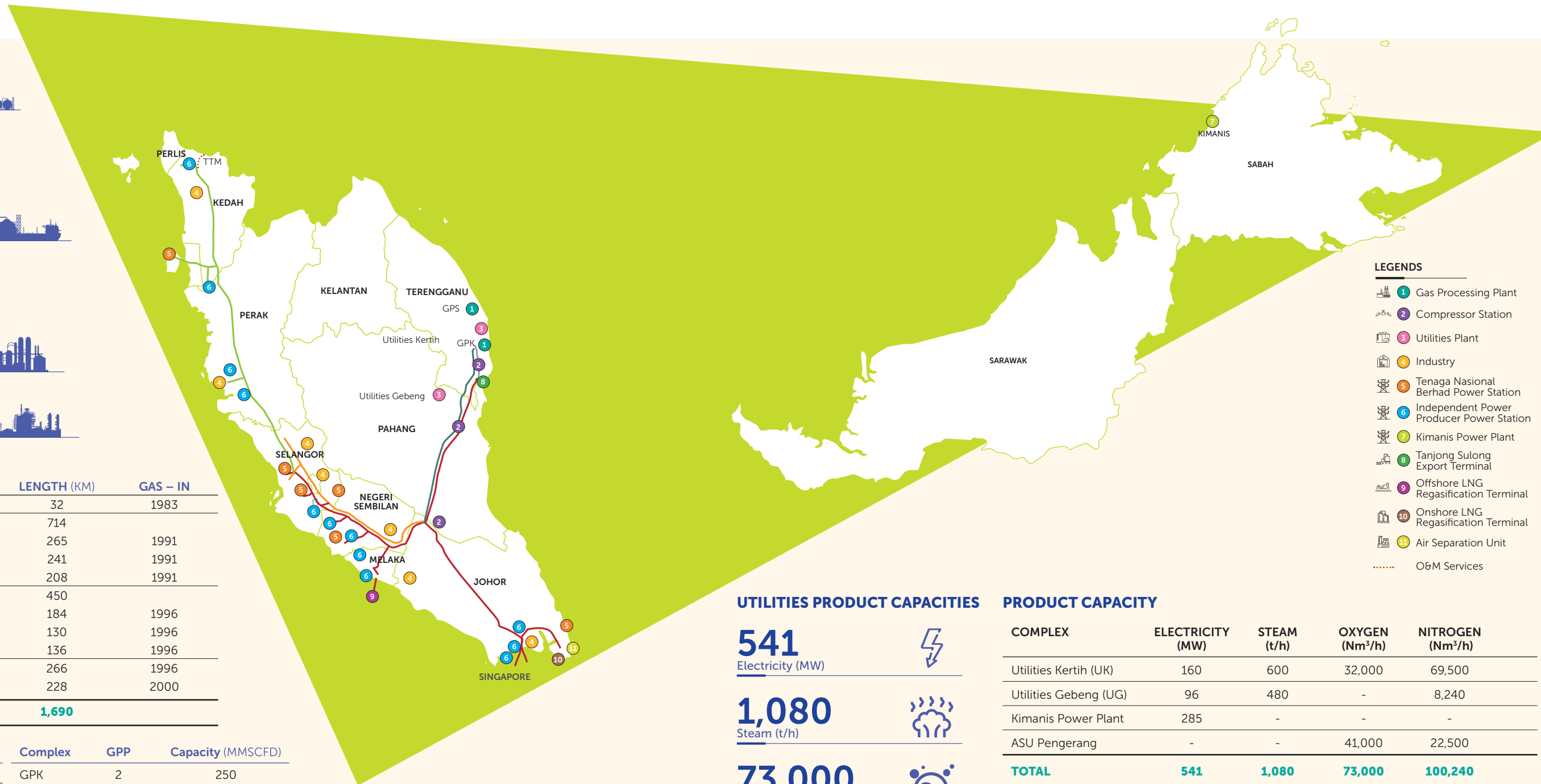
**1,750** MMSCFD  
Total Gas Processing Capacity

**990** MMSCFD  
Total LNG Regasification Capacity

MAIN PGU PIPELINE	LENGTH (KM)	GAS – IN
PGU I : Kertih – Teluk Kalong	32	1983
PGU II	714	
Sector I : Teluk Kalong – Segamat	265	1991
Sector II : Segamat – Kapar	241	1991
Sector III : Segamat – Plentong	208	1991
PGU III	450	
Sector I : Meru – Lumut	184	1996
Sector II : Lumut – Gurun	130	1996
Sector III : Gurun – Pauh	136	1996
Loop 1 : Kertih – Segamat	266	1996
Loop 2 : Segamat – Meru	228	2000

**Total** **1,690**

OVERALL PIPELINE	LENGTH (KM)	Complex	GPP	Capacity (MMSCFD)
Main PGU	1,690	GPK	2	250
Lateral	458		3	250
Liquid	373		4	250
Sungai Udang	30	GPS	5	500
Pengerang	72		6	500
<b>Total</b>	<b>2,623</b>	<b>Total</b>		<b>1,750</b>



- LEGENDS**
- 1 Gas Processing Plant
  - 2 Compressor Station
  - 3 Utilities Plant
  - 4 Industry
  - 5 Tenaga Nasional Berhad Power Station
  - 6 Independent Power Producer Power Station
  - 7 Kimanis Power Plant
  - 8 Tanjung Sulong Export Terminal
  - 9 Offshore LNG Regasification Terminal
  - 10 Onshore LNG Regasification Terminal
  - 11 Air Separation Unit
  - ..... O&M Services

**UTILITIES PRODUCT CAPACITIES**

**541**  
Electricity (MW)



**1,080**  
Steam (t/h)



**73,000**  
Oxygen (Nm<sup>3</sup>/h)



**100,240**  
Nitrogen (Nm<sup>3</sup>/h)

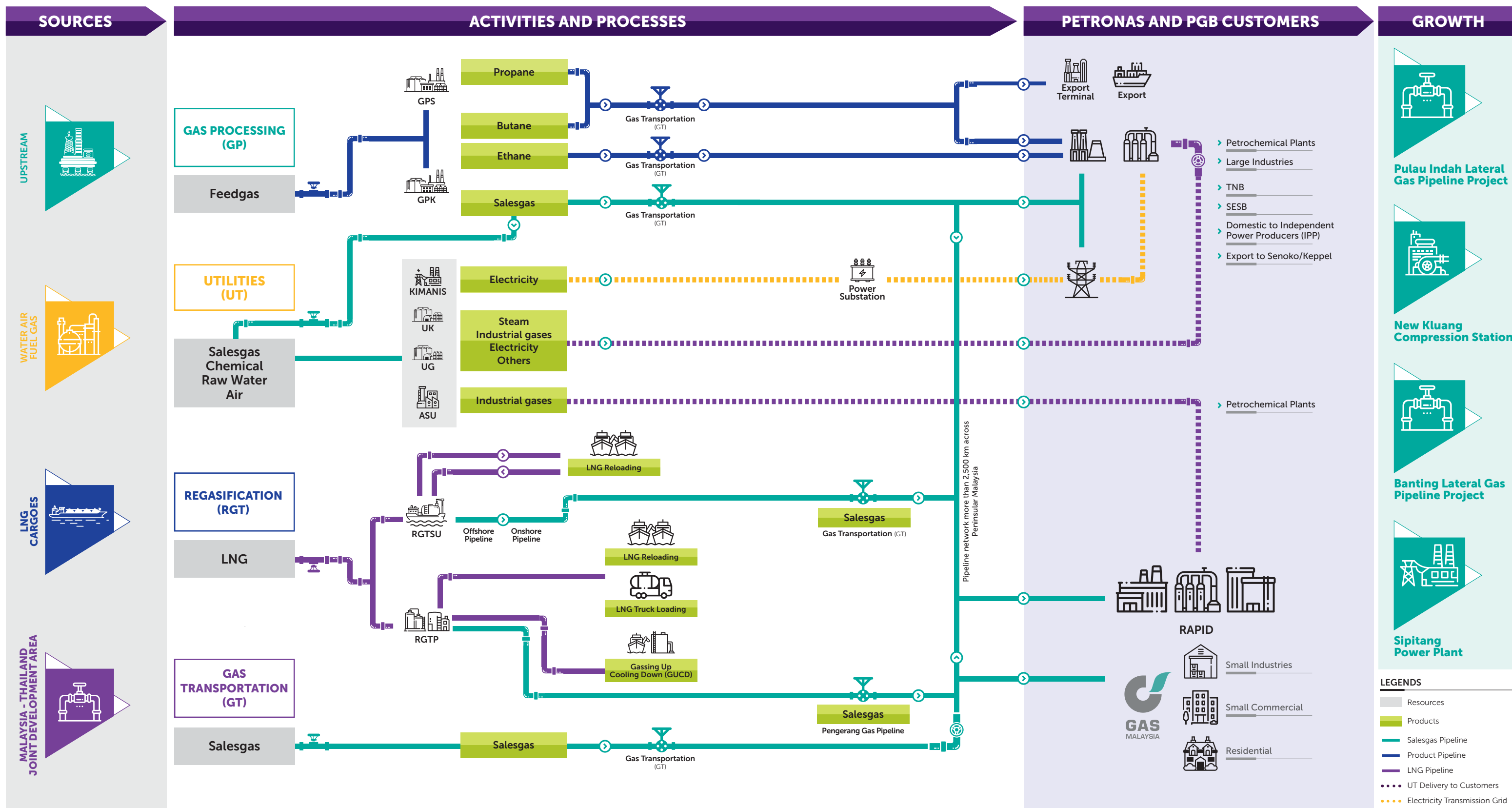


**PRODUCT CAPACITY**

COMPLEX	ELECTRICITY (MW)	STEAM (t/h)	OXYGEN (Nm <sup>3</sup> /h)	NITROGEN (Nm <sup>3</sup> /h)
Utilities Kertih (UK)	160	600	32,000	69,500
Utilities Gebeng (UG)	96	480	-	8,240
Kimanis Power Plant	285	-	-	-
ASU Pengerang	-	-	41,000	22,500
<b>TOTAL</b>	<b>541</b>	<b>1,080</b>	<b>73,000</b>	<b>100,240</b>

LNG REGASIFICATION TERMINAL	CAPACITY (MMSCFD)	OPERATIONS & MAINTENANCE (O&M) SERVICES
Sungai Udang, Melaka	500	Trans Thai-Malaysia (M) Sdn. Bhd. (TTM)
Pengerang, Johor	490	

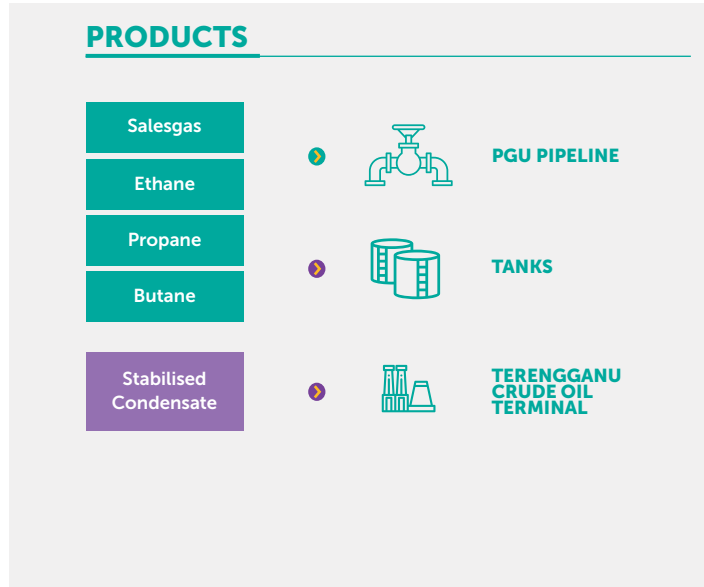
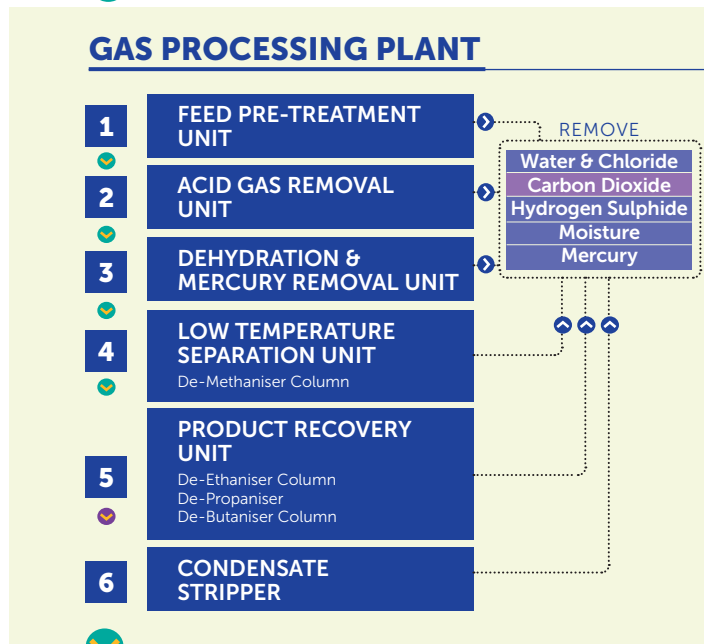
# OUR GROUP BUSINESS ACTIVITIES AND PROCESSES



# OUR GROUP BUSINESS ACTIVITIES AND PROCESSES

**RESOURCES\***

**FEEDGAS FEED LIQUID**

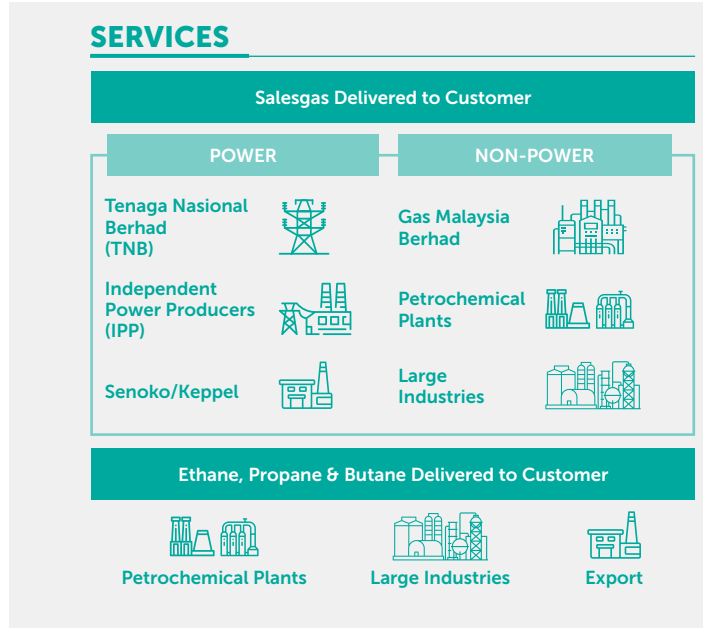
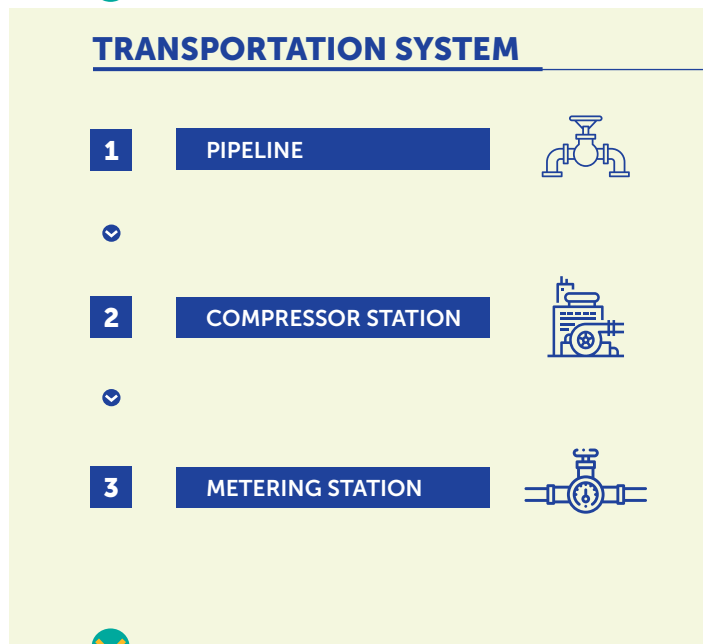


Gas Liquid  
Product By-Product Contaminants

\*Resources and products belong to customer

**RESOURCES\***

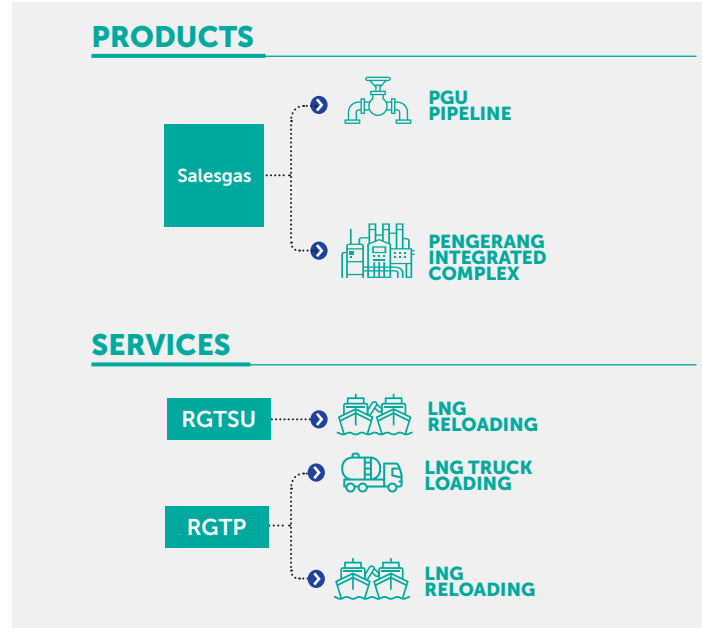
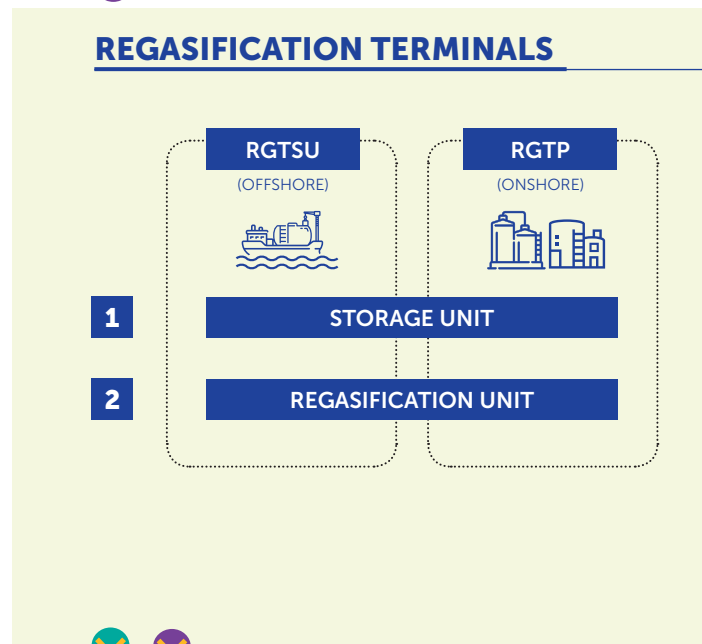
SALESGAS from:  
**GAS PROCESSING PLANTS**  
**LNG REGASIFICATION TERMINALS**  
**MALAYSIA-THAILAND JOINT DEVELOPMENT AREA**



\*Resources and products belong to customer

**RESOURCES\***

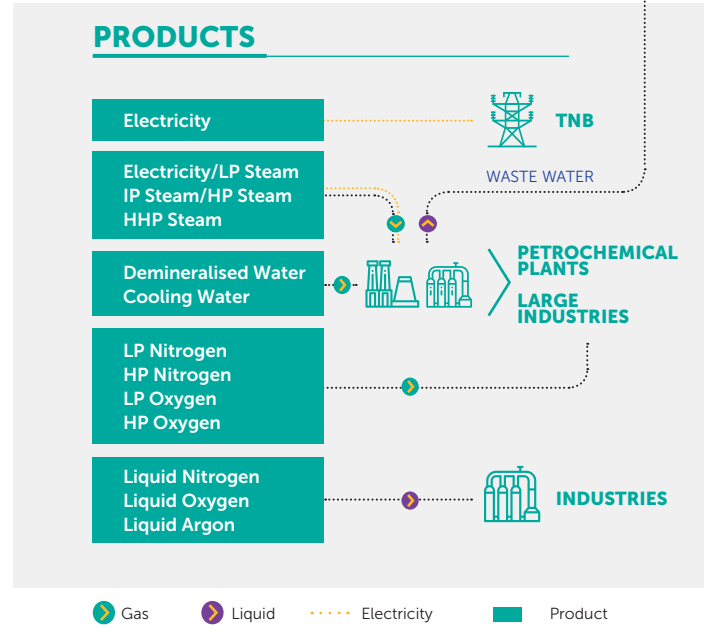
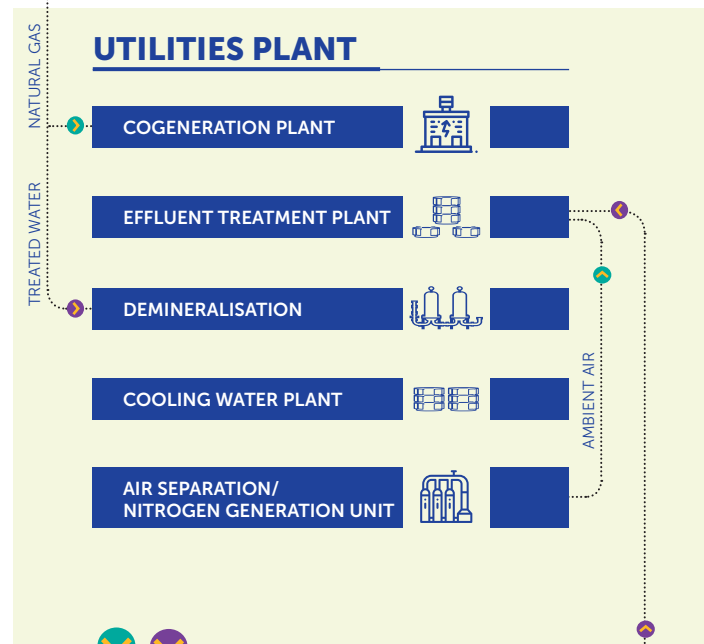
**LIQUIFIED NATURAL GAS**



\*Resources and products belong to customer

**RESOURCES**

**WATER**  
**AIR**  
**FUEL GAS**



Gas Liquid Electricity Product

ABBREVIATION HHP : High High Pressure HP : High Pressure LP : Low Pressure IP : Intermediate Pressure



**DETERMINING OUR MATERIAL MATTERS**

PGB's Material Matters have the most significant impact on our ability to create sustainable value. They influence how the Board and the Leadership Team steer the Group. Our sustainability materiality assessment cycle is based on a periodic assessment which is presented on various management platforms prior to obtaining approval from the Board.

**Material Matters Identification Process:**

**Identify**

We conduct relevant research to analyse our business context, consider our operating environment and the resources we rely on, as well as obtain feedback from our stakeholders (internal and external) to assess matters that are of financial, reputational, operational, environmental, social, strategic or legislative significance. We pinpoint and discuss our risks and opportunities for each component based on this.

**Prioritise**

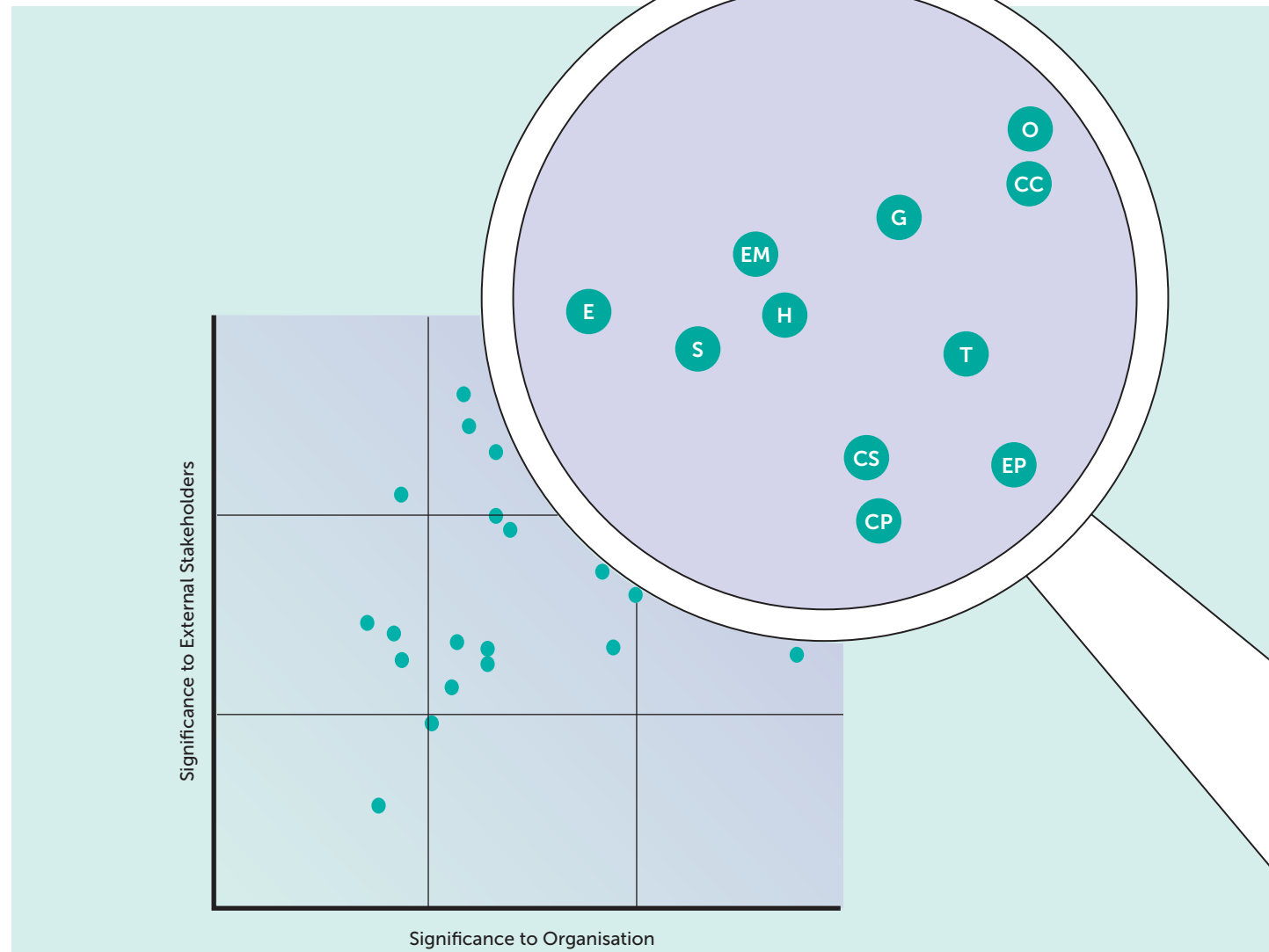
We prioritise Material Matters that influence our ability to create sustained value in the short, medium and long-term, using the outcome of our analysis as well as major risks and opportunities identified.

**Integration**

We integrate our Material Matters into our strategy. We also track our performance against this strategy using clearly identified, strategic focus areas and key performance indicators (KPIs) that are cascaded down and monitored across the organisation.





















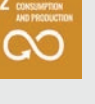

**Material Matters Matrix**



LEGEND

<b>Economic</b>	<b>Social</b>	<b>Governance</b>
<b>EP</b> Economic Performance	<b>E</b> Equal Opportunity, Diversity & Inclusion	<b>G</b> Governance and Business Ethics
<b>Environment</b>	<b>T</b> Talent Management - Human Capital Development - Talent Attraction and Retention	<b>CP</b> Customer Privacy
<b>CC</b> Climate Change - Greenhouse Gas Emissions - Energy Use - Climate Adaption, Resilience and Transition	<b>H</b> Human Rights - Forced and Compulsory Labor - Child Labor	<b>CS</b> Cyber Security
<b>EM</b> Environmental Management - Air Emission Management - Effluent Management - Waste Management	<b>S</b> Suppliers Social Impact	
	<b>O</b> Occupational Health and Safety	

MATERIAL MATTERS	RISK DESCRIPTION	MITIGATION OPPORTUNITIES	SDGs
 <b>Climate Change</b>	<ul style="list-style-type: none"> <li>▶ Continuous emissions from business operations through various actions such as combustion, flaring and venting.</li> <li>▶ Inefficient energy consumption.</li> <li>▶ Failure to adapt to climate change expectations impacting business operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Improvements to energy efficiency in operations.</li> <li>▶ Implementation of renewable energy solutions.</li> <li>▶ Exploration of step out opportunities such as Carbon Capture and Storage (CCS), waste to resource, waste to energy, and cold energy optimisation.</li> </ul>	   
 <b>Environmental Management</b>	<ul style="list-style-type: none"> <li>▶ Breaches of environmental laws, regulations and licenses resulting in reputational impact and disruption to operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Enhancements to facilities performance in full compliance with environmental requirements.</li> </ul>	  
 <b>Equal Opportunity, Diversity &amp; Inclusion</b>	<ul style="list-style-type: none"> <li>▶ Insufficient pool of competent and capable talents to drive value in growth and core businesses.</li> <li>▶ Unhealthy and non-progressive workplace impacting day-to-day business operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Robust talent management strategies and plans to produce a capable and continuous pipeline of talent.</li> <li>▶ Inculcation of progressive and diverse perspectives and ways of thinking/working.</li> </ul>	
 <b>Talent Management</b>	<ul style="list-style-type: none"> <li>▶ Insufficient pool of competent and capable talent to drive value in growth and core businesses.</li> <li>▶ Unhealthy and non-progressive workplace impacting day-to-day business operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Robust talent management strategies and plans to produce a capable and continuous pipeline of talent.</li> <li>▶ Inculcation of progressive and diverse perspectives and ways of thinking/working.</li> </ul>	
 <b>Human Rights</b>	<ul style="list-style-type: none"> <li>▶ Hiring of forced labour by hiring services and contractors within the supply chain which impacts company reputation.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Enhancements to the labour hiring process and guidelines.</li> </ul>	 
 <b>Suppliers Social Impact</b>	<ul style="list-style-type: none"> <li>▶ Ineffective manpower management impacting business and plant operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Support of the surrounding community for better opportunities.</li> </ul>	 

MATERIAL MATTERS	RISK DESCRIPTION	MITIGATION OPPORTUNITIES	SDGs
 <b>Occupational Health and Safety</b>	<ul style="list-style-type: none"> <li>▶ Unsustainable HSSE performance, resulting in business, operational and reputational impact.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Inculcation of a behavioural safety culture with commitment from all staffs, leading to increased operational reliability and efficiency.</li> </ul>	  
 <b>Governance and Business Ethics</b>	<ul style="list-style-type: none"> <li>▶ Impact on company reputation via misconduct, lack of integrity and corruption.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Strengthening employees' understanding on integrity and introducing guidelines related to business performance and operations at all sites.</li> <li>▶ Improvements to integrity programmes</li> </ul>	 
 <b>Customer Privacy</b>	<ul style="list-style-type: none"> <li>▶ Exposure to operating system failure and data leakage due to ineffective cyber security measures.</li> <li>▶ Leakage of customer information to other parties thereby disrupting business operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Implementation of the Cyber Security Strategy and Deployment Programme.</li> </ul>	 
 <b>Cyber Security</b>	<ul style="list-style-type: none"> <li>▶ Exposure to operating system failure and data leakage due to ineffective cyber security measures.</li> <li>▶ Leakage of customer information to other parties thereby disrupting business operations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Implementation of the Cyber Security Strategy and Deployment Programme.</li> </ul>	 
 <b>Economic Performance</b>	<ul style="list-style-type: none"> <li>▶ Inability to secure and deliver growth projects effectively.</li> <li>▶ Unsustainable profitability from the utilities business.</li> <li>▶ Inability to achieve reasonable tariffs for the regulated business.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Potential growth opportunities in core and adjacent plays to add further value to the business.</li> <li>▶ Potential growth opportunities in non-regulated areas, such as utilities, power and ancillary services.</li> </ul>	    

**Aligning to Sustainable Development Goals**

In producing this Report, we are guided by local and international statutory and reporting frameworks, particularly Bursa Malaysia Securities Berhad’s (Bursa Malaysia) Sustainability Reporting Guide (3<sup>rd</sup> Edition), the PETRONAS Corporate Sustainability Framework (PCSF), as well as the updated FTSE4Good Bursa Malaysia (F4GBM) Index ESG assessment indicators. We are also guided by the reporting requirements of organisations such as the International Petroleum Industry Environmental Conservation Association (IPIECA) and the Global Reporting Initiative (GRI).

PGB’s overall sustainability agenda also aligns with the United Nations’ 17 Sustainable Development Goals (SDGs) which serve as a “blueprint to achieve a better and more sustainable future for all” by 2030. Today, in line with the stance of the PETRONAS Group, we have adopted seven of the 17 SDGs that are most relevant to the PGB Group’s Sustainability Agenda and its Four Sustainability Lenses (namely Continued Value Creation, Safeguard the Environment, Positive Social Impact, and Responsible Governance).

These seven SDGs are spelt out below:

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

This focused alignment with the SDGs is helping us to better coordinate our support of the global sustainability agenda whilst strengthening our collaborative efforts with our stakeholders as we go about our business of creating sustainable value.

**UNSDG 3** : Good Health and Well-being

**UNSDG 4** : Quality Education

**UNSDG 7** : Affordable and Clean Energy

**UNSDG 8** : Decent Work and Economic Growth

**UNSDG 9** : Industry, Innovation and Infrastructure

**UNSDG 12** : Responsible Consumption and Production

**UNSDG 13** : Climate Action



**ENGAGING OUR STAKEHOLDERS**



Stakeholder engagement is integral to all that we do. Given that each community within our group of stakeholders has its own set of interests and expectations based on the way they are impacted by our company, we remain committed to engaging with them in more effective ways to better comprehend their needs and interests.

Today, we continue to keep our diverse stakeholders informed about our activities, results, and direction as well as gather input on their needs, focus areas, and expectations via our existing engagement platforms.

The list of stakeholder groups provided in this section identifies our key stakeholder groups, spells out why we engage with them and what we offer them, outlines their key concerns and our responses, as well as pinpoints the specific engagement channels and our frequency of engagement with them.

**Frequency**

W Weekly      M Monthly      Q Quarterly      Y Yearly



**INVESTORS AND FUNDING INSTITUTIONS**

**Why We Engage**

- Access to equity and debt funding
- Liquidity of our shares
- Fair rating of our shares
- Open dialogue to understand and address concerns

**What We Offer**

- Solid investment case
- Assurance that business activities and decisions are aligned to strategy in creating sustained value
- Assurance that sustainability and compliance with governance principles are considered and integrated into business practices
- Ability to sustain attractive return to shareholders

**Key Concerns**

- Impact of elevated energy prices, foreign exchange and Prosperity Tax on our business
- Progress of growth initiatives
- Prospect of Incentive-Based Regulation for Regulatory Period 2 (RP2)
- Continued shareholders’ return
- Sustainability practices and disclosure

**Response**

- Guided disclosures on company strategy and growth initiatives
- Issuance of quarterly results announcements, quarterly analyst briefings and press statements
- Continuous engagement with all relevant stakeholders
- Timely response to queries and shareholders’ feedback
- Disclosure of sustainability and governance practices in annual report, company presentations and website

**Channel and Frequency of Engagement**

Annual General Meeting	Y
Analyst briefings	Q
Investor conferences and roadshows	Y
One-on-one meetings	W
Site visit	Y
Website	Q



**CUSTOMERS**

**Why We Engage**

- Present a superior offering that reflects our operational and commercial excellence
- Extension of contracts
- Secure new contracts

**What We Offer**

- Reliable product delivery at competitive cost
- Quality product offering

**Key Concerns**

- Delivery of high quality products and services in a timely manner
- Competitive product offering

**Response**

- Close integration along the value chain to ensure reliability and PDR
- Increased offering of customer centric-solutions for both products and prices
- Increased customer engagement and visits
- Increased marketing activities and outreach to customers

**Channel and Frequency of Engagement**

- Annual customer experience survey **Y**
- Customer visits **Q**
- Industry conferences, forums and events **Y**
- One-on-one meetings **W**



**BUSINESS PARTNERS**

**Why We Engage**

- Foster and maintain good business relationship

**What We Offer**

- Mutually beneficial partnerships
- Support in business operations

**Key Concerns**

- Performance and returns of business ventures
- Opportunity for growth and value creation
- Sustaining long term partnership
- Regulatory compliance

**Response**

- Assimilation of operational and commercial excellence to drive performance
- Identification of potential business opportunities
- Mutual secondment of staff
- Focused effort on managing existing and potential partners

**Channel and Frequency of Engagement**

- Board meetings **Q**
- Management committee meetings **M**
- Strategic dialogues, conferences, forums and events **Y**
- One-on-one meetings **W**



**SUPPLIERS AND VENDORS**

**Why We Engage**

- Delivery of goods and services aligned to PETRONAS and PGB value

**What We Offer**

- Opportunities and partnerships that assist in growing their business

**Key Concerns**

- Fair and seamless business transactions

**Response**

- Leverage on PETRONAS Group Procurement and Financial Services' relevant policies and procedures
- Close engagements to maintain reliable supply chain

**Channel and Frequency of Engagement**

- Contractor Engagement and Clinic **Y**
- Toolbox sessions **W**
- Project sponsor meetings **Q**
- HSSE Contractor Improvement Programme **W**



**EMPLOYEES AND UNIONS**

**Why We Engage**

- Encourage employees to make valuable contributions in delivering business strategy
- Identify and fill skills gap in order to nurture and develop future talent with us

**What We Offer**

- A work environment that promotes sustainability
- Opportunities for learning, development and growth
- Opportunity to make valuable contributions and achieve personal fulfilment and satisfaction

**Key Concerns**

- Staff physical and mental well-being
- Conducive and inclusive working environment

**Response**

- Flexibility in working arrangements post MCO
- Provide physical and mental health-related support
- Structured leadership development framework
- Communication programmes to encourage staff to embrace Diversity and Inclusion in the workplace

**Channel and Frequency of Engagement**

- PGB townhall **Y**
- Union engagement and activities **Q**
- Engagement with employees **M**
- Intranet and internal newsletters **M**

**Frequency**

**W** Weekly      **M** Monthly      **Q** Quarterly      **Y** Yearly

**Frequency**

**W** Weekly      **M** Monthly      **Q** Quarterly      **Y** Yearly



**GOVERNMENT AGENCIES & AUTHORITIES**

**Why We Engage**

- Establish PGB's role in delivering sustainable energy for the nation
- Be a consultative partner in defining the role of gas in the energy market

**What We Offer**

- Extensive gas delivery network in Peninsular Malaysia
- Cleanest fossil fuel energy from cogeneration plants
- Safe, reliable and efficient operations across all facilities

**Key Concerns**

- Gas supply, security and reliability
- Economic impact to consumers
- Regulatory compliance
- Health and safety of PGB operations and impact to surrounding communities
- Integrity and ethical business practice

**Response**

- Formal and informal engagements
- Joint emergency response exercises
- Familiarisation visit to PGB facilities
- Regular reporting to government agencies

**Channel and Frequency of Engagement**

Engagement programmes	Q
Consultative sessions	Y



**COMMUNITIES**

**Why We Engage**

- Increase communities' understanding of PGB's business and operations
- Maintain positive image of the company

**What We Offer**

- Education and social support
- Environmental protection and biodiversity preservation

**Key Concerns**

- Health and safety of PGB operations and impact to surrounding communities
- Education and social support
- Environmental protection and biodiversity preservation

**Response**

- Implementation of Corporate Social Responsibility (CSR) programmes in the areas of education, environment and social support:
  - Back-to-school programmes
  - 'Sayangi Sungai Lato' mangrove planting programme
- Sponsorships and donations
- Outreach programmes to foster good relationship with community

**Channel and Frequency of Engagement**

Corporate Social Responsibility (CSR) programmes	Q
Briefings and engagements with local communities	Q



**MEDIA**

**Why We Engage**

- Enable a key communication link between our business and our stakeholders
- Collaborate with the Media to circulate vital information that impacts our corporate brand and reputation

**What We Offer**

- Transparency in information
- Regular engagement with PGB's LT

**Key Concerns**

- Business performance
- Environmental management and sustainability efforts
- New innovation and technology

**Response**

- Foster open and transparent communication with the Media
- Provide a speedy response to the Media's enquiries on business developments
- Organise rapport-building activities

**Channel and Frequency of Engagement**

Interviews with CIMB/Bursa Malaysia	Y
Quarterly Performance Press releases	Q
Press releases on Key Business update	Q



**Frequency**

W Weekly    M Monthly    Q Quarterly    Y Yearly

**Frequency**

W Weekly    M Monthly    Q Quarterly    Y Yearly

# OUR SUSTAINABILITY STRATEGY

# SUSTAINABILITY GOVERNANCE AT PGB

## DEVELOPING OUR SUSTAINABILITY BLUEPRINT

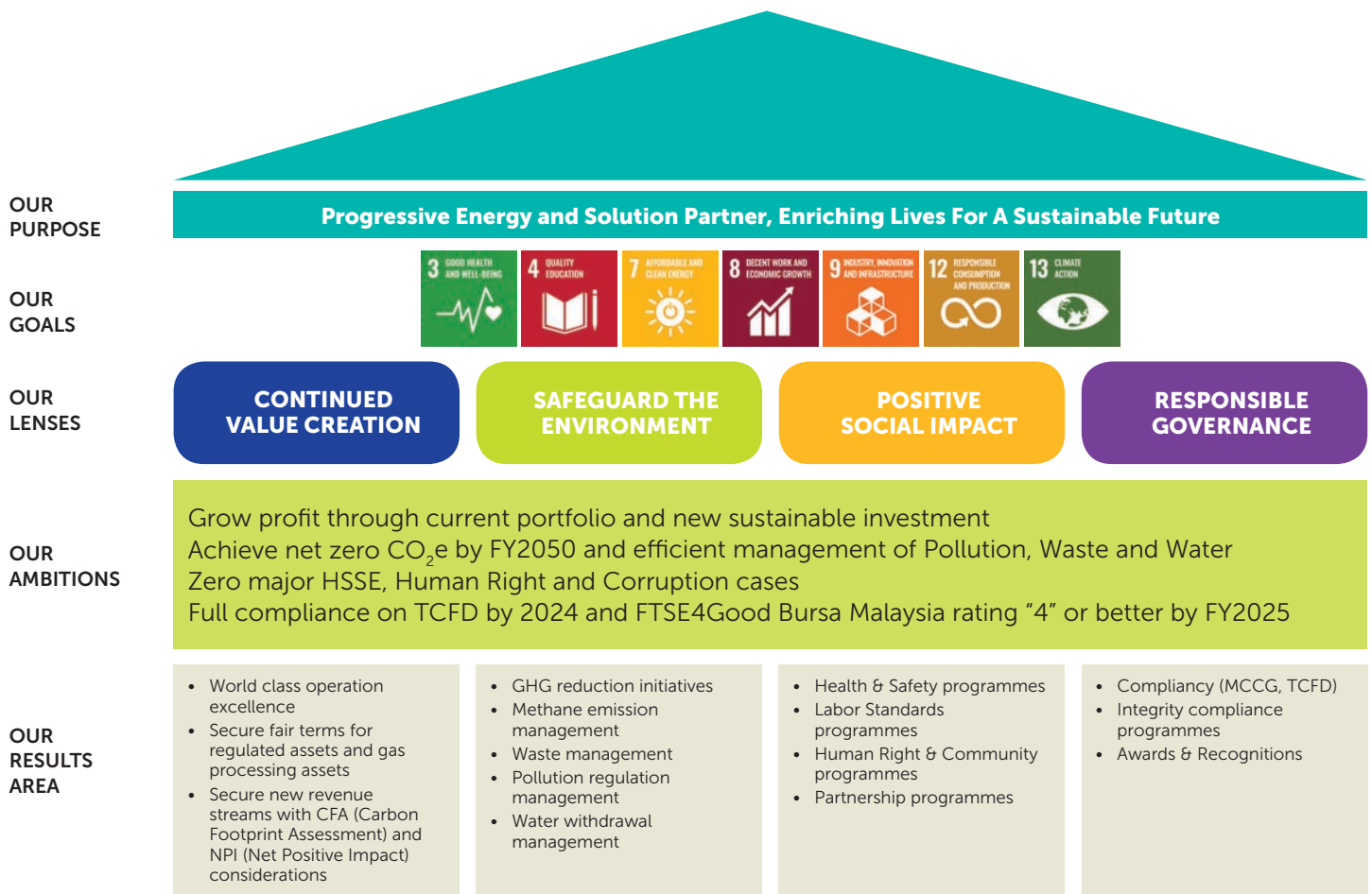
As per our commitment in PGB's Sustainability Report 2021, we have gone on to establish a Sustainability Blueprint which covers sustainability goals, lenses, ambitions, result areas, initiatives, and targets. All of these are aligned with and support PETRONAS's Statement of Purpose, "A progressive energy and solutions partner, enriching lives for a sustainable future".

We have also aligned these initiatives with international standards such as the United Nations Sustainability Development Goals (UN SDGs), GHG Protocol and Oil & Gas Methane Partnership (OGMP 2.0) Framework as well as the standards of the global rating agencies. On top of these, PGB's initiatives line up with PETRONAS' Net Zero Carbon Emissions by 2050 (NZCE 2050) pathway and PETRONAS' Sustainability Agenda.

PGB's Goals are aligned with seven of the SDGs adopted by PETRONAS, namely SDG#3, SDG#4, SDG#7, SDG#8, SDG#9, SDG#12 and SDG#13.

To ensure clear demarcation and objective execution of our sustainability endeavours, we have adopted the Four Sustainability Lenses as stated in the PETRONAS Sustainability Development Guidelines i.e., Continued Value Creation, Safeguard the Environment, Positive Social Impact and Responsible Governance.

### The PGB Sustainability Blueprint



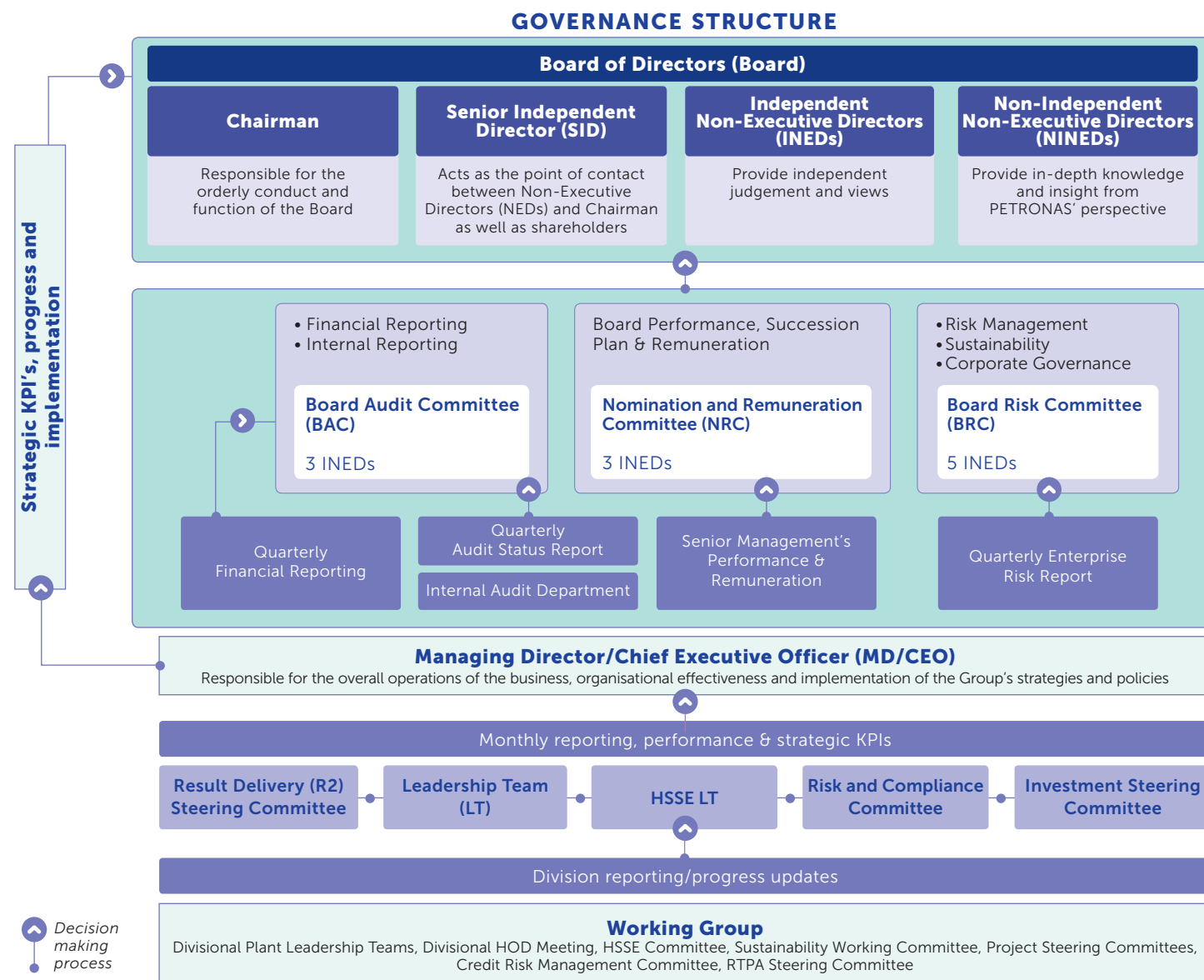
PGB's leadership acknowledges that a robust sustainability framework is indispensable for the Group's businesses as it has material impact on our business strategy and performance as well as our ability to create long-term value. As such, the LT is ensuring focused sustainable practices and initiatives are being brought into play to bolster our business framework. This is all the more important amidst the existing and emerging headwinds of the ever-evolving market environment.



# SUSTAINABILITY GOVERNANCE AT PGB

## SUSTAINABILITY DEVELOPMENT GOVERNANCE STRUCTURE

PGB's Board Risk Committee (BRC) was established in the second quarter of 2021, followed by the establishment of the Sustainability Working Committee which is led by the HSE & Sustainability Department Head. Today, the BRC and Sustainability Working Committee are responsible for overseeing sustainability governance at PGB. Together, they are to weigh up the Group's sustainability considerations and ascertain that all sustainability strategies, priorities and targets, as well as the performance against these targets, are communicated to internal and external stakeholders in a transparent manner. In the first quarter of 2022, the BRC agreed to appoint a PGB Sustainability Focal Person to serve in an advisory role on PGB's overall sustainability development activities.

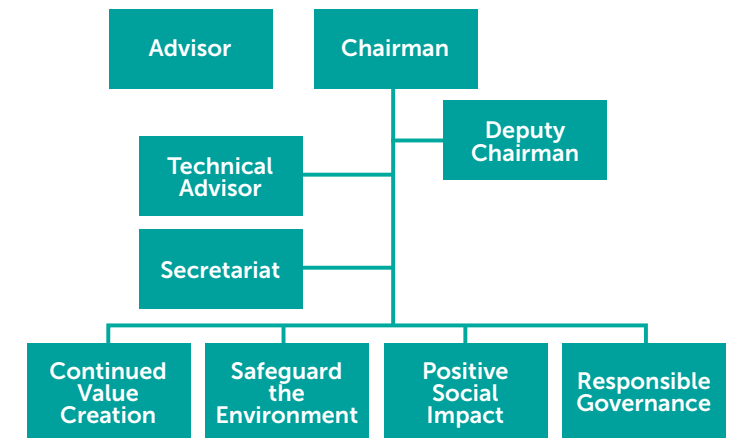


The Terms of Reference (TOR) of the BRC spell out the BRC's responsibilities in the areas of risk management and sustainability. These TOR can be found on the PGB corporate website.

## PGB Sustainability Working Committee

PGB's Sustainability Working Committee is tasked with keeping a keen eye on the execution of approved sustainability initiatives under the Sustainability Blueprint by leveraging on sustainability governance mechanism and best practices. In ensuring that sustainability consideration are factored in across all our products and services, the committee holds monthly meetings to ensure sustainability is embedded into our value creation activities and ESG goals.

The structure as well as roles and responsibilities of PGB's Sustainability Working Committee are outlined below. Any deliberation on sustainability stewardship by the management is done through PGB RCC, as chaired by the MD/CEO, with members comprising representatives from all the functions across the business units.



ROLES	RESPONSIBILITIES OF COMMITTEE MEMBERS
<b>Advisor (Designated Focal Person)</b>	<ul style="list-style-type: none"> <li>Provide high level advice and direction to steer sustainability across PGB's businesses.</li> <li>Provide the relevant links and network to foster sustainability development within PGB.</li> <li>Serve as the chief sustainability communication liaison with PGB's Board of Directors.</li> </ul>
<b>Chairman</b>	<ul style="list-style-type: none"> <li>Orchestrate and determine the best approach for PGB's sustainability in term of business strategy, implementation resource, communication to stakeholders, timelines, and schedules.</li> <li>Provide oversight for the smooth planning and implementation of all sustainability commitments.</li> <li>Chair working committee meetings and provide direction on PGB's sustainability development.</li> <li>Ensure PGB's Sustainability milestones and objectives are met.</li> </ul>
<b>Secretariat</b>	<ul style="list-style-type: none"> <li>Organise SWC activities as discussed and agreed upon during the sittings of the SWC.</li> <li>Provide logistics requirement for SWC activities.</li> <li>Capture all agreed upon action items and the way forward and share these with SWC members.</li> <li>Follow up on any actions to executed by identified parties as indicated by the SWC.</li> </ul>
<b>Technical Advisor</b>	<ul style="list-style-type: none"> <li>Advise on the technical requirements and standards for developing sustainability practices within PGB's operations.</li> <li>Provide technical perspectives on initiatives, gaps and Sustainability Lens metrics.</li> <li>Provide best practices from other OPU's or other SMEs to be embedded within PGB.</li> </ul>
<b>Lens Leader</b>	<ul style="list-style-type: none"> <li>Develop and embed sustainability practices in business and operation.</li> <li>Conduct gaps analyses and implement gaps closure.</li> <li>Liaise with relevant stakeholders whenever required.</li> <li>Ensure the appropriate resources are available to perform team duties.</li> <li>Ensure Sustainability Lens metrics and intents are met.</li> </ul>
<b>Lens Member</b>	<ul style="list-style-type: none"> <li>Support the Lens Leader in developing and embedding the respective sustainability practices within the asset.</li> <li>Act as a change agent within the asset/department.</li> <li>Identify gaps and propose suitable gap closure at each asset/department.</li> <li>Support the Lens Leader in liaising with the relevant stakeholders whenever required.</li> </ul>

## SUSTAINABILITY GOVERNANCE AT PGB

### Investment Steering Committee

PGB's Investment Steering Committee was established in 2021 and is helmed by the MD/CEO. This committee is responsible for looking into investment-related matters, investment strategies and investment decisions on a monthly basis. As part of the investment guidelines, consideration is to be given to sustainability metrics such as carbon emissions, among other factors, when evaluating investment opportunities in addition to commercial and financial parameters. This will ensure more effective decision-making during the investment deliberation process.

The well-defined sustainability governance structure that has been implemented throughout PGB aims to ensure that all decisions are made in an equitable and balanced manner for the long-term, sustainable growth of the Group.

### OPERATIONAL EXCELLENCE MANAGEMENT SYSTEM (OEMS)

As we pursue operational excellence, we are tapping into digitalisation, leading edge technologies and sophisticated facilities to deliver on our performance targets in a cost-effective manner while ensuring high productivity. To ensure operational excellence is implemented in a safe, reliable, and sustainable manner we continue to leverage our Operational Excellence Management System (OEMS) which incorporates a value-driven approach that delivers bespoke solutions to key operational areas.

Periodic assessments of the OEMS are performed and deliberated upon by the LT at the Management System Review to ensure continuous compliance with the PETRONAS Sustainable Management Guideline. In 2022, we performed a sustainability review to ensure our sustainability measures aligned with the PETRONAS Sustainable Management Guideline and the Group's globally-recognised framework. These findings support the ongoing development of PGB's ESG blueprint.

### SUBSCRIPTION TO STANDARDS AND CERTIFICATION

PGB subscribes to the ISO Occupational Health and Safety Assessment Series (OHSAS) 45001:2018 standard (relating to occupational health and safety) and the ISO EMS 14001:2004 standard (relating to environmental management).

### RISK MANAGEMENT AND SUSTAINABILITY

Being a key player in Malaysia's energy landscape, PGB is exposed to a variety of significant risks that can have an impact on our operations, prospects, future performance, financial position, liquidity, asset value, growth potential, sustainable development and reputation. To ensure that we continue creating, preserving and realising value, we are proactively leveraging an effective and comprehensive system of risk management and internal control to mitigate these significant risks. The details of our risk management and mitigation activities can be found in the Statement on Risk Management and Internal Control in our Governance and Financial Report.





# FOCUSED ON CONTINUED VALUE CREATION

To ensure PGB delivers value in a sustainable manner, we continue to steward our existing resources and pursue new opportunities. As we align with the PETRONAS Group's NZCE 2050 pathway and position ourselves to embrace a low-carbon energy future, we are confident of upholding our license to operate for the long term while remaining adaptable and relevant to the evolving marketplace.

## LONG-TERM CONTRACTS

Our customers are at the core of our business and are essential to our sustainable growth. To ensure their needs and expectations are met, we continue to create and deliver customer-centric solutions by way of superior quality products, services and technological solutions, as well as by improving the overall customer experience. All these elements support thriving mutual value creation.

Today, PGB's business continues to benefit from a variety of long-term contracts.

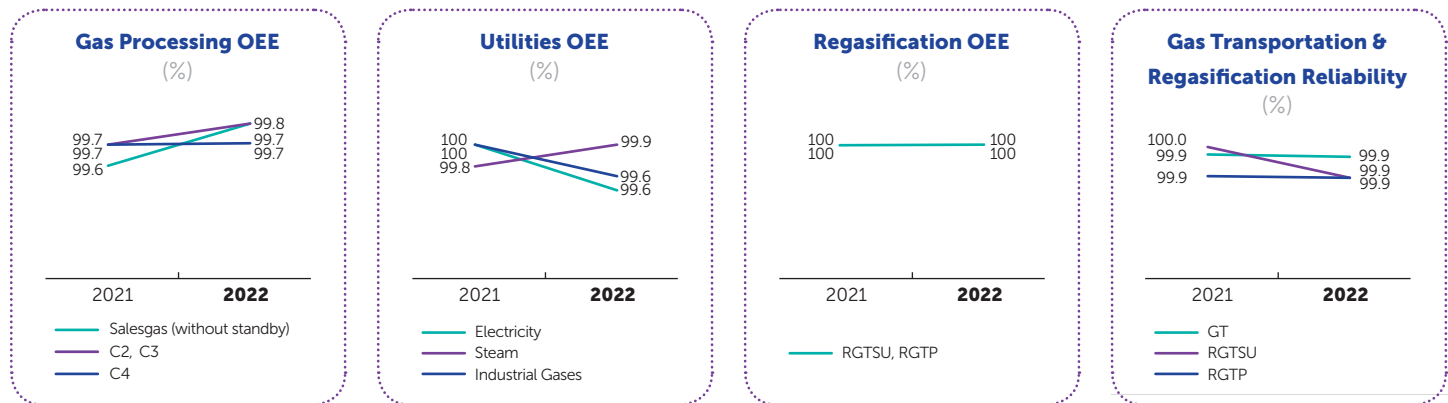
<p><b>Gas Processing Agreement</b> Parties: PETRONAS &amp; PGB Expiry: 31 December 2033</p> 	<p><b>Terminal Use Agreement (RGTSU)</b> Parties: PEGT &amp; RGTSU Expiry: 30 June 2033</p> 
<p><b>Gas Transportation Agreement</b> Parties: PEGT Expiry: 31 December 2033</p> 	<p><b>Terminal Use Agreement (RGTP)</b> Parties: PEGT &amp; PLNG2 Expiry: 31 October 2042</p> 
<p><b>Utilities Agreements</b> 5 contracts renewed in 2021 8 contracts renewed in 2022</p> 	

\*The cost of fuel gas is largely passed through to customers except for electricity

## OPERATIONAL EXCELLENCE

As we continued to leverage and manage our operational resources in an optimal manner throughout 2022, our efforts yielded solid returns. A peak Overall Equipment Effectiveness (OEE) rate on the Gas Processing, Utilities and Regasification fronts led to 100% Product Delivery Reliability (PDR) for our customers.

Indicator	Description	2018	2019	2020	2021	2022
Salesgas PDR (%)	Product delivered as per customers' nomination	100	100	100	100	100
Ethane PDR (%)		99.5	99.3	100	99.9	99.9
Electricity PDR (%)		100	99.9	100	100	100
Steam PDR (%)		100	99.8	100	100	100
Industrial Gases PDR (%)		98.9	97.2	100	100	99.8



**Notes:**  
**OEE** - A measure of plant performance against its limits and identified sources of loss within the plant and a measure of how well equipment is used when available. World-class performance benchmark for OEE is 95%.  
**Reliability** - A measure to determine the impact of unscheduled downtime on the availability of the plant. World-class performance benchmark for Reliability is 98%.

For details inside into PGB performance please refer to the performance scorecard section in PGB's IAR 2022 which is available on our website [www.petronas.com/pgb](http://www.petronas.com/pgb).

**EFFECTIVE PORTFOLIO MANAGEMENT**

In 2022, we continued to deliver on the Group’s growth agenda by making strong strides forward on the multi-pronged portfolio management front.

**1 EXPAND CURRENT BUSINESS IN LINE WITH DEMAND**

**New Kluang Compressor Station**

In December 2021, PGB awarded a RM359 million contract to Dialog E&C Sdn. Bhd. to increase the existing capacity in PGU II Sector 3 by up to 720mmscfd which will be able to cater 200mmscfd diversion to Pengerang Cogeneration Plant (PCP) and the potential new 116mmscfd demand at Sector 3. The project scope is inclusive of the installation of a new booster compressor at Kluang, Johor, and tie-in works on the existing pipeline. Engineering works have been completed and the overall project is expected to be completed by January 2024.

**Terengganu Crude Oil Terminal (TCOT) Off Gas Re-routing**

In September 2021, PGB awarded a RM154 million contract to Kejuruteraan QKS Sdn. Bhd. to re-route 22,000 kg/h of Terengganu Crude Oil Terminal (TCOT) off-gas from GPP1 LPGU to GPP2 and GPP3.

The TCOT off gas re-routing shall be realised via installation of new compression system to boost the off-gas pressure from TCOT facility to GPP2 and GPP3 pre-treatment units interchangeably or simultaneously depending on demand. The project is targeted for completion in December 2023.

**Pipeline Project in Banting, Selangor**

In 2022, PGB awarded a RM92 million contract to a consortium comprising Carimin Engineering Services Sdn Bhd and Drill Pipelines Constructions Sdn Bhd to extend a gas pipeline in Banting, Selangor. The project involves the construction of about 10 km of lateral pipeline and metering stations to supply natural gas to ND Paper Malaysia (Selangor), a paper making plant owned by China’s Nine Dragons Paper Ltd. To fund the cost of the project, PGB will utilise its existing Islamic financing facility. The project is targeted for completion in August 2023.

**2 PURSUE GROWTH LEVERAGING ON KEY COMPETENCIES**

**Power Plant Project in Sipitang, Sabah**

In 2022, PGB, via its subsidiary Sipitang Utilities Sdn. Bhd. entered into a joint venture with Kejuruteraan Asastera Bhd (KAB) to co-own and undertake a RM230 million power plant project in Sabah which will be the only energy supplier to PETRONAS’ nearshore floating liquified natural gas (FLNG) facility known as the ZLNG Project.

Upon completion of the power plant project in the first quarter of 2026, Sipitang Utilities Sdn. Bhd. will own the asset and enter into a 20-year concession power purchase agreement with the FLNG facility at Sipitang, Sabah. This joint venture, which is a significant development in the clean energy sector, showcases the respective companies’ capabilities in sustainable energy solutions.

**3 EXPLORE STEP OUT OPPORTUNITIES**

Potential collaboration with PETRONAS on CCS Project

**TOWARDS FUTURE VALUE CREATION**

As PGB ventures forth, we will continue to explore new pathways of opportunity on several fronts to ensure we deliver ongoing value creation opportunities.

Aside from the upcoming projects at Sipitang and Banting, PGB’s existing co-generation utilities assets at Kertih and Gebeng are capable of generating electricity at high levels of efficiency with lower amounts of fuel gas. As this energy is generated on-site, the load on the power network is minimised, and transmission line losses are prevented. We aim to make the most of our proven record of accomplishment in this area to encourage our customers to use energy in a more sustainable manner while reducing their carbon footprint.

We also envisage growth potential in the power sector as demand for gas rises. In line with the Malaysian Government’s plans to retire around 7GW of coal-fired capacity by 2039, financial providers have announced their commitment to phase out coal power plants from their portfolios. All these developments underscore the fact that gas power plants stand out as the clear solution for a clean and reliable energy supply for the nation. This opens up opportunities for PGB to both supply more gas and venture into the power generation business. The future augurs well for PGB in this area of opportunity as we have a strong competitive edge given our knowledge and expertise in running and maintaining the gas-fired power plant in Kimanis.

On top of this, PETRONAS has announced the creation of Gentari Sdn Bhd (GENTARI), its renewable energy arm. Gentari’s mandate is to deliver integrated net zero solutions that puts cleaner energy into action today, to transform how people live tomorrow. PGB will actively seek collaboration opportunities with Gentari, as part of our commitment to sustainable value creation.



# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## PRESERVING THE ENVIRONMENT



PGB remains committed to minimising the impact of our operations on the ecosystem. Through the application of innovative operating technologies, strategies and best practices to mitigate our carbon footprint and preserve the environment, we endeavour to build a legacy for existing and future generations.

### MITIGATING AND ADAPTING TO CLIMATE CHANGE

According to the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6), it is an undisputable fact that human activities lead to an increase in the global temperature, causing widespread and rapid changes in the climate across the globe. The impacts of climate change are expected to further intensify, leading to a variety of concerning climate change risks.

### ALIGNING WITH GLOBAL FRAMEWORKS AND GROUP POLICIES

In tackling these risks and in our quest to reduce greenhouse gas or GHG emissions, PGB is aligning with the relevant global emissions frameworks and standards. We are primarily guided by the Task-force on Climate-Related Financial Disclosures (TCFD) recommendations.

Integral to our GHG emissions mitigation efforts is our commitment to support the PETRONAS Group's Net Zero Carbon Emissions by 2050 or NZCE 2050 aspiration. This aspiration calls for the Group's companies to minimise the impact of their carbon footprint on existing and future operations as well as to employ more low carbon solution technologies. We are also aligning with PETRONAS' guidelines on carbon commitment, climate change as well as Energy and Loss Management System (ELMS) Charter in support of the Sustainability blueprint.

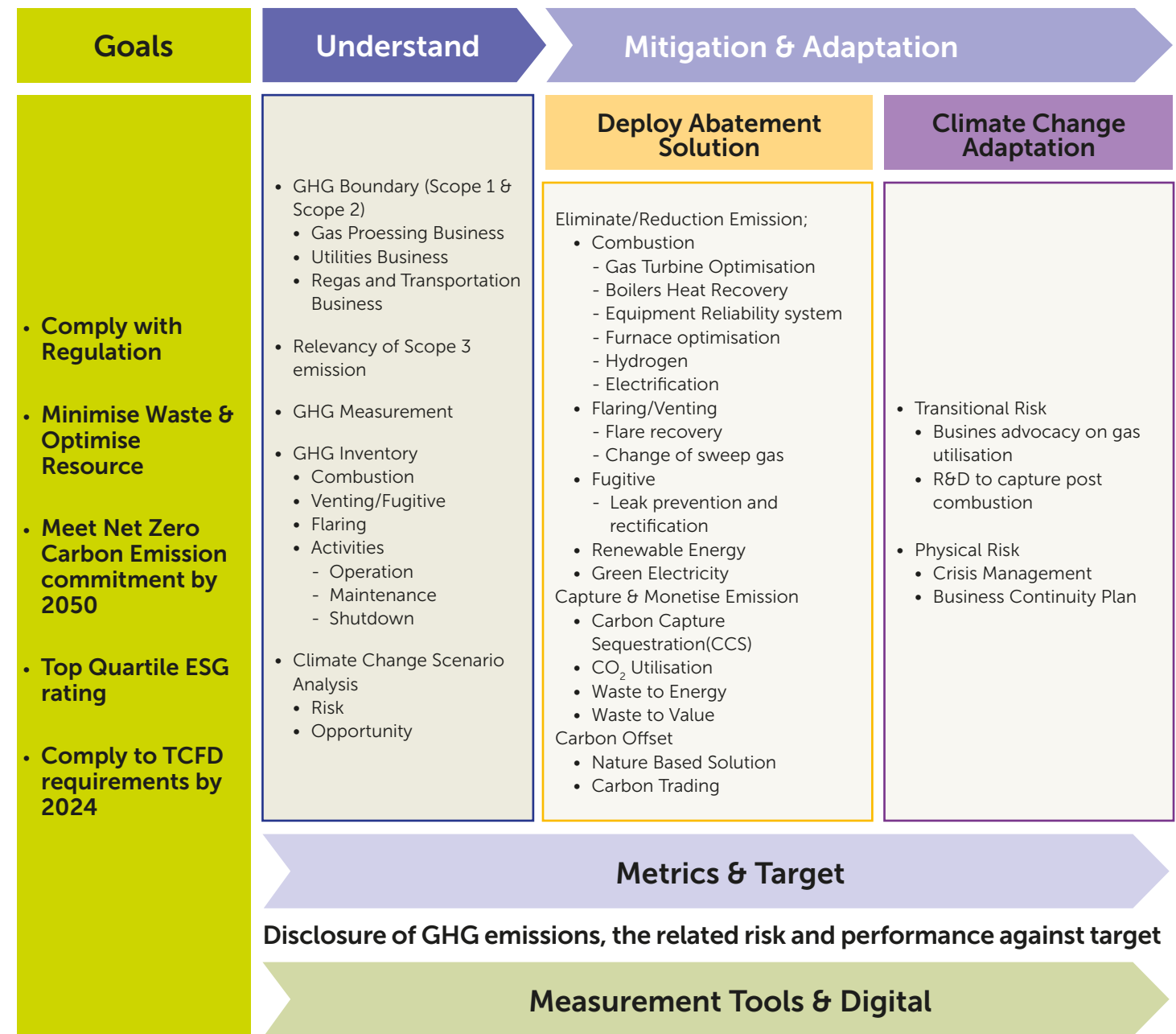
We are also tapping into the PETRONAS Group's membership in the World Business Council for Sustainable Development (WBCSD) to acquaint ourselves with the sustainability-related best practices of its member organisations. Given that membership of the WBCSD provides access to a like-minded network of peers focused on sustainably delivering energy to an expanding world population by leveraging on collaboration, technology and people, we anticipate fruitful outcomes.



### PGB Climate Change Risk Management Framework

We have also referred to the PETRONAS Climate Change Framework which consists of three integral components, namely Carbon Footprint, Mitigation and Adaptation, to develop the PGB Climate Change Risk Management Framework.

### PGB Climate Change Risk Management Framework



# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## The Overall Framework Approach

The PGB Climate Change Risk Management Framework aims to accord us clear goals, provide us a clear understanding of where we are in our carbon footprint and emissions journey, as well as pin down the associated risks and opportunities. The framework also outlines the mitigation and adaptation plans to address climate change as well as spells out how we are to disclose our performance against our targets. The framework not only covers climate change risk in our day-to-day operations but also considers the carbon pricing factor in our growth projects.

## Setting Focused Goals

Clarity in climate change goals is critical for providing clear direction on how PGB is to steer itself to achieve its NZCE 2050 aspiration. The framework outlines the following as far as these goals are concerned:

- i. PGB's focus has always been on compliance with laws and regulations which is a basic requirement for us to operate. To date, PGB has had a good track record of complying with emissions regulations reflecting zero occurrences of non-compliance or penalties being imposed since the 2000s;
- ii. The second focus is on enhancing operational efficiencies by implementing two key thrusts i.e., minimising waste and optimising energy consumption, as well as maximising low carbon power;
- iii. The third focus is on mitigating inherent and post-combustion emissions by exploring Carbon Capture & Storage (CCS) measures and any other emissions through netting, carbon offsetting and carbon trading activities;
- iv. To validate that we are on the right track, our key goals are to achieve a top quartile ESG rating and comply with TCFD requirements by 2024.



## Understanding the Requirements

As a responsible Gas Infrastructure and Utilities company, we continue to clearly define the boundaries, identify the sources, and validate the measurements relating to GHG emissions from our business operations. These encompass the operations at our gas processing (GPK, GPS and TSET), utilities (UK and UG), regasification (RGTSU and RGTP), and gas transportation facilities.

The GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'Scopes'. PGB's GHG emission baseline assessment covers Scope 1 and Scope 2. Scope 1 GHG emissions are from sources where the reporting company has operational control including over inherent CO<sub>2</sub>, while Scope 2 GHG emissions are indirect emissions resulting from the consumption of purchased energy from a third party.

We have undertaken the necessary measurements, made an inventory of the emissions throughout our facilities, and conducted an external verification in 2020 with a plan to repeat this every three years. The inventories comprise emissions from inherent CO<sub>2</sub> in our feedgas, combustion, venting, flaring, fugitive and purchased energy.

For methane emissions, it is observed that the quantum is relatively low as methane sources are only from factored-in emissions, planned maintenance, venting and fugitive emissions which are included as part of overall GHG emissions. As for Scope 3 GHG emissions, we plan to determine the relevancy of the 15 categories from Scope 3 GHG emissions in PGB's business within the boundaries mentioned above in the future.

In measuring emissions, PGB is utilising the latest technologies while keeping abreast with technological enhancements to measure and monitor emissions by using softwares and tools such as Leak Detect and Repair (LDAR), the Continuous Emissions Management System (CEMS), and the Predictive Emission Monitoring System (PEMS). We also plan to use a digital platform for real time monitoring and analysis of emissions.

Under this framework, we have, to date, set the goals for climate change and completed our understanding of the relevant boundaries, scope, measurement, and scenario analysis for climate change.

In charting PGB's journey towards NZCE 2050, following is the emissions baseline as at 2019:

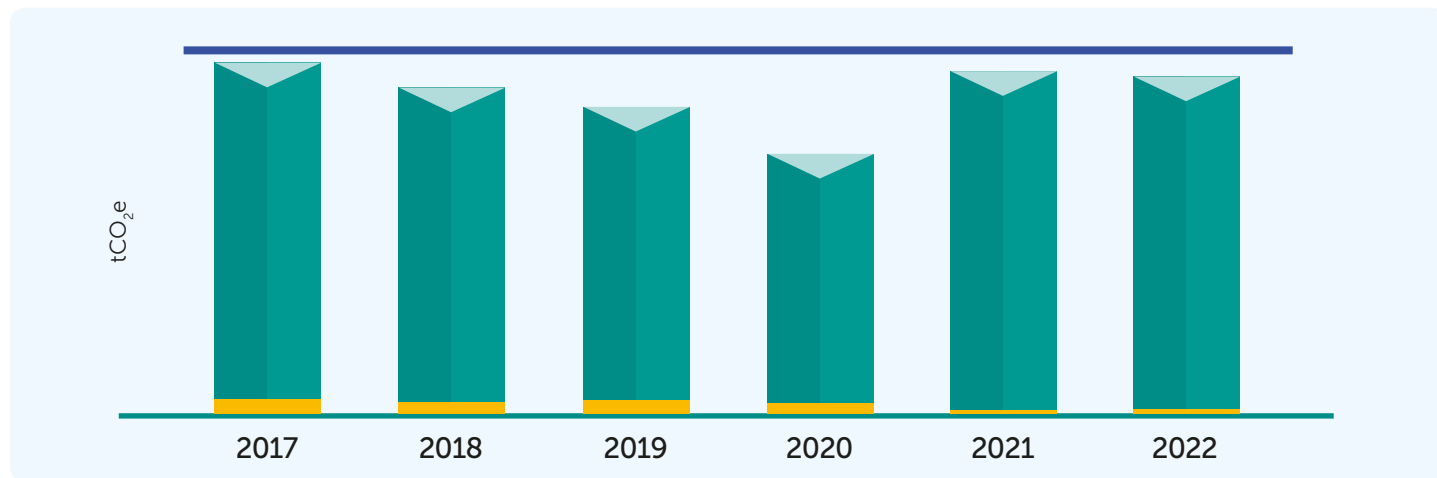
- GHG: 5.51 million tCO<sub>2</sub>e with export energy emission; and
- Methane: 3,024.51 tonnes (75 ktCO<sub>2</sub>e).

## GHG Emissions Initiatives and Performance Highlights

The PETRONAS Group has set in place a GHG emissions limit of 49.5 million metric tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) by 2024 for Scope 1 and 2 emissions. In relation to this, PGB has been assigned a target cap of 5 million tCO<sub>2</sub>e (based on the PETRONAS-wide boundary).

In line with our current emissions reduction efforts, we managed to maintain our emission within the limit set by PETRONAS thus far. Moving forward, to sustain the momentum, we continue and enhance our emission reduction efforts under Operational Excellence (OE) for Scope 1 and exploring renewable energy such as GET (Green Electricity Tariff) from TNB for Scope 2. On top of that we also participate in PETRONAS efforts of Enterprise Decarbonisation and Decarbonisation Hackathon initiatives. In 2022, PGB emitted a total of 4.70 million tCO<sub>2</sub>e (Scope 1 and Scope 2 combined) within the target cap of 5 million tCO<sub>2</sub>e (2021: 4.78 million tCO<sub>2</sub>e).

**PGB GHG Emissions**



	2017	2018	2019	2020	2021	2022
<b>Scope 1</b>	4,866,385	4,549,641	4,287,647	3,632,876	4,738,145	4,655,100
<b>Scope 2</b>	75,298	60,158	68,221	64,573	37,989	49,697
<b>Limit</b>	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000

**PGB GHG Emissions (without exported energy\*)**

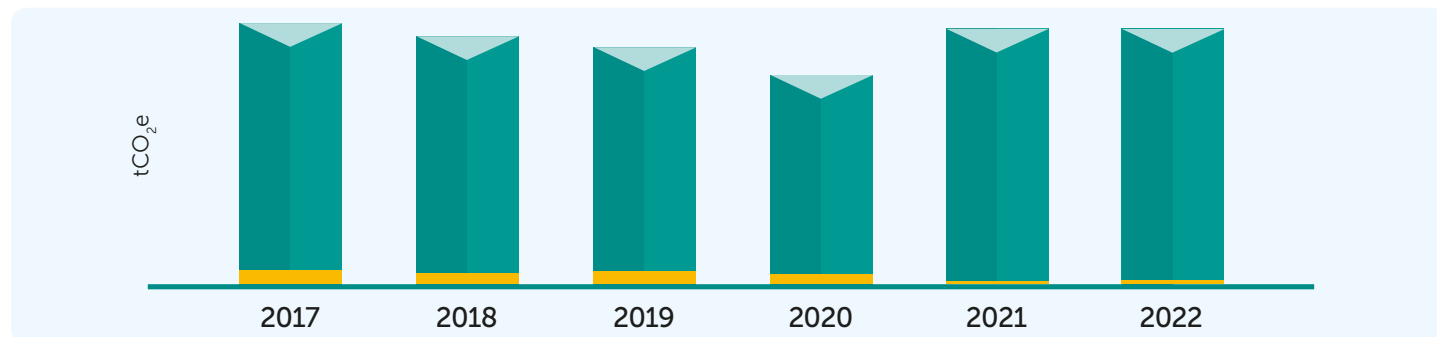
Indicator	Base (2019)	Limit/Target	2020	2021	2022
GHG Emissions	<b>4.36 million tCO<sub>2</sub>e</b>	<b>5.00 million tCO<sub>2</sub>e</b>	<b>3.70 million tCO<sub>2</sub>e</b>	<b>4.78 million tCO<sub>2</sub>e</b>	<b>4.70 million tCO<sub>2</sub>e</b>

\* Exported energy refers to energy (electricity and steam) sold to other PETRONAS subsidiaries.

The PGB GHG Emissions (Without Exported Energy) table portrays reduced GHG emissions amounting to 0.08 million tCO<sub>2</sub>e in 2022 against 2021's value on the back of successful efforts within PGB.

**Total PGB GHG Emissions**

(inclusive emissions from exported energy to other PETRONAS subsidiaries i.e electricity and steam)



	2017	2018	2019	2020	2021	2022
<b>Scope 1</b>	6,010,120	5,741,590	5,439,900	4,802,500	5,874,940	5,857,870
<b>Scope 2</b>	75,298	60,158	68,221	64,573	37,989	49,697

**PGB GHG Emissions (With Exported Energy)**

Indicator	Base (2019)	2020	2021	2022
GHG Emissions	<b>5.51 million tCO<sub>2</sub>e</b>	<b>4.87 million tCO<sub>2</sub>e</b>	<b>5.91 million tCO<sub>2</sub>e</b>	<b>5.91 million tCO<sub>2</sub>e</b>

The PGB GHG Emissions (With Exported Energy) table reflects that more exported energy was supplied to other PETRONAS OPUs to support their operational requirements.

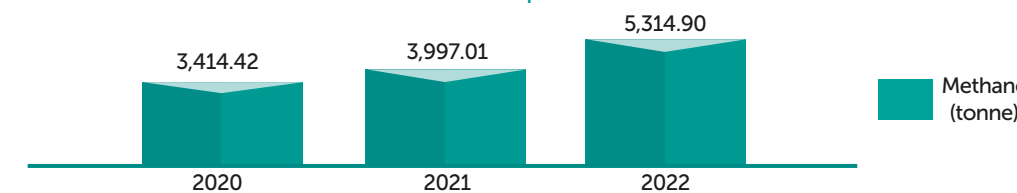
The following tables highlight the details of PGB's GHG emissions performance by type.

**Scope 1 Breakdown by GHG Type for 2021-2022**

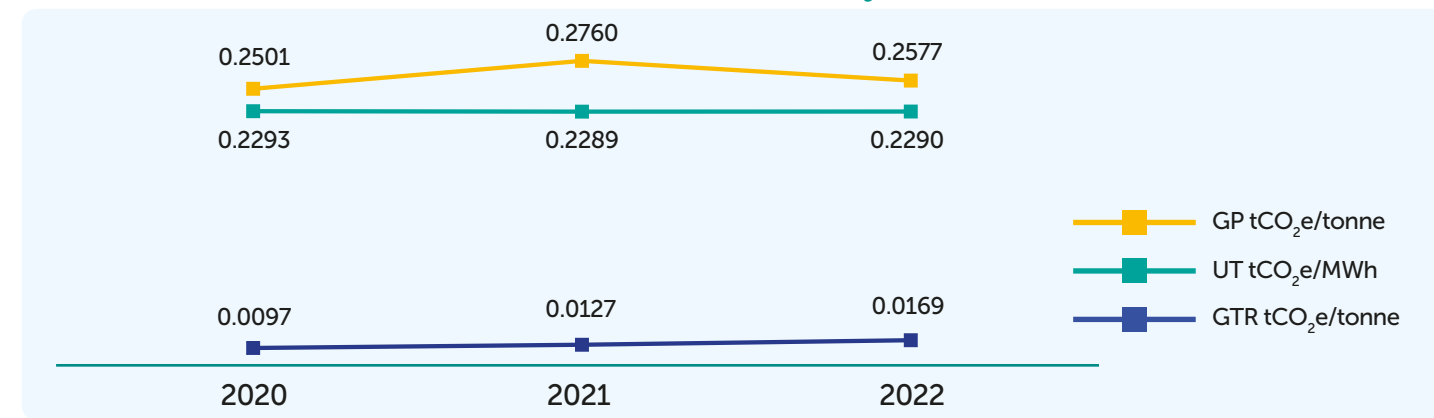
Pollutant	2021	2022	Global Warming Potential (GWP)*
<b>CO<sub>2</sub></b>	4,654,656.14	4,714,293.94	1
<b>CH<sub>4</sub></b>	3,997.01	5,314.90	25
<b>N<sub>2</sub>O</b>	65.38	65.84	298
<b>HFCs</b>	1.44	0.25	18-18,100

\* Global Warming Potential (GWP) is a factor describing the radiative forcing impact of one mass-based unit of a given GHG relative to an equivalent unit of carbon dioxide. Hence the higher the value, the higher the global warming impact of certain type of GHG to the earth.

**Methane (CH<sub>4</sub>) Emissions**



**PGB GHG Intensity**



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The GHG intensity indicators highlight the GHG emissions released in energy consumption for production purposes. These are based on total emissions (i.e., GHGs released in energy consumption for overheads; GHGs released by transport used for business travel; and additional GHGs released from the production process) normalised by the total value of production output.

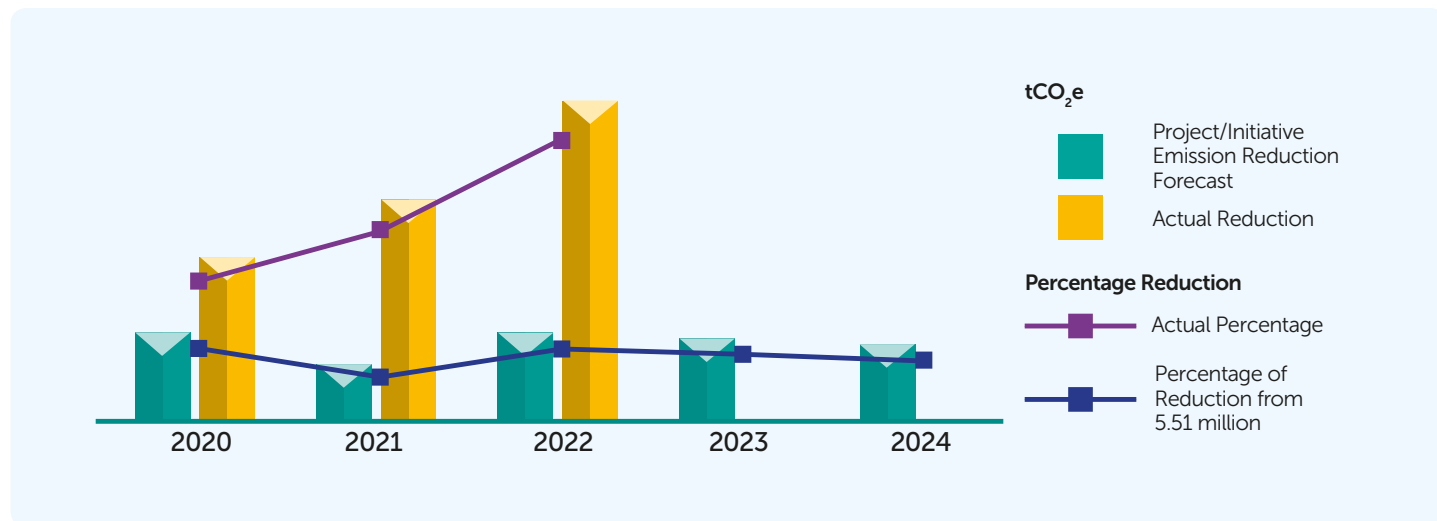
In 2022, the GHG intensity indicators for PGB's Gas Processing (GP) Division were lower as a result of the OE initiative that was completed in the same year. For the Utilities (UT) Division, there were no major changes despite increased production. In comparison, the GHG intensity indicator for the Gas Transmission and Regasification (GTR) Division increased, mostly as a consequence of project and maintenance activities undertaken throughout the year.

The reduction targets for PGB's Scope 1 and 2 emissions are spelt out in the following table. These targets are based on the outcome of a preliminary study from several identified potential CO<sub>2</sub> reduction initiatives that could potentially reduce Scope 1 and 2 emissions. Each of these projects will be evaluated based on their GHG emissions reduction results as well as their fuel gas and flared gas reduction results.

### Reduction Targets for PGB's Scope 1 and 2 Emissions

	Unit	2020	2021	2022	2023	2024
Project/Initiative Emission Reduction Forecast	tCO <sub>2</sub> e	80,725	51,256	80,402	75,000	69,115
Percentage of Reduction from 5.51 million	%	1.47%	0.93%	1.46%	1.36%	1.25%
Actual Reduction	tCO <sub>2</sub> e	150,919	204,449	296,783		
Actual Percentage	%	2.74%	3.71%	5.39%		

### Target vs Actual



For 2022, PGB rolled out 12 OE projects encompassing nine OE initiatives, one low carbon energy initiative, one renewable energy and one CO<sub>2</sub> monetisation initiative. These projects contributed to the reduction of approximately 119,000 tCO<sub>2</sub>e. The reduction in GHG emissions was based on the amount of fuel gas savings and the reduction in product flaring. The details of these projects are outlined below:

### PGB's Operational Excellence Initiatives in 2022

Cluster	Initiative
Operational Excellence Initiatives GHG Reduction: 112,794 tCO <sub>2</sub> e/annum	1. Boil-Off Gas (BOG) Skid Rejuvenation (OE: Flare Reduction)
	2. GPS K5-0601 Overhead Compressor Unit Utilisation Improvement (OE: Flare Reduction)
	3. UK GT Uprate (OE: Energy Efficiency)
	4. Optimisation of the Propane and Butane Treater at GPP2, 3 and 4 (OE: Flare Reduction)
	5. UK Utility Optimiser Installation (OE: Energy Efficiency)
	6. GPP3 Steam User Optimisation (OE: Energy Efficiency)
	7. GPK Auxiliary Boiler Excess O <sub>2</sub> Reduction (OE: Energy Efficiency)
	8. GPS Auxiliary Boiler Turndown Reduction (OE: Energy Efficiency)
	9. GPS WHB Seal Air Blower Reinstatement (OE: Energy Efficiency)
Fuel-Switching GHG Reduction: 6,499 tCO <sub>2</sub> e/annum	10. H2 Rich Reinstatement and Utilisation at UG (Low Carbon Energy)
Renewable Energy GHG Reduction: 120 tCO <sub>2</sub> e/annum	11. GTR Solar Installation
CO <sub>2</sub> Monetisation CO <sub>2</sub> sales: 177,370	12. Selling CO <sub>2</sub> to neighbouring plants
<b>Total GHG Reduction: 296,783 tCO<sub>2</sub>e/annum</b>	

### EXPLORING CLIMATE CHANGE ASPECTS, IMPACTS, RISKS AND OPPORTUNITIES

PGB acknowledges that climate change poses both a material risk and opportunity for our businesses. As such, we have implemented measures to strengthen our resilience against the physical effects of climate change to ensure the sustainability of our businesses and to reduce potential asset damage.

#### Climate Change Scenario Analysis

To better understand the aspects and impacts of climate change, we have conducted climate change scenario analyses to identify the risks and opportunities associated with climate change. The results garnered enable us to implement the relevant strategies for our day-to-day operations and growth agenda. Today, we have allocated the appropriate resources to ensure a balance between meeting energy demand and mitigating the impact of emissions.

Back in 2021, PGB collaborated with the PETRONAS Group and participated in a climate vulnerability assessment that was conducted across the Group's business locations in Malaysia including PGB's operational sites in Kertih, Gebeng, Kedah, Johor and Melaka.



The scope of the assessment included the following:







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## Climate Transition Risks

The following table outlines the climate transition risks for PGB in line with the Taskforce on Climate related Financial Disclosure (TCFD) criteria together with the potential risks as well as the business implications and opportunities.

TCFD Element	No.	Risk Statement (RS)	Business Implication	Business Opportunity
<b>Policy and Legal</b> 	RS1	Introduction of climate change regulations by host authority.	Increased cost of compliance and reputational damage e.g., unable to comply in a timely manner.	Opportunity to collaborate with the host authority to craft climate change regulations that also address energy security and affordability.  Opportunity to explore new technologies and business strategies to ensure compliance and cost optimisation.
	RS2	Lack of clarity on the carbon offsets mechanism.	Unable to meet NZCE targets, delay in business growth opportunities and the possibility of un-optimised expenditure.	Opportunity to explore and prioritise investments in low carbon technologies and solutions for emissions reduction.  Opportunity to reconsider carbon offset-related projects at a later stage when the mechanism is made clear.
	RS3	Unfavourable carbon price introduced.	An increase in business and operational costs.	Opportunity to explore cost optimisation strategy and prioritise investment from the Sustainability Lenses perspective through Carbon Footprint Assessment.  Opportunity to secure incentives for low carbon projects from the molecule owner and to explore the potential/value of adjacent waste to energy businesses.
	RS4	Failure to comply with climate disclosure requirements.	Reputational damage and financial impact e.g., difficulty in securing funding (including international) and a poor credit rating.	Opportunity to leverage high technology measurements and digital tools for quantification, monitoring, tracking and projection. This will lead to better transparency and the attainment of a higher index score which in turn will enable smooth fundraising and facilitate PGB's growth agenda.
<b>Technology</b> 	RS5	Untimely deployment of low carbon technology and innovation.	Loss of opportunities to market new low-carbon solutions (low carbon footprint) impacting PGB's growth strategies.	Opportunity to proactively work with the parent company and to be considered a solution partner in carbon utilisation, in addition to expediting the deployment of low carbon technology and innovation.
	RS6	The threat of the emergence of cheaper clean or low carbon technologies.	PGB is substituted with a new energy and solutions company.	Opportunity to remain as one of main energy providers through the promotion of a total energy transition package encompassing energy security and energy affordability as well as abatement through Carbon Capture & Storage or CCS activities for competitive advantage.
	RS7	No proven low energy technology to manage post-combustion emissions.	Unable to materialise growth opportunities for PGB.	Opportunity to proactively work with the parent company and be considered a technology solution partner to capture and store post-combustion emissions through CCS.

TCFD Element	No.	Risk Statement (RS)	Business Implication	Business Opportunity
<b>Market</b> 	RS8	Failure to manage methane emissions in the gas value chain.	Limits the opportunity to promote natural gas as a low carbon fuel and the loss of potential revenue.	Opportunity to leverage high technology measurement and digital tools for quantification, monitoring, tracking and projection, to provide better transparency relating to methane emissions management.
	RS9	Untimely response to the increasing demand for gas during the energy transition e.g., the shift from coal to gas.	Loss of potential business opportunities and revenue.	Opportunity to cater for increased demand for infrastructure/gas to power via for instance, increased capacity storage, pipeline expansion, new RGT, new Power plant (hybrid).
<b>Physical</b> 	RS10	Failure to determine the vulnerability of our operations and adapt to current asset readiness requirements.	Unsafe facility/work environment, loss of production days, and personnel and asset damage.	Opportunity to include climate change considerations in project designs to build climate-resilient facilities as well as establish an effective crisis management and business continuity plan.
<b>Operational</b> 	RS11	Insufficient internal capacity to provide the necessary intervention.	Reputational, social, environmental and financial loss.	Opportunity to include climate change considerations in the ecosystem resulting in PGB being perceived as a strong and sustainable company.
	RS12	Introduction of carbon price by host government may lead to the reduction of LPG product demand exports due to the sentiments concerning higher prices, etc.	Operational constraints in inventory management (e.g., slowdown, product flaring) and cost increments due to the increase in emissions.	Opportunity to increase the domestic base of LPG customers and explore new customers with less carbon tax.  Opportunity to revisit the plant operating philosophy and plant prioritisation of supply for more sustainable operations.
<b>Reputation</b> 	RS13	Increased stakeholder concerns, negative feedback and perception in view of increasing expectations relating to climate change.	An increase in the cost of capital and loss of stakeholder trust which can degrade the intangible value of the company and its goodwill.	Opportunity to implement a proactive resolution towards achieving a good index score which will lend to smooth fund raising and facilitate PGB's growth agenda.  Opportunity to explore the Step Out potential for the CCS O&M, Waste to Resource and Waste to energy businesses, as well as cold energy optimisation.

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## Physical Climate Change Risk

Where physical climate change risk is concerned, the risk ratings are based on the climate change vulnerability assessment done together with PETRONAS' Group Health, Safety, and Environment (GHSE) arm. The following table outlines the assessment undertaken in collaboration with GHSE.

### Climate Change Vulnerability Assessment

No.	Hazard	Surface water flooding		River flooding		Coastal flooding		Storminess		Lightning		Marine Sedimentation, Scour and Coastal erosion		Corrosion		Seawater Temperature		Heat		Drought		Wildfires		Landslide		River morphology	
		2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050
1	East Coast	20	25	15	15	15	15	25	25	0	0	15	15	20	20	0	0	4	4	4	4	20	20	16	16	4	4
2	West Coast	8	8	2	2	2	2	5	5	16	16	2	2	3	3	1	1	1	2	16	25	8	8	4	4	3	3
3	Southern	12	12	3	3	3	3	6	6	0	0	6	6	3	3	0	0	1	2	3	3	6	6	1	1	1	1
4	Northern	3	3	3	3	0	0	3	3	0	0	0	0	2	2	0	0	2	4	9	12	1	1	1	1	1	1

Risk Level	Exposure	Score
Very Low		1
Low		2 to 3
Medium		4 to 9
High		10 to 12
Very High		15 to 25

- Basis:
- Adopt PETRONAS risk scoring based on regional risk exposure
  - For offshore facility (RGTSU) is considered as onshore facility in the assessment
  - The risk level is initial risk rating which excluded existing or future mitigation

All risk ratings within the assessment are initial ratings which do not consider any existing and future mitigations. The findings of this assessment reflect that the risks related to physical climate change adaptation include the potential impact from extreme weather events particularly floods and storms, as well as the failure to act on climate change.

## Safeguarding PGB's Resources from Extreme Weather Events

PGB today has several climate risk mitigation and adaptation plans in place whereby the necessary actions have been prioritised to protect PGB's respective businesses from extreme weather events. These are among the key ones:

### Flood Preparation and Mitigation

Following the drainage system improvement project in 2014, PGB has established a Flood Committee at every asset. These committees which are activated between the months of October to December during the monsoon season, are tasked with undertaking several precautionary measures as well as collaborating with local authorities such as the Fire and Rescue Department of Malaysia (Jabatan Bomba dan Penyelamat Malaysia or BOMBA) and the Public Services Department (Jabatan Perkhidmatan Awam or JPA) during any emergency. The committees are to provide transportation for the affected staff and to meet the basic needs of their families including helping them clean up their flood-stricken homes.



### Averting Lightning Strikes

To safeguard people, installations and investments against lightning strikes, we continue to leverage the innovative Compound Air Plasma Lightning Rejection System (CPLR). This RM2.4 million system which is powered by solar power utilises active charge neutralisation technologies to effectively detect and defuse lightning storms before they occur.



Lightning is typically produced by cumulonimbus clouds, which have a base of approximately 1-2 km above the ground and reach up to 15 km in height. The CPLR system is able to perceive the increased atmospheric electrical field strength of an approaching storm at a height of 600 metres. The system then triggers the control unit to ionise the air and generate a high-density plasma cloud consisting of billions of negative and positive ions. Using the law of equivalent ions, negative ions will bond with positive ions ascending from the ground, while positive ions will bond to negative ions from the base of the thundercloud. The plasma cloud effectively neutralises the electrical charge of a storm and greatly reduces the possibility of lightning strikes taking place within the effective radius of the system.



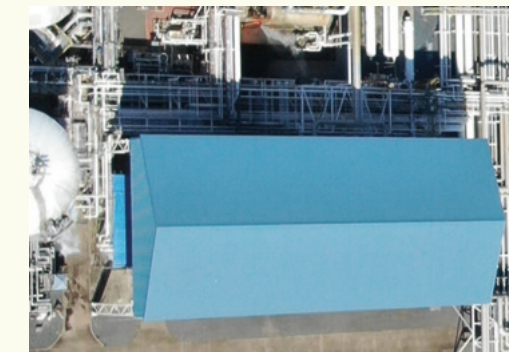
Since the initiative was operationalised in September 2021, PGB has recorded zero lightning incident with a recorded cost of avoidance amounting to RM34.7 million. This initiative, which was presented at the PETRONAS Making Impossible Possible Award Convention (MIPAC), went on to receive the Top 3 Best Replicated Project Award.

### Protection from Storms

In line with our efforts to adapt to extreme weather conditions, we have undertaken studies and made improvements to ensure that our roofing can withstand the pre-determined wind speed loading of 28 m/s. To this end, the conventional nailing system at the Air Separation Unit (ASU) 2 compressor shelter has been totally replaced with a clipping system to ensure that the metal roofing deck and accessories can sufficiently meet the permissible wind speed.

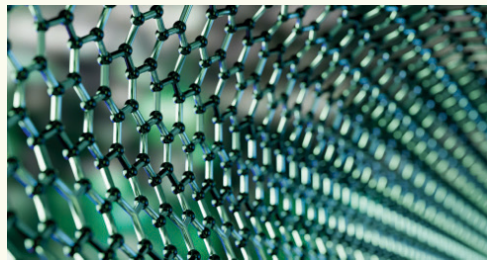


In addition to the improvement works at the ASU 2 site, the shelter has been registered under the Structure Integrity Management System (SIMS) preventive maintenance programme in an effort to maintain the super structure's integrity through annual monitoring. Following the rollout of an integrity exercise on wind loading on the ASU2 compressor shelter, it was verified that the shelter is today able to withstand 40% higher wind loading thus confirming its long-term durability.





**Corrosion Prevention**



PGB has undertaken an innovative project to prevent corrosion of steel structures for the long term. In collaboration with PETRONAS Research Sdn Bhd, we implemented the graphene paint project at PGB with the objective of increasing the asset's lifespan from five to 15 years.



**Mitigating Coastal Erosion**



As part of PGB's coastal management system, we have breakwaters where we operate. These breakwaters help protect our sites against tides, currents, waves, and storm surges by dispersing the wave. They also provide sheltered areas where vessels can berth, as well as offer protection against sediment transport in the littoral/basin zone.



**Preventing the Spread of Wildfires**



Back in 2019, one of PGB's assets at Gebeng was at risk from a nearby bushfire. This is because the surrounding areas comprises of peat which during the hot season becomes dry and vulnerable to wildfires. To minimise the risk, we are working with the relevant parties to prevent the recurrence of wildfires.



**Deploying PGB's Abatement Solution Strategy**

The critical steps in our climate change risk management efforts are mitigation and adaptation. In line with our goal NZCE 2050 aspiration, we have collaborated with PETRONAS to establish our own NZCE Pathway by deploying an abatement solution strategy as follow:

**1**

**Elimination and Reduction of Emissions**

PGB continues to leverage operational excellence to eliminate and reduce flaring as well as combusted, vented or fugitive emissions. Technology and innovation are tapped extensively to optimise resources and minimise waste throughout our operations. The efforts to date includes:

- gas turbine optimisation and upgrading
- boiler heat recovery improvements
- equipment reliability system implementation
- furnace optimisation
- zero carbon methane utilisation
- flare recovery installation
- sweep gas replacement to inert gas
- leak prevention and rectification

We target to achieve a potential maximum reduction of some 13% or nearly 0.70 million tCO<sub>2</sub>e of GHG emissions.

To further minimise emissions, where possible, we are also looking to switch fuels and use renewable energy. Our operation in Kertih has utilised solar power for internal usage and plans to scale-up the utilisation of this. At a different site, we have been using hydrogen gas since 2005 and expect to maximise consumption with an equivalent emissions reduction amounting to some 8,000 tCO<sub>2</sub>e per annum.

**2**

**Capture and/or Monetise Emissions**

PGB is collaborating with PETRONAS to not only capture inherent CO<sub>2</sub> but also post-combustion CO<sub>2</sub>.

We have also put in place a plan to address post-combustion emissions through electrification of gas and steam turbines as well as by procuring green electricity. The electrification of gas turbines will not only eliminate emissions, but will also demonstrate PGB's commitment to complying with the Environmental Quality (Clean Air) Regulations 2014 or CAR 2014 requirements. This effort has the potential to reduce approximately 1.4% or 80,000 tCO<sub>2</sub>e of PGB's GHG emissions.

By way of the monetisation of CO<sub>2</sub>, we have been selling our CO<sub>2</sub> to our customers since the early 2000s and have increased our output to the equivalent of 0.25 million tCO<sub>2</sub>e per annum.

Aside from our ongoing efforts in the areas of operational excellence, utilisation and renewables, we have identified Carbon Capture & Storage or CCS as one of the key pathways for PGB to meet our NZCE 2050 aspiration. As far as capturing and storing CO<sub>2</sub> is concerned, PGB is collaborating with PETRONAS to capture inherent CO<sub>2</sub>.

**3**

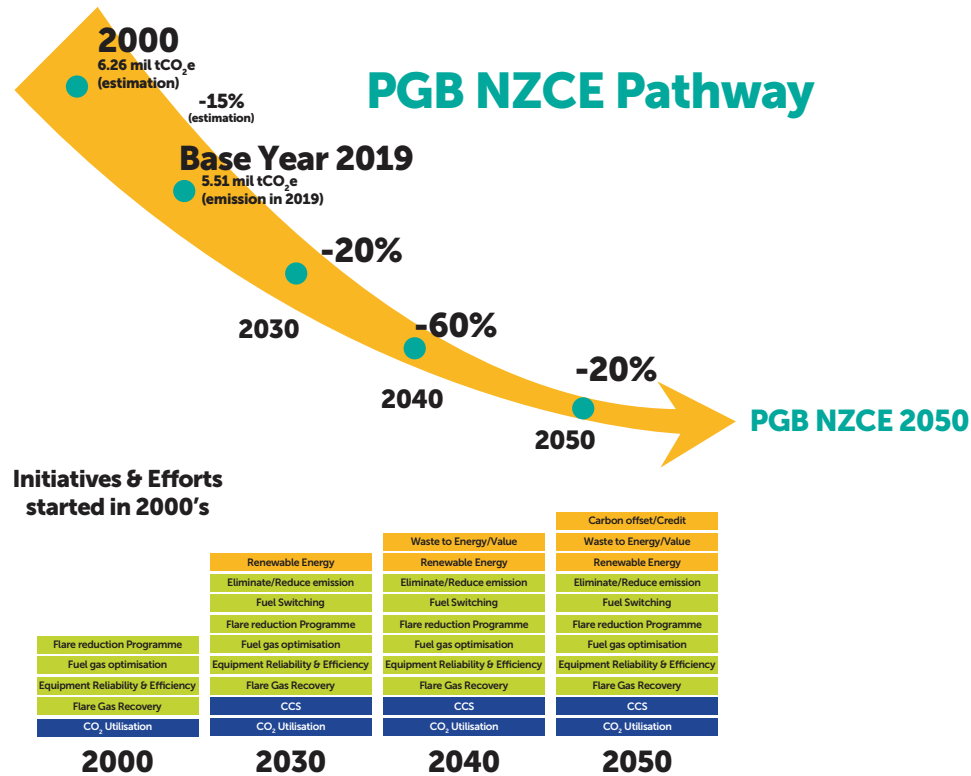
**Carbon Offset for Remaining Emissions**

For the longer term and for any molecule that PGB cannot reduce, capture and store or monetise, we will explore netting as an option to reach net zero. PGB is already exploring the viability of new green projects such as renewables, waste to energy and waste to value. Concurrently, PGB is also garnering a solid understanding of these projects and assessing how best to apply entitlement certificates which can then be used for netting or offsetting opportunities.

PGB continues to make good progress especially on the reduction part of abatement activities as follows:

Elements		Result in 2021 (tCO <sub>2</sub> e)	Results as of 2022 (tCO <sub>2</sub> e)
1. Reduced Scope 1	Combustion	61,399	81,324
	Flaring	4,505	37,969
	Venting	0	0
2. Reduced Scope 2	Renewable	0	120
3. Capture & Storage (Reduced Scope 1)		0	0
4. Monetisation (Scope 1 to Scope 3)		133,806	177,370
5. Offsetting (Reduced Scope 1 & Scope 2)		0	0

Having adopted the above three pathways, PGB has developed the following roadmap to deliver on our NZCE 2050 commitment:



**Climate Change Adaptation Plan**

In line with PGB's commitment to achieve NZCE 2050, we have also developed a plan to adapt to climate change risks and opportunities. Embedded within our business strategy, the plan includes the following:

**Business advocacy on the use of gas to replace coal within the energy mix as gas will reduce 50% of the net GHG emissions on a per unit basis while providing energy security and affordability.**

**Collaboration with PETRONAS and a solutions partner in the area of Carbon Capture Utilisation and Storage (CCUS) to address inherent and post-combustion emissions as more than 50% of PGB's GHG emissions are post-combustion emissions.**

**Readily established crisis management and business continuity plan which include review of our plant operating philosophy and plant prioritisation of supply for more sustainable business operations.**

Last but not least, to make sure PGB is moving in the right direction by way of our climate change management and NZCE 2050 aspirations, we will need to continue monitoring GHG emissions in real time and disclose our GHG performance against our targets on a regular basis. A digital platform to facilitate this is currently under development via collaboration with PETRONAS. When the platform is in place, our GHG emissions data can be monitored and audited in a more efficient manner while we will be able to manage our GHG emissions more effectively.



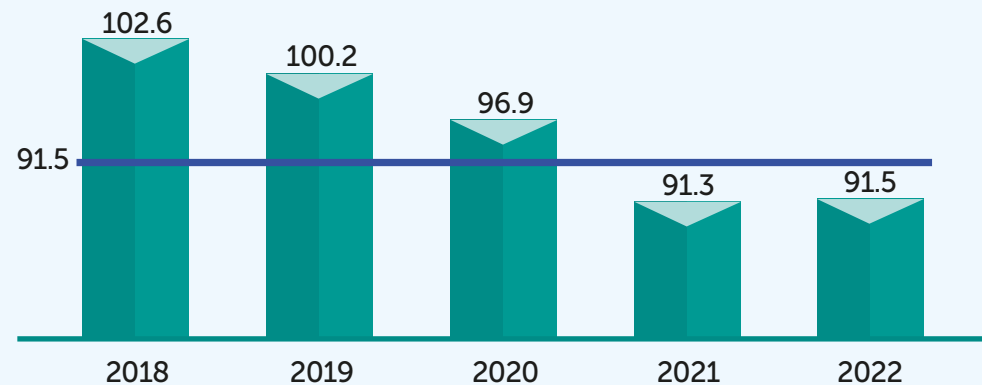
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## ENERGY MANAGEMENT

As per PGB's 301Q99 R2 Game Plan, we had set a target of achieving top quartile energy performance by the year 2022. This called for us to deliver more relevant, profitable and sustainable operations where our assets performed at their true potential. We had also committed to developing an energy culture and to becoming a cost-effective production unit by implementing an effective energy and loss management system. Our proactive approach zeroes in on areas like energy conservation and GHG emissions reduction through continuous improvements in plant design and operational efficiencies. Our overall goal is to run our business by focusing on energy utilisation efficiency and the reduction of wasteful energy in any form. Our Zero Routine Flaring Initiative underscores our efforts to eliminate routine gas flaring at our facilities.

In 2022, as a result of intensive energy and emissions reduction initiatives, PGB was able to maintain its Energy Index (EI) rating in the top quartile by attaining an EI rating of 91.5 versus the EI top quartile annual target of 95.7.

PGB Energy Index Performance



The following tables outline the Group's production capacity by energy type and overall energy production and consumption:

Power Production Capacity by Energy Type

Energy Type	Total Electricity Generation Capacity (MW)	Total Steam Generation Capacity (MT/hour)
Natural Gas	398	1,312
Solar	0.151	NA

Power Production by Energy Type

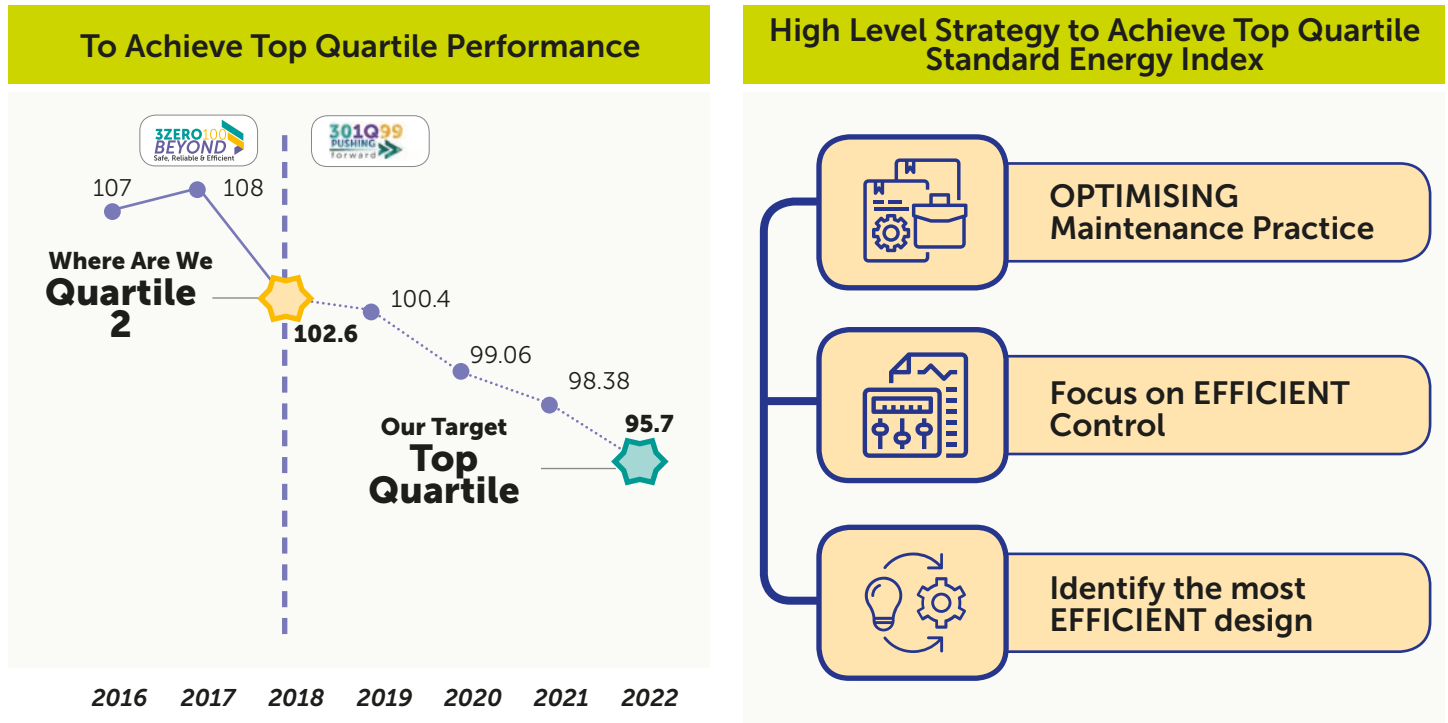
Energy Type	2020 (MWh)	2021 (MWh)	2022 (MWh)
Fuel Gas	15,725,433	17,310,838	17,992,509
Solar	192	202	252
Imported Electricity from Grid	94,405	63,791	74,913

Note: No other energy type being produced other than listed above

## PGB ENERGY MANAGEMENT

PGB has established an Energy Commitment and Roadmap strategy for PGB's GPU (Gas Processing & Utilities Division) or GPU and GTR (Gas Transportation and Regasification) divisions to ensure effective energy management and energy performance activities are carried out.

This energy roadmap consists of a five-year energy index target, a list of initiatives, and the estimated energy saved by each of the initiatives. We have also established an Energy Working Committee at each division to effectively drive and implement those energy initiatives as well as ensure the roadmap milestones are achieved in a timely manner.

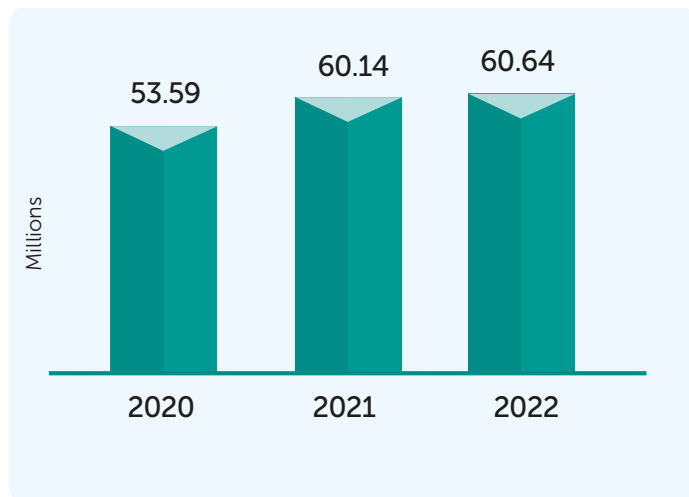


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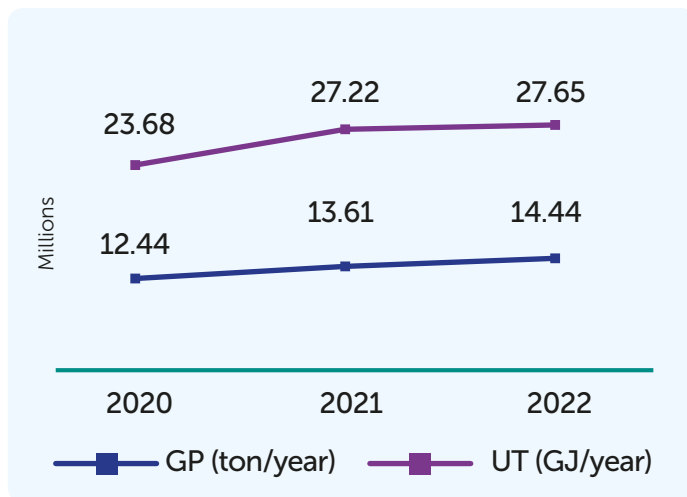
## Energy Management at GPU

In 2022, GPU recorded total energy consumption of 60.6 million GJ/year which was higher by 0.8% as a result of increased production at the gas processing and utilities plant. The specific energy consumed and the EI are monitored throughout the year to assess the impact of energy-related initiatives against the overall energy performance.

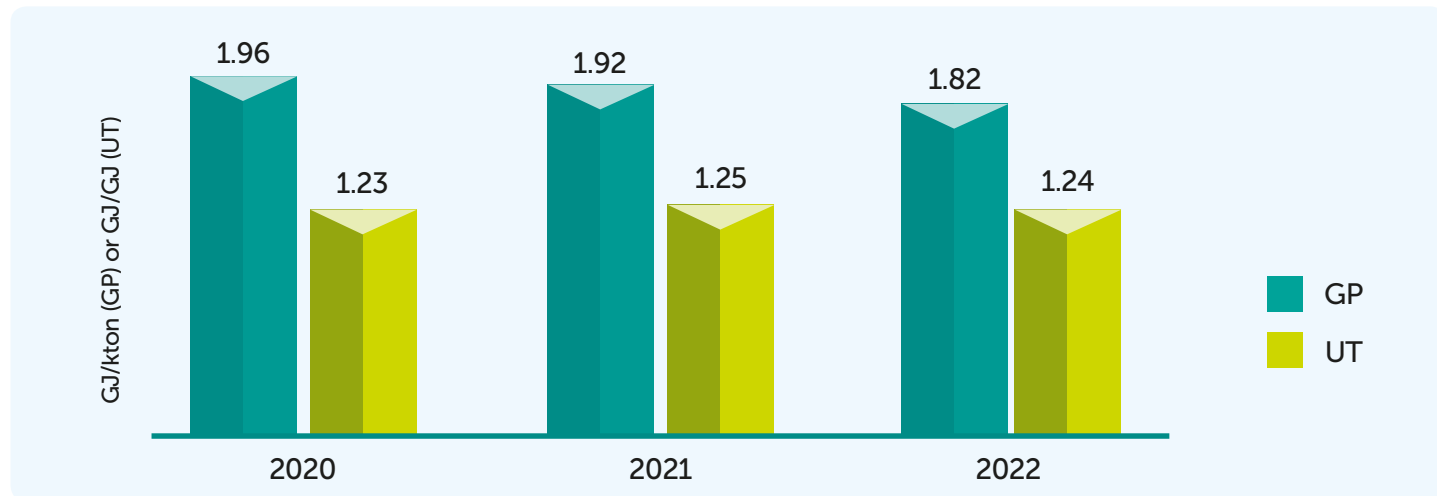
**Total Energy Consumption (GJ/year)**



**Total Production GP and UT**



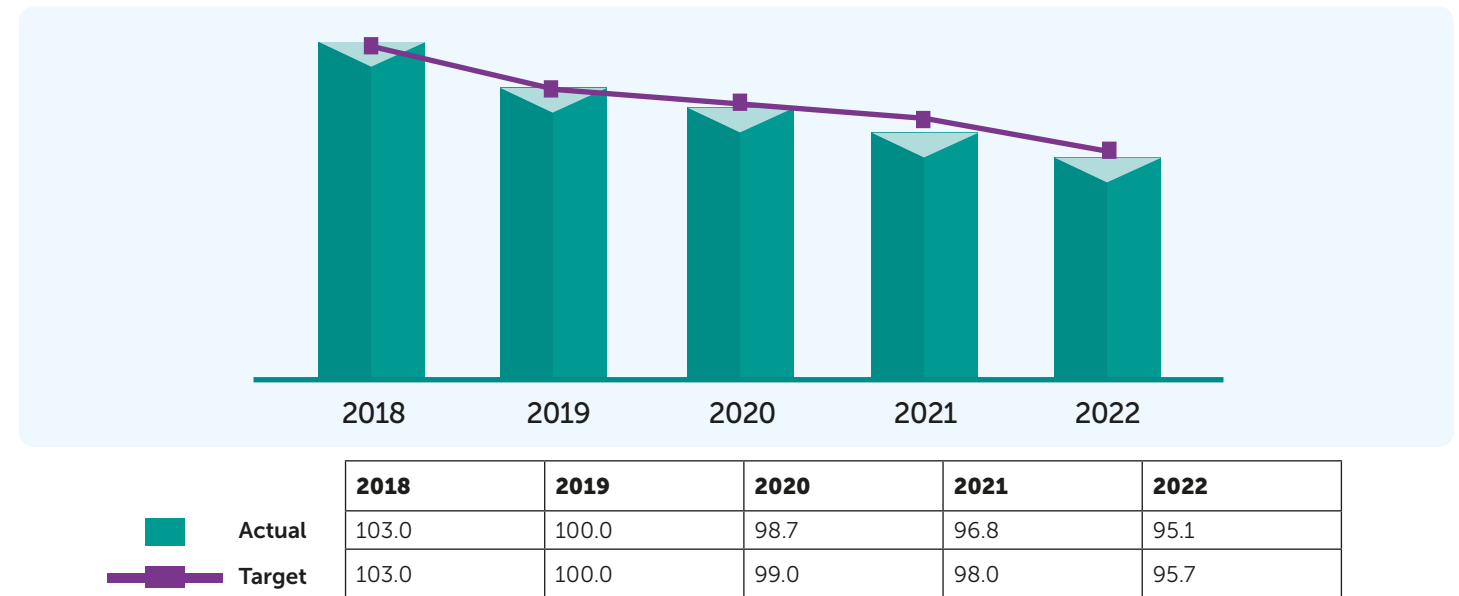
**Specific Energy Consumption**



The Energy Index or EI is defined as the Actual Specific Energy Consumption divided by the Best Achieved Specific Energy Consumption. The ratio of these two data sets provides an indication of the current actual specific energy against the target. GPU has been monitoring its EI performance since 2018 in line with its strategic agenda. Its EI performance has improved year after year as a result of the successful completion of multiple initiatives executed at the plant level.

For 2022, GPU delivered a stellar performance, achieving an EI rating of 95.1 compared to the target of 95.7 while generating savings amounting to RM67.5 million. The savings are calculated based on the baseline performance and the performance after the energy initiatives are executed.

**GPU Energy Index**



The following spell out the details of the various projects completed in 2022 that sought to reduce energy consumption and GHG emissions at GPU.

<b>Gas Turbine Optimisation (GTOP)</b>	The GTOP initiative involves the enhancement of gas turbine material and modification of the GT control curve which helps to reduce the gas turbine heat rate as well as fuel gas consumption. This initiative was applied to six gas turbines at Utilities Kertih. As a result of the GTOP initiative, the gas turbine heat rate improved by 1.2% which is equivalent to a GHG emissions reduction of 7,400 tCO <sub>2</sub> e/annum.
<b>UK Utility Optimiser</b>	The Utility Optimiser is a form of prescriptive analysis which applies algorithms to optimise a sequence of decisions so as to achieve a desired result in energy management. It aims to meet the steam, fuel and electricity needs of users at minimum cost by optimising process, environmental and contractual real time constraints. All in all, this project was able to improve the cogeneration efficiency and reduce average fuel consumption by 0.5% thereby generating RM2.8 million in savings and reducing GHG emissions by 3,800 tCO <sub>2</sub> e/annum.

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## Reinstatement and Utilisation of Hydrogen Rich Gas (H<sub>2</sub>RG) at UG

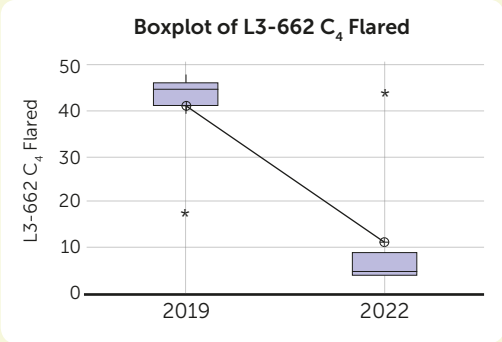
UG has three Heat Recovery Steam Generation (HRSG) systems with Hydrogen Rich Gas (H<sub>2</sub>RG) lines for burners. UG had previously reinstated two lines of H<sub>2</sub>RG between 2019 and 2021 which were for HRSG A and HRSG B. In July 2022, UG successfully reinstated the third H<sub>2</sub>RG line for HRSG C. The value created and GHG emissions reduced as a result of this initiative are as per the following table:

	2021	2022
GHG reduction (KtCO <sub>2</sub> e)	4.4	6.5
Value Creation (RM million)	2.0	10.4

## Optimisation of the Propane and Butane Treater at GPP 2, 3 and 4

The team at GPK identified that the butane (C<sub>4</sub>) product treater could replicate an initiative previously conducted at the propane (C<sub>3</sub>) product treater to reduce product flaring.

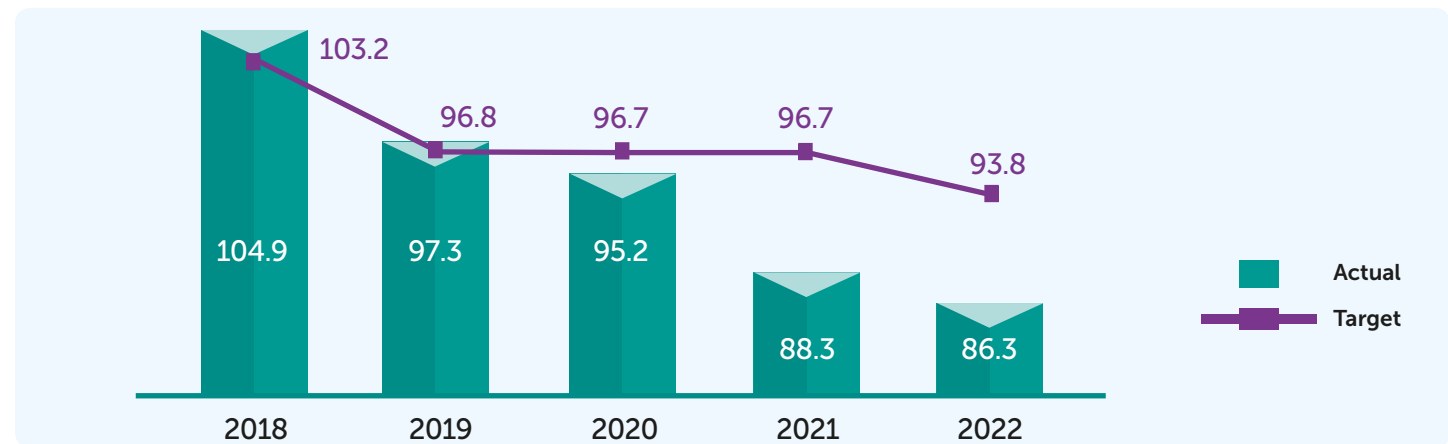
A similar approach of logic automation improvement was implemented to reduce product wastage and the GHG released by prolonging absorption while ensuring the product specifications were met. By optimising both product treaters' sequence of regeneration, the initiative successfully increased the C<sub>3</sub> and C<sub>4</sub> product gains, delivering savings amounting to approximately RM7.3 million and a GHG reduction of 6,900 tCO<sub>2</sub>e/yr.



### Energy Management at GTR

The Gas Transportation and Regasification (GTR) Division is committed to creating an energy culture by implementing the Energy and Loss Management System or ELMS. The ELMS initiative has enabled GTR to meet top quartile energy performance. The EI data for GTR from 2018 to 2022 shows a significant and continued reduction from an EI rating of 104.9 in 2018 to 86.3 in 2022.

GTR Energy Index

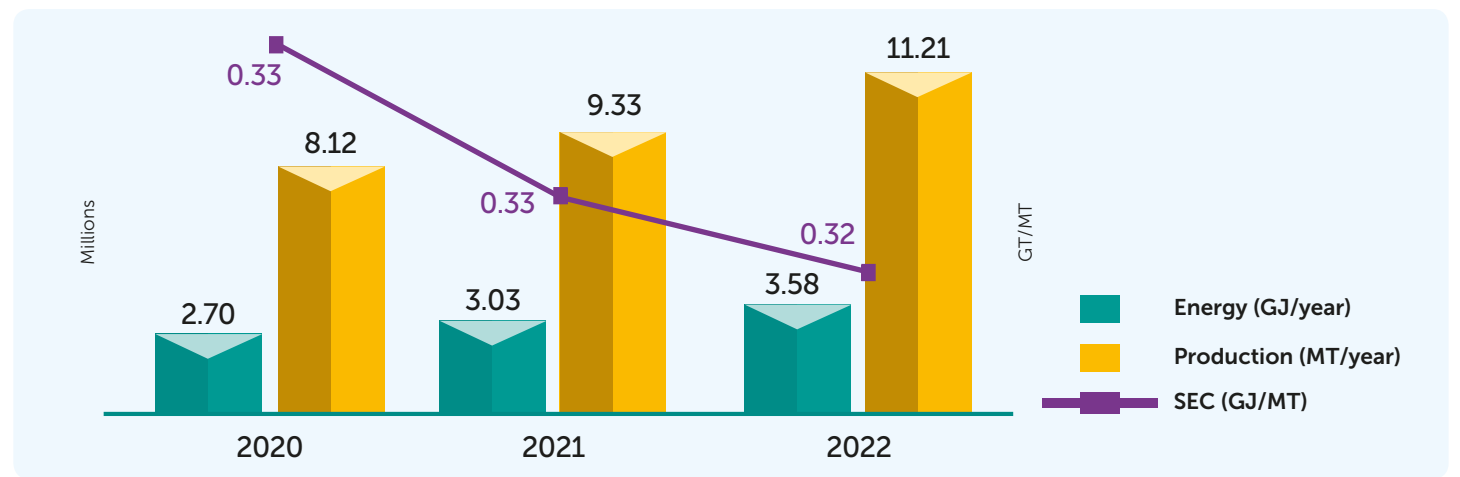


The significant reduction of EI is due to the higher offtake at GT and higher production at RGT, together with overall lower energy consumption which resulted in the reduction of Specific Energy Consumption (SEC) over the years. The lower energy consumption is attributed to continuous improvements in energy efficiency following the installation of solar panel rooftop at the Seremban Regional Office as per the table below:

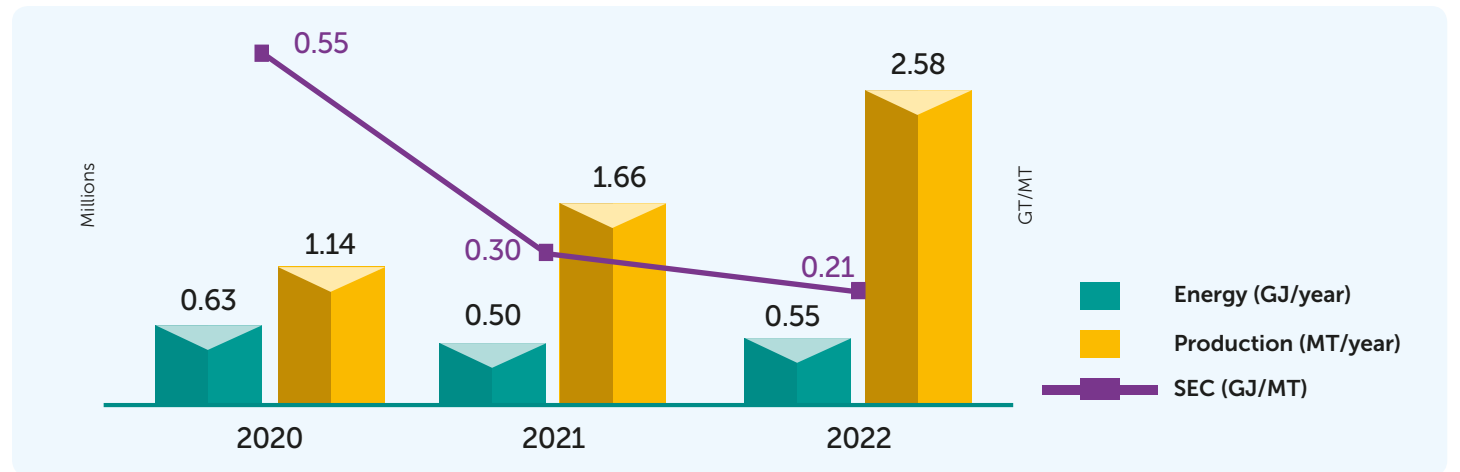
Solar Electricity Production at the Seremban Regional Office

Year	Total Electricity Production (MWh)
2020	192.00
2021	191.45
2022	181.19

GT Energy Consumption, Production, SEC



RGT Energy Consumption, Production, SEC





**POLLUTION AND RESOURCE MANAGEMENT**

PGB's pollution and resource management efforts are guided by the PGB Health, Safety and Environment (HSE) Policy and PETRONAS HSE MCF (Mandatory Control Framework). These two references accord the highest priority to the health and safety of our workforce as well as the protection of our assets, stakeholders, communities and the environment. Our HSE policy also spells out the guiding principles for managing risks and hazards relevant to PGB's business operations.

The PGB HSE Policy aims to ensure that every person at any of our locations does the right thing, every time. It outlines prescriptive requirements related to the management of significant health, safety and environmental (HSE) risks, including technical and operational integrity of facilities and equipment. This includes the conduct of environmental assessments at various phases of a project, while timely audits and risk management activities ensure effective daily operations. As per our HSE mandate, we are continuously undertaking measures to protect the environment, prevent pollution and use natural resources in a sustainable manner. We remain committed to mitigating environmental impact by identifying potential environmental hazards due to pollution, natural resource depletion or high waste generation, and subsequently reducing these risks to a level as low as reasonably practicable.

PGB's HSE Policy



**Key Pollution Management Initiatives**

The PGB Sustainability Blueprint underscores the Group's commitment to run and grow its businesses through four strategic lenses, one of which is the "Safeguard the Environment" lens. For the year in review, we continued to uphold this commitment to reduce environmental impact by identifying and managing potential environmental hazards from pollution sources. These are among the key initiatives that we carried out:

**Ongoing R22 Refrigerants Phase-Out Activities**

Back in 2020, the Malaysian Government gazetted the new Environmental Quality (Refrigerant Management) Regulations 2020 that prohibit the use of R22 refrigerants in the manufacturing or assembling of any air conditioning equipment as well as set a target of zero R22 utilisation by 2030. As a responsible company that supports the nation's aspiration to move towards zero R22 utilisation, PGB continues to phase out the remaining units of R22 refrigerants in existing refrigeration and air conditioning equipment. By end of 2022, a total of 375 units of equipment containing R22 has been phased out. We continue to track these activities closely to ensure 100% compliance with regulations by 2030 as outlined in our Sustainability Blueprint.

PGB R22 Phase-Out Plan

	GPU	GTR
Total Units	766*	430
Status as at 2022	294	81
Percentage of Completion(%)	38	19

Note: \* Including units at non-process area.

**Secondary Containment Compliance Assessment Activities**

In line with our continuous improvement efforts, we continue to engage Group Technical Solutions (GTS) to carry out secondary containment compliance assessment activities. In 2022, GTS covered a total of 37 tanks at five of PGB's GPU plants (refer to the details in the table below). The assessment activities were carried out via desk studies of documents and drawings received from the asset owner as well as site verifications. These activities enabled us to identify and develop mitigation measures at chemical and product storage areas to prevent potential discharge and spillage onto the soil and stormwater drains.

**Secondary Containment Compliance Assessment Activities at GPU**

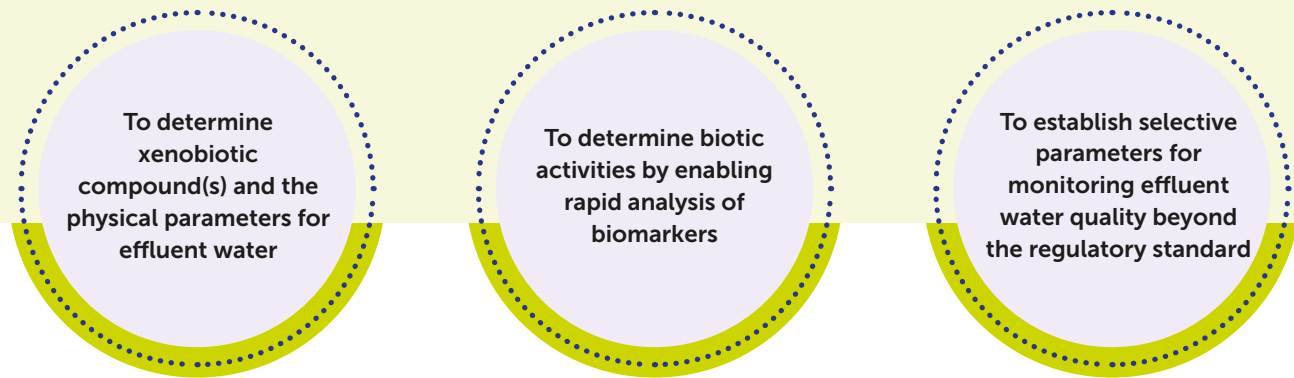
Plant	Quantity	Year of Completion	Status
Gas Processing Santong (GPS)	13 tanks	2024	In Progress
Gas Processing Kertih (GPK)	16 tanks	2023	In Progress
Tanjong Sulong Terminal Export (TSET)	4 tanks	2021	Completed
Utilities Kertih (UK)	2 tanks	2022	Completed
Utilities Gebeng (UG)	2 tanks	2022	Completed

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## Collaborative Ecological Risk Study with UMT

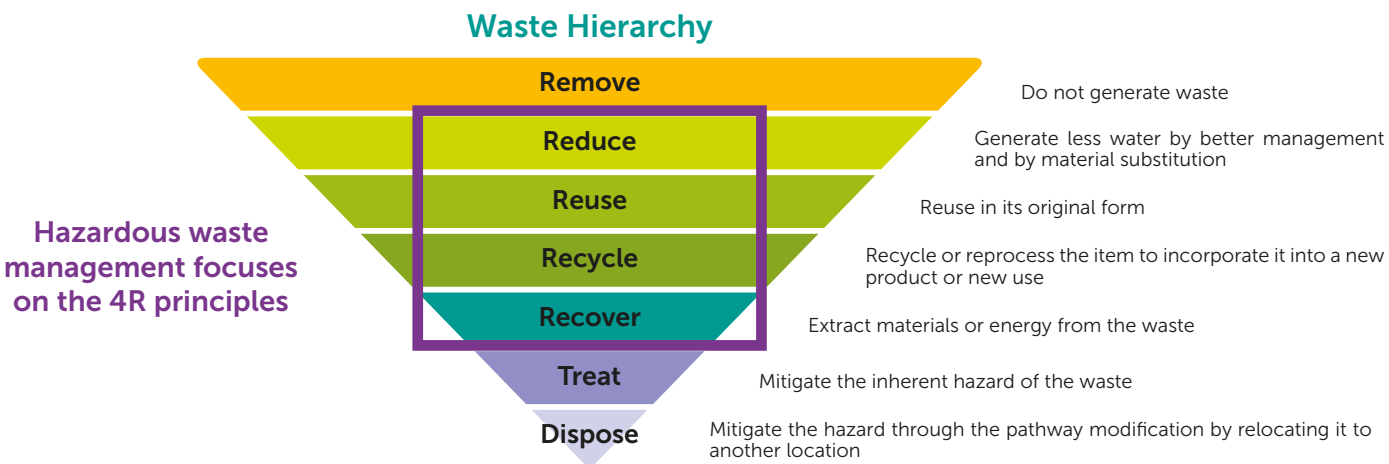
In 2022, PGB collaborated with University Malaysia Terengganu (UMT) to carry out ecological risk assessment and monitoring activities relating to effluent water quality in the drains surrounding the Kertih Integrated Petrochemical Complex (KIPC). The study helped us to identify the related biomarkers and obtain a better understanding of the water conditions required for healthy aquatic life during the monsoon and dry seasons.

These were among the study's objectives:



## WASTE MANAGEMENT

As part of PGB's commitment to manage waste generation from our operations, we implement the Waste Hierarchy concept that focuses on the 4R principles of Recover, Recycle, Reuse, and Reduce.



In line with the PGB HSE Policy of preventing pollution throughout our operations, we continue to review the PGB Waste Management Plan on annual basis and making good strides forward under the 4R principles.

## Hazardous Waste Management

In strict compliance with the local environmental authority, all our hazardous wastes are managed properly by qualified and certified waste contractors registered with the Department of Environment (DOE). For 2022, PGB generated a total amount of 1,530 metric tonnes (MT) of hazardous waste from normal operations, maintenance, projects and turnaround activities. A total of 985.7 MT or equivalent to 64% of total hazardous waste was recovered by 4R activities at prescribed premises thereby exceeding the target of 56% set for 2022.

### Quantity of Hazardous Waste Generated (MT)

**1,530**

2021: 1,419  
2020: 1,489

### Quantity of Hazardous Waste Disposed (MT)

**797**

2021: 575  
2020: 443

### Cost Savings from Hazardous Waste that Underwent 4R Activities (RM Million)

**1.9**

2021: 0.7  
2020: 1.3

### Quantity of Hazardous Waste that Underwent 4R Activities (MT)

**985.7**

2021: 804  
2020: 966

### Percentage of Hazardous Waste that Underwent 4R Activities (%)

**64%**

2021: 57%  
2020: 65%



### Performance and Target of 4R Activities

Year	2020	2021	2022	2023	2024
Target 4R%	42%	55%	56%	56%*	61%*
Actual 4R%	65%	57%	64%		
Actual (MT)	966	804	985.7		

\*Preliminary target based on the 2022 plan.

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The following are among the key 4R initiatives in 2022 that PGB conducted in managing hazardous waste.

<b>Reduce:</b> <b>LED Upgrading Project at RGT</b>	Following the implementation of the LED upgrading project at GPS and TSET sites in 2021, the initiative was extended to RGT sites in 2022. The replacement of LED lighting prevents the generation of hazardous waste under the SW109 label i.e., waste containing mercury or its compound, saving up to 75% energy as compared to conventional lighting.
<b>Reduce:</b> <b>Shift from Time-based to Risk-based Maintenance Approach at GTR</b>	Previously, GTR performed maintenance activities based on schedule for its filter vessels at 94 metering stations and city gates. This involved high risks activities such as confined spaces entry and scheduled waste handling, costing approximately RM2 million annually. An innovative digital solution called Barrier Management & HSSE (BMH) solution applies risk-based maintenance, replacing the conventional time-base maintenance approach. The solution also minimises the maintenance cost, waste generation and HSSE risks by increasing the interval of maintenance activities from one year to three years. To ensure operational safety and reliability are not compromised, the inspection frequency is increased from once to three times a year. As a result, GTR managed to reduce approximately 50% of total waste tonnage and achieve cost savings of more than RM400,000 in 2022.
<b>Reuse:</b> <b>Prolonging the Usage of Molecular Sieves at GPU</b>	As part of the efforts to reduce the total hazardous waste generated, PGB successfully reused the spent molecular sieve from turnaround activities at Utilities Kertih. This was made possible by sieving the spent molecular sieve prior to reuse. As a result, the life-span of the molecular sieve was prolonged and 114 MT of waste generation was avoided.
<b>Recycle:</b> <b>Spent Random Packing Recycling at Prescribed Facility</b>	All spent random packing generated during turnaround activities was previously sent to Kualiti Alam for disposal. In 2022, they were recycled by a DOE-licensed recycling company, generating cost savings of RM126,000.

Note: There were no Recover initiative implemented in 2022.

### Non-Hazardous Waste Management

Apart from hazardous waste management, PGB is also focusing its efforts on managing non-hazardous waste through the following key initiatives:

<b>Reuse:</b>  <b>Single-Use Plastic Campaign and Use of Biodegradable Material</b>	<p>In line with Malaysia's Towards Zero Single-Use Plastic Roadmap 2018-2030 initiative, PGB continues to collaborate with the PETRONAS GAS Business on the Zero Single Use Plastic Campaign. Deeply aware that plastic pollution had become one of the most pressing environmental issues, we have made the shift to a greener initiative i.e., paper-based materials that are biodegradable. Today, these biodegradable materials are being utilised throughout PGB's operations during normal operations, over the course of projects, and during turnaround activities.</p>	<p style="text-align: center;"><b>Plastic Usage Reduction Data 2022</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Types of Plastic Used</th> <th style="text-align: center;">Quantity Reduced in 2022 (units)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Straws</td> <td style="text-align: center;">30,700</td> </tr> <tr> <td style="text-align: center;">Polystyrene materials</td> <td style="text-align: center;">118,900</td> </tr> <tr> <td style="text-align: center;">Cups</td> <td style="text-align: center;">80,100</td> </tr> </tbody> </table>	Types of Plastic Used	Quantity Reduced in 2022 (units)	Straws	30,700	Polystyrene materials	118,900	Cups	80,100
Types of Plastic Used	Quantity Reduced in 2022 (units)									
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<b>Reuse:</b>  <b>Use of Reusable Food Containers at RGTP</b>	<p>To support the Zero Single-Use Plastic Roadmap 2018-2030 initiative at Regasification Terminal Pengerang (RGTP), the team has stopped the use of polystyrene as a food packaging medium as well as reduced purchases of bottled mineral water. Today, a better quality medium of packaging such as reusable food containers are being utilised while staff are making good use of self-cleaning water bottles. As a result of these efforts, RGTP's polystyrene waste disposal cost has been reduced by 43%, while its bottled mineral water cost has reduced significantly by 70% since implementation. This initiative was also acknowledged as being among the Top 5 of Best Virtual Showcase at the MIPAC 2021 event.</p>
<b>Recycle:</b>  <b>Collaboration with FELDA to Recycle Spent Perlite at GPU</b>	<p>Under our 4R programme, we have been collaborating with the Federal Land Development Authority (FELDA) to manage the spent perlite from our cold box maintenance activities by using it as fertilizer. In 2022, a total of 1,474 jumbo bags (32 MT) of spent perlite was sent to FELDA, resulting in reduction of waste sent to landfills, contributing to 74% savings in disposal costs. For these collaboration efforts, we received the Gold Award and Best Sustainability Award at the MIPAC 2022 event.</p>
<b>Recycle:</b>  <b>Introduction of Pilot 4R Programme during Turnaround Activities</b>	<p>During turnaround activities in 2022, PGB collaborated with a local recycling company to promote a pilot 4R campaign involving contractors and staff. To stimulate active participation, we established a recycling centre and offered incentives to those who took part in the event. Approximately 1,600 people participated in the initiative with GPK successfully recycling the highest amount of non-hazardous waste, amounting to 700kg.</p>







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The following table highlights the data compiled on PGB's non-hazardous waste management activities over 2021 and 2022:

Quantity of Non-Hazardous Waste Generated (MT)				Quantity of Non-Hazardous Waste Disposed (MT)			
2021		2022		2021		2022	
GPU: 576	TOTAL	GPU: 609	TOTAL	GPU: 575	TOTAL	GPU: 567	TOTAL
GTR: 28	<b>604</b>	GTR: 33	<b>642</b>	GTR: 28	<b>603</b>	GTR: 30	<b>597</b>

Quantity of Non-Hazardous Waste Recovered by 4R Activities (MT)			
2021		2022	
GPU: 1	TOTAL	GPU: 42	TOTAL
GTR: 0.01	<b>1.01</b>	GTR: 5	<b>47</b>

## EFFLUENT MANAGEMENT

In the context of PGB, effluent is water knocked-out from feed and processes generated mainly from a few of our facilities, namely GPK, GPS, UK and RGTP. As a responsible company, we monitor effluent discharge from the Industrial Effluent Treatment System (IETS) to ensure compliance with the DOE Standard B limit as per the Environmental Quality (Industrial Effluent) Regulations 2009. Performance monitoring is conducted monthly by an IETS-competent person certified by the DOE, while the monitoring of effluent discharge and IETS performance are conducted by an internal laboratory and an accredited third-party laboratory.

The table below highlights the PGB facilities that generate effluent and the respective locations where this effluent is discharged:

### Point of Effluent Generation and Respective Destination of Discharge

Point of Effluent Generation	Location	Destination of Discharge
GPK	Surface Water (River)	Sg Kertih
GPS	Surface Water (River)	Sg Paka
UK	Surface Water (River)	Sg Kertih
RGTP	Ocean	Marine Water (South China Sea)

The table below shows the results of PGB IETS discharge for parameter Chemical Oxygen Demand or COD, for all plants between 2020 and 2022. Based on the analysis, the results were within the limit as per Standard B.

### Total Amount, Quality, Loading of Effluent Discharge from Each Facility

Plant	Parameter	2020	2021	2022
GPK	Total Amount of Effluent Discharge (m3)	46,612.87	36,279.00	30,340.00
	Total COD Loading (tonnes)	1.95	1.89	2.75
GPS	Total Amount of Effluent Discharge (m3)	279,548.00	109,514.00	48,925.00
	Total COD Loading (tonnes)	7.28	3.78	1.29
UK	Total Amount of Effluent Discharge (m3)	752,263.63	889,906.00	792,005.00
	Total COD Loading (tonnes)	13.96	27.47	27.24
RGTP	Total Amount of Effluent Discharge (m3)	0	0	0
	Total COD Loading (tonnes)	0	0	0
PGB	Total Amount of Effluent Discharge (m3)	1,078,424.50	1,035,699.82	871,270.00
	Total COD Loading (tonnes)	23.20	33.10	31.29

**AIR EMISSIONS MANAGEMENT**

PGB is committed to closely monitoring and managing its air emissions via solutions such as the Continuous Emission Monitoring System (CEMS) and Predictive Emission Monitoring System (PEMS). Aside from this, manual sampling of air emission is carried out by an accredited third party contractor.

As of 2022, a total of 33 units of CEMS have been installed to PGB's equipment allowing us to obtain real time data and take prompt action should any abnormal reading be detected.

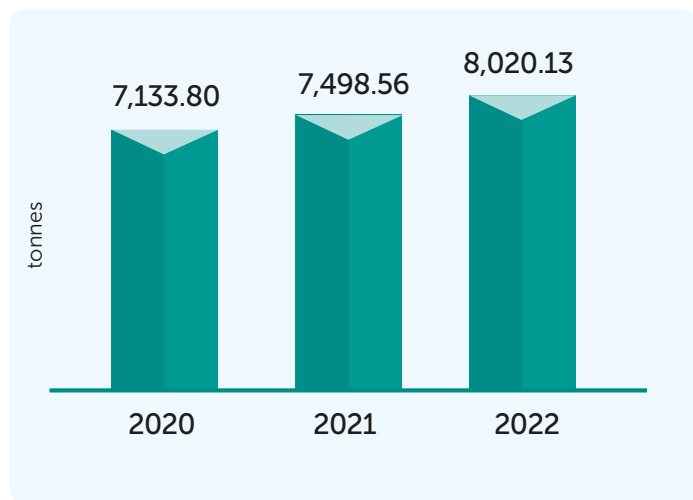
**Installation of New Acid Gas Oxidiser at GPS**

We have invested approximately RM85 million to replace two units of Acid Gas Incinerator (AGI) at GPS with an Acid Gas Oxidiser (AGO) aimed at improving the reliability and efficiency of the equipment. This will significantly improve the quality of CO pollutants from 1,950 mg/m<sup>3</sup> to less than 600 mg/m<sup>3</sup> (as per standard limit). This project is expected to be completed in 2023.

**Monitoring Nitrous Oxide and Sulphur Oxides Loading**

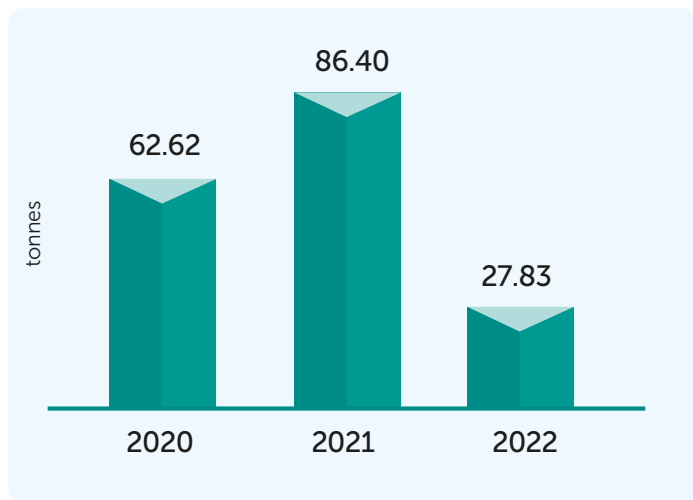
On top of monitoring the quality of emissions, we also measure the quantity of emissions through calculating Nitrous Oxide (NOx) and Sulphur Oxides (SOx) loading. The following charts highlight the NOx and SOx loading between 2020 and 2022.

**PGB NOx Emissions**



The higher NOx level in 2022 was mainly due to more post-combustion activities driven by higher production.

**PGB SOx Emissions**

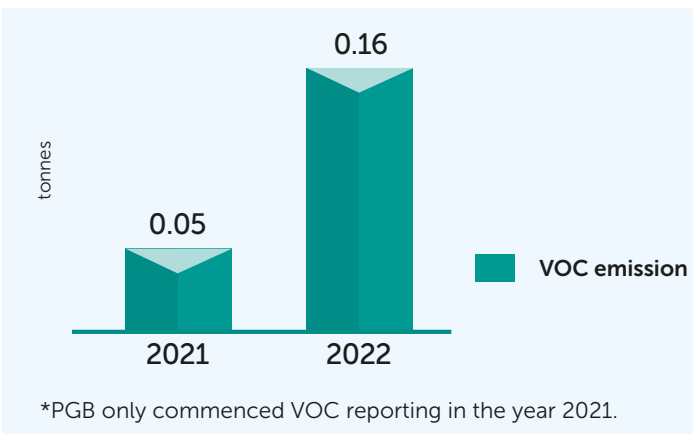


The lower SOx level in 2022 was mainly due to higher AGI reliability throughout the year.

**Monitoring Volatile Organic Compound (VOC) emissions**

Effective 2021, we began quantifying our volatile organic compound (VOC) emissions. Although all VOC emissions in the hydrocarbon storage are diverted to flare, nevertheless, a very small amount of the remaining VOC emissions is released through the breathing line from the diesel and methanol tank. To ensure maximum safety, control measures such as nitrogen (N<sub>2</sub>) blanketing within the tanks, while the tanks themselves are strategically located at a remote area within the plant.

**PGB VOC Emissions**



The significant VOC increment in 2022 was due to increased frequency of diesel tank refill activities to meet operational requirements.

**LIFE CYCLE ANALYSIS (LCA)**

PGB continues to collaborate with the PETRONAS Group HSE Product Stewardship & Toxicology team to conduct assessments for methane, ethane, propane, butane and condensate. The outcomes of these assessments, which include the environmental footprint of these products and their carbon price, have been used to identify opportunities to improve our waste minimisation programme and optimise usage of natural resource that help us achieve our sustainable development goals.

To date, we have undertaken assessments at these facilities:

Year	LCA Sites Completed
2020	Utility Gebeng (UG)
	Gas Processing Santong (GPS)
2021	Tanjung Sulong Export Terminal (TSET)
2022	Regas Terminal Pengerang (RGTP)
	Regas Terminal Sungai Udang (RGTSU)

For 2023, we will carry out assessments at the remaining facilities i.e., UK and GPK.

**ENVIRONMENTAL FINES AND PENALTIES**

PGB has been able to maintain its zero environmental fine and penalty track records for three consecutive years from 2020 to 2022. We will continue to ensure that we deliver above and beyond the standard environmental compliance requirements to maintain our excellent record of accomplishment.



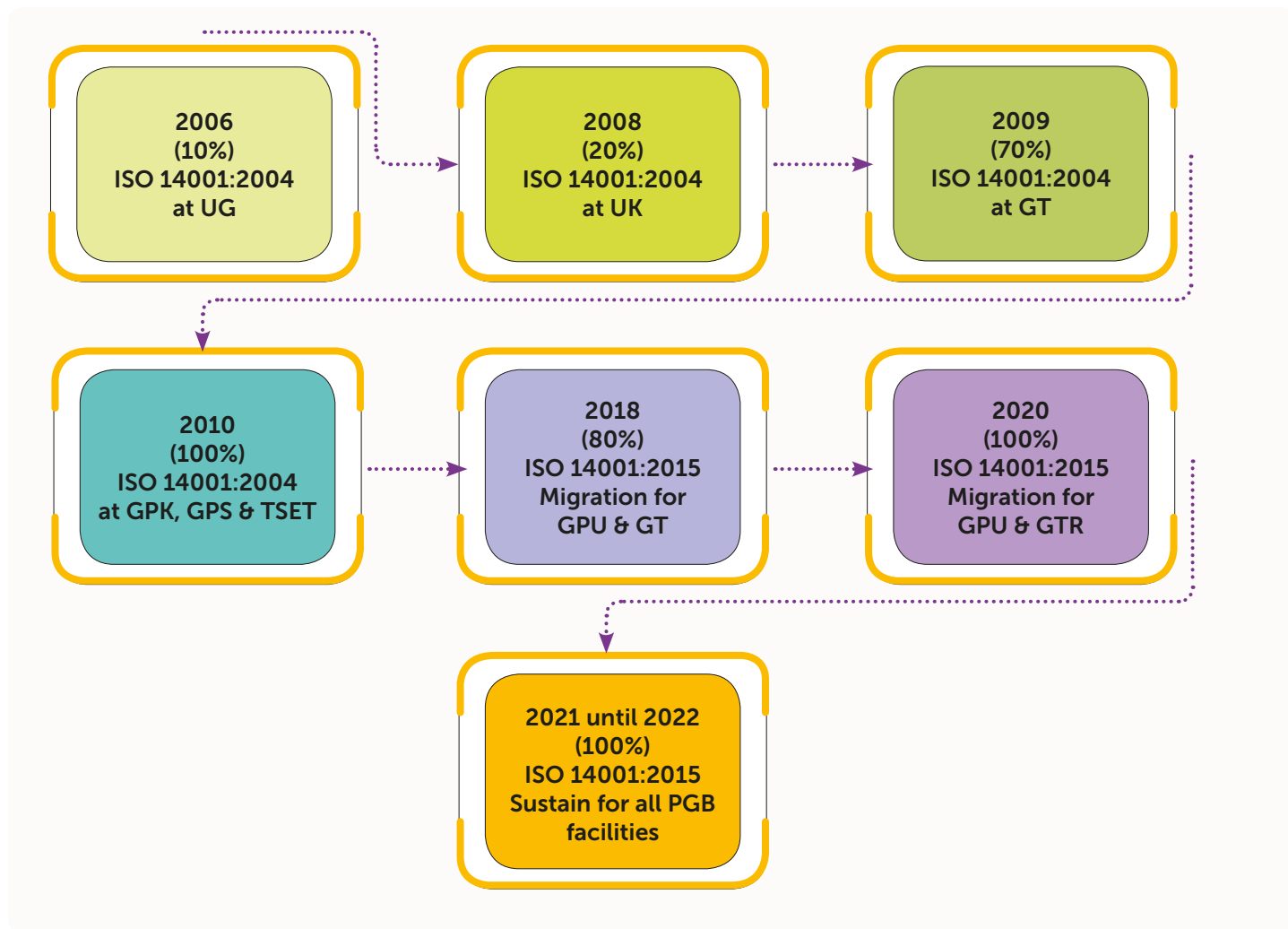
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## ENVIRONMENTAL MANAGEMENT SYSTEM (ISO 14001:2015)

PGB began its ISO certification journey in 2008 following the commencement of 14001:2004 accreditation at UG and UK. The ISO 14001:2004 standard was then implemented at our other facilities, namely GPK, GPS, TSET and GT effective 2010, until we successfully migrated to the updated ISO 14001:2015 standard.

To date, all PGB's sites including RGTSU and RGTP have successfully obtained ISO 14001:2015 accreditation and we are confident of renewing this come the next assessment cycle. This accreditation emphasises our commitment to improving our environmental performance by making more efficient use of our resources and reducing our waste. On top of this, having an accreditation that complies with global sustainability practices and requirements, accords PGB a strong competitive advantage as well as strengthens our good standing with our stakeholders.

### PGB'S Ongoing ISO Journey



## PGB'S ENVIRONMENTAL-RELATED CSR EFFORTS

We are committed to collaborating with a variety of organisations to undertake effective corporate social responsibility (CSR) activities.

### Collaboration with Authorities and NGOs on the Sayangi Pantai Kita Programme

In 2022, we worked together with several local authorities and non-governmental organisations (NGOs) on the Sayangi Pantai Kita (Love Our Beaches) programme that aims to preserve coastal ecosystems. Through the initiative, PGB staff, local government bodies and NGOs had the opportunity to work together to improve the coastal and ocean ecosystem by ensuring that marine life was kept safe from indiscriminately disposed waste and that the aquatic life cycle was not disrupted by toxic waste materials. Aside from strengthening the relationship between our staff and partners, the programme also helped to inculcate a healthy lifestyle among participants.

### Beach Cleaning Programme at Pantai Kuala Kertih

215 participants consisting of staff of GPS and TSET and their families together with teams from Geng Plastic Ija (GPI) came together for a beach plogging session to clean up the coastline at Pantai Kuala Kertih. The initiative helped to foster closer ties between GPS, TSET and GPI as well as their families. This exercise led to the collection of 215.45 kg of waste consisting of plastic bottles, polystyrene, and other waste materials.

### Beach Cleaning Programme at Pantai Balok

200 GPS and TSET staff, 50 contractors and DOE Kemaman came together for a beach cleaning programme at Teluk Kalong in Kemaman aimed at conserving the coastal ecosystem. This initiative, which led to the collection of 300 kg of waste, underscores our people's belief that we are responsible for the locations that we operate in.

### Beach Cleaning Programme at Awana Kijal, Kemaman

A total of 150 participants comprising staff of PGB and DOE Kemaman together with the GPU leadership team did their bit for the community and environment by cleaning up some 7.5 km of the beach area at Awana Kijal. Aside from supporting the development of tourism in Terengganu through keeping the beaches clean, the initiative also focused on elevating employee wellbeing through physical activities. Altogether, some 730.8 kg of waste in the form of plastic bottles, tyres and polystyrene was collected by the programme's participants.

### Supporting Oil Spill Response Training for Emergency Responders

RGTSU collaborated with Malaysia Refining Company Sdn Bhd (MRCSB) to support DOE Melaka in organising oil spill response training for all new emergency responders. The training conducted by the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG) offered newly-appointed staff at the respective agencies the opportunity to both acquire theoretical knowledge on the strategic and tactical responses in the event of an oil spill, as well as to familiarise themselves with the related equipment.



**RESOURCE MANAGEMENT**

In support of UN SDG12 (Responsible consumption and production), and in line with PGB’s endeavours to reduce resource usage, we implemented these key initiatives in 2022:

**Use of digital tools for ROW surveillance and optimisation of regasification operations**

PGB performs pipeline Right of Way (ROW) surveillance activities, conducted by staff for on-the-ground surveillance and/or helicopters surveying the pipeline distribution network from the air. Subsequently, RGTSU operations required staff to travel back and forth to offshore, exposing them to high personnel offshore hazards. Embracing digitalisation into every aspect of our business, PGB has adapted to the New Way of Working at across our organisation. This involved digital transformation at our transportation and regasification assets through GT, RGTSU and RGTP Digital Transformation (GT-DX, RGTSU-DX and RGTP-DX).

The GTR team started utilising drone technology to conduct surveillance activities over a target area initially covering some 800 km of the distribution network. The drones have a flying range of between 10 and 100 km as well as livestreaming capabilities that substitute conventional surveillance. The coverage includes large areas with varied terrain, inaccessible areas to humans, and can also monitor the environmental conditions along the distribution network. The Unified Operation Centre (UOC) enabled RGTSU to be operated remotely, equipped with engineering capability for rapid diagnostic analysis for our team to identify action items and make faster decisions.

As a result, the GTR successfully utilised short to medium-range drones in place of ROW helicopter to conduct ROW surveillance activities, translated into 234 litres of jet fuel savings over a period of six months. At the same time, RGTSU remote operations via UOC minimised offshore logistics and staff traveling risk, while still keeping the high facilities uptime and reliability.



**Side Stream Filter Installation Project at TSET**

TSET installed a Vortisand side stream filter unit at its cooling water system as this had proven effective in reducing turbidity as well as had low installation and operational costs. The side stream filter is able to remove the suspended solids from the municipal water supply, thus increasing the water quality and reducing the cooling water blowdown. As a result of this initiative, we expect to reduce chemical purchases by approximately RM60,000 per annum.

The following table highlights the data compiled on PGB’s raw materials usage in 2020, 2021 and 2022:

**Raw Materials Usage (kg) (2020-2022)**

Unit	Type of Chemical	Annual Average Consumption (kg) According to Type		
		2020	2021	2022
Cooling Water	3DT 129	8,906	7,737	10,780
	3DT 304	12,930	12,051	15,055
	N7330	14,510	14,655	19,557
	3DT 199	3,960	4,080	4,355
	GN8020	22,289	23,413	24,934
	NX1103	16,363	14,985	15,850
	NX1104	15,130	14,887	13,902
	SODIUM HYPOCHLORITE	219,000	220,000	120,201
Boiler Water	BT3000	1,009	1,181	1,240
	TriAct 1800	35,937	36,291	35,449
	ELIMINOX	4,941	4,865	5,369
	HTP73614	22,644	22,276	27,418
	NA0660	6,363	5,826	5,065
	OS5300	5,955	6,284	5,586

**THIRD PARTY ENVIRONMENTAL AUDITS**

Selected PGB facilities continue to conduct annual third-party environmental audits as part of Environmental Impact Assessment (EIA) approval conditions. In line with the Environmental Audit Guidance Manual, third-party environmental audits are to be conducted by DOE-registered auditors. The scope of these audits include the assessment of environmental compliance as well as verification of environmental operational data that is submitted to the authorities (i.e., hazardous wastes, effluent, and air emissions, among others). Apart from that, the various PGB facilities also undergo annual independent limited assurance by SIRIM auditors to maintain their ISO 14001:2015 certification.

# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## BIODIVERSITY AND ECOSYSTEM SERVICES

Our commitment is to conduct and grow business in ways that deliver sustainable value and contribute positively to society and the environment. Our actions are guided by the PETRONAS Sustainability Agenda, which is aligned with the United Nations' Sustainable Development Goals. In line with climate science and our NZCE 2050 aspiration, PGB strives to demonstrate visible leadership on the nature and biodiversity agenda in Malaysia, specifically in the areas where we operate. We aim to conserve, restore, and enhance nature as we recognise that the issues surrounding our climate and nature are intertwined and need to be addressed together.



We are aligned with PETRONAS' Position on Nature and Biodiversity which was established in 2022. This translates into five areas of action as below:

No.	Areas of Action	Commitment
1	Establishing Voluntary Exclusion Zones	<ul style="list-style-type: none"> <li>We recognise the Universal Values<sup>1</sup> of UNESCO World Heritage Sites.</li> <li>We commit to not conduct any new<sup>2</sup> operation or project within UNESCO World Heritage Sites.</li> </ul>
2	Managing Nature and Biodiversity Risks	<ul style="list-style-type: none"> <li>We recognise the importance of conserving nature and biodiversity and will ensure no or minimal impact to biodiversity caused by our operations and projects.</li> <li>We aim to achieve net positive impact (NPI) on nature and biodiversity for new<sup>2</sup> projects in Protected Areas<sup>3</sup> and Key Biodiversity Areas<sup>3</sup> starting from 2024.</li> <li>We will establish site-specific inventory of important biodiversity features for our existing sites and consider additional conservation measures using a risk-based approach.</li> <li>We will develop Biodiversity Action Plans for new<sup>2</sup> projects in Protected Areas and Key Biodiversity Areas, starting from 2024.</li> <li>For existing operations, Biodiversity Action Plans will be developed for Very High and High Risk sites<sup>3</sup>, which are identified from Biodiversity and Ecosystem ("BES") risk profiling.</li> </ul>
3	Promoting Nature and Biodiversity through Partnerships and Collaborations	<ul style="list-style-type: none"> <li>We support local nature and biodiversity conservation, restoration and enhancement efforts to safeguard and protect ecosystems, habitats and endangered species in Malaysia and other countries where we operate.</li> <li>We continue to participate in relevant initiatives that promote nature and biodiversity conservation.</li> <li>We partner with credible international organisations to leverage global best practices, international frameworks and standards.</li> </ul>


No.	Areas of Action	Commitment
4	Supporting Public Policy that Aims to Protect Nature and Biodiversity	<ul style="list-style-type: none"> <li>PETRONAS supports the intent of the forthcoming United Nations (UN) Post-2020 Global Biodiversity Framework, and Malaysia's National Policy Biodiversity (NPBD), as well as recognises other countries' policies and ambitions on nature and biodiversity where we operate.</li> </ul>
5	Promoting High-Quality Nature-Based Climate Solutions	<ul style="list-style-type: none"> <li>As part of our aspiration to achieve Net Zero Carbon Emissions (NZCE) by 2050, protecting nature and biodiversity is an integral part of supporting nature-based carbon offsets.</li> <li>We actively explore and invest in opportunities in high-quality nature-based climate solutions, anchoring on credible, internationally recognised certification standards.</li> </ul>

Notes:

- Outstanding Universal Values, which means cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of humanity (Source: UNESCO World Heritage Centre – Compendium).
- Will be determined using Biodiversity and Ecosystem Services (BES) risk profiling and analysis by leveraging the Integrated Biodiversity Assessment Tool or IBAT (Source: UNESCO World Heritage Centre - Compendium).
- As per footnote 2.

### Biodiversity and Ecosystem Services Explained

Today, there is greater demand for the business community to play a more extensive role in biodiversity and ecosystem services (BES) management and conservation. The term "**Biodiversity**" – made up of the words "biological" and "diversity" – refers to all varieties of life that can be found on Earth, the communities that they form, and the habitats in which they live. Meanwhile, the term "**Ecosystem Services**" relates to the benefits that ecosystems contribute towards human well-being. These services can be divided into four categories, namely (i) provisioning services – products or goods such as water, fish, or timber; (ii) regulating services – ecosystem functions such as flood control and climate regulation; (iii) cultural services – non-material benefits such as recreational, aesthetic and spiritual benefits; as well as (iv) supporting services – fundamental processes such as nutrient cycling and photosynthesis that support the above three categories.



Source: Based on World Resources Institute (WRI) materials

The PETRONAS Group is committed to minimising and preventing disruptions to BES through leveraging tools such as holistic BES risk assessments which include the Integrated Biodiversity Assessment Tool (IBAT), a one-stop global dataset on biodiversity. At the same time, PETRONAS is focused on restoring and nurturing the ecosystems around its operations through conservation efforts. In this regard, PGB too is doing its part to protect the BES surrounding our projects and operations by tapping tools such as Environmental Impact Assessments (EIAs) and the Biodiversity and Ecosystem Services Risk Assessment (BESRA), while undertaking conservation initiatives.

# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## BIODIVERSITY AND ECOSYSTEM SERVICES RISK ASSESSMENT (BESRA)

In 2018, a BESRA was conducted in PPIC covering major operations in that area. The BESRA methodology is used to provide better insights into the potential impact of operations on the BES in the surrounding areas where we operate. Based on the risks identified, the PPIC was classified as having low to moderate risk to BES. All data collected served as a baseline data for future assessments.

### BES RISK PROFILING

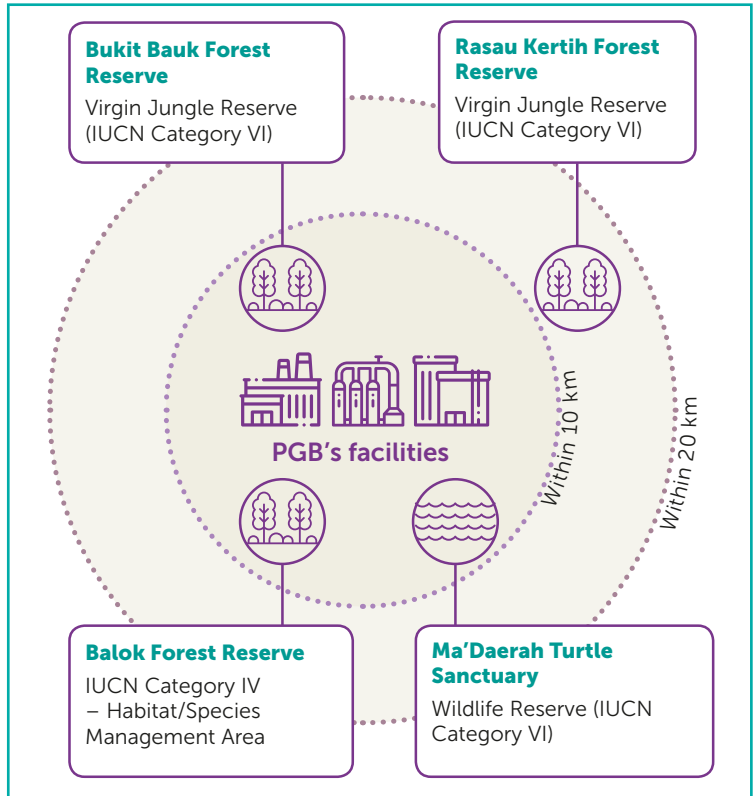
In 2020, PETRONAS completed BES risk profiling for all its existing facilities onshore and offshore facilities in Malaysia including PGB's facilities i.e., GPK, GPS, TSET and UK. Due to the size and complexity of the PETRONAS Petroleum Industry Complex or PPIC operations, any spill or pollution can cause damage to sensitive riverine, marine and coastal ecosystems, as well as impact surrounding BES and the livelihood of communities.

While PPIC is not within any protected area, it was given a medium risk rating as the area contains important ecosystem. In tandem with this, the assessed sites within the PPIC, namely GPK, GPS, TSET, and UK, have also been categorised as medium risk. UG in particular, has been given a medium risk rating due to its proximity to protected areas such as forest reserves. Upon identifying the inherent risks involved, physical, operational or abatement controls have been set in place by applying a mitigation hierarchy and minimising risk impact.

BES Risk Matrices have been developed with reference to the PETRONAS HSE Matrix and the document titled "Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning" (prepared for the Multilateral Financing Institutions Biodiversity Working Group) where the risk likelihood and severity levels have also been defined. This is outlined in the following table:

Facility/Asset	Likelihood	Severity	Risk Rating	Justification
The PPIC in Kertih encompassing Gas Processing Kertih (GPK), Gas Processing Santong (GPS), Tanjong Sulong Export Terminal (TSET), and Utilities Kertih (UK)	(C) Possible	(3) Moderate	C3 MEDIUM	Due to the size and complexity of PPIC operations, any spill or pollution incident can reach into sensitive riverine, marine and coastal ecosystem, which may impact surrounding BES and the livelihood of the community.  Note: Although the PPIC is not within any protected area, the area does contain important ecosystems.
Utilities Gebeng (UG)	(C) Possible	(3) Moderate	C3 MEDIUM	Proximity to protected areas (i.e., forest reserves).

The following map pinpoints the Key Biodiversity Areas (KBA) within a 10 km to 20 km radius of PGB's Gas Processing and Utilities facilities as well as the IUCN categories:



### What is the IUCN?

The International Union for Conservation of Nature or IUCN's Red List of Threatened Species is the world's most comprehensive information source on the global conservation status of animal, fungi and plant species. It is a critical indicator of the health of the world's biodiversity and serves as a powerful tool to inform and catalyse action for biodiversity conservation and policy change, critical to protecting the natural resources we need to survive. IUCN Category VI denotes protected areas with sustainable use of natural resources, while Category IV denotes protected areas that serve to protect particular species or habitats with management that reflects this priority.



Below are the number of flora and fauna species potentially found within a 50 km radius from PGB's facilities as per the Integrated Biodiversity Assessment Tool or IBAT:

### Kuantan



### Kertih



**CR** Critically Endangered    **EN** Endangered    **VU** Vulnerable    **NT** Near Threatened  
**LC** Least Concerned    **DD** Data Deficient

	CR	EN	VU	NT	LC	DD
Kuantan	28	84	220	254	2,384	145
Kertih	30	66	181	246	2,324	128

**Chronology of Biodiversity Assessments at PETRONAS Petroleum Industry Complex (PPIC) between 2010 and 2022**

Between 2010 and 2022, a variety of biodiversity-related assessments were conducted within what is today known as the PETRONAS Petroleum Industry Complex (PPIC) operations area. The PPIC encompasses all PETRONAS’ existing facilities onshore and offshore facilities in Malaysia including PGB’s facilities, namely Gas Processing Kertih (GPK), Gas Processing Santong (GPS), Tanjung Sulong Export Terminal (TSET) and Utilities Kertih (UK), which are located in Kertih, Terengganu.

2010	- PPIC area underwent its first BES survey.
2017-2020	- Several BESRAs were undertaken within the PPIC area.
2020-2021	- BES Risk Profiling was conducted to identify operation/sites with high and very high risks to biodiversity.
2022	- BESRAs were conducted for sites with high and very high risks, and BAPs developed to outline required mitigation measures based on the risks identified. - A biodiversity survey was conducted to serve as a benchmark against the 2010 survey results and to supplement a BESRA conducted in 2018. - PETRONAS’ Nature and Biodiversity Position was established.

**BIODIVERSITY SURVEYS UNDERTAKEN IN 2010 AND 2022**












In 2010, the first biodiversity survey within the PPIC was carried out to better understand the biodiversity surrounding our facilities. The results from that BES survey were used as the baseline data for the area’s biodiversity.

In 2022, a follow-through BES survey was carried out to provide an updated overview of the ecosystem’s health as well as ascertain the changes to the area over a period of 10 years. The results from the 2022 BES survey were also compared against a Biodiversity Blueprint that was conducted in 2010. The BES survey assessed the area’s four main habitats covering the hill forest, coastal sandy beach, freshwater swamp, man-made lake, mangrove and riparian of Sg Kertih. The BES survey also covered flora and fauna groups such as fish, avifauna (birds), herpetofauna (reptiles, amphibians), and arthropods (insects).

While there were some differences by way of the survey methodologies used and the survey areas covered between the 2010 and 2022 surveys, the 2022 BES survey showed an overall increase in species group surrounding the facilities. The findings are summarised as per the following tables:

Groups	BES Survey 2010	BES Survey 2022
Plants	190 species	286 species
Mammals	7 species	10 species
Fish (swamp and man-made lake)	17 species	18 species
Fish (Sg Kertih)	9 species	13 species
Avifauna (birds)	123 species	122 species

Based on the BES survey findings, the following species have been identified to date:

Group	Species			Group	Species		
 <b>Flora</b>	Kelat Jambu Laut Rhizophora Spp Nypa Fruiticians (Nipah) Balau Laut	Willow Asam Kumbang Rotan Kerai Laut Serdang	Calamus Ericnaceus (Rotan Bakau) Keruing Gasing Akasia Semalu Gajah	 <b>Snakes</b>	Mangrove Snake Painted Bronzeback Striped Bronzeback	Puff-Faced Water Snake King Cobra	Equatorial Spitting Cobra Dog-Faced Water
 <b>Mammal</b>	Long-Tailed Macaque Dusky Leaf Monkey	White-Handed Gibbon Smooth-Coated Otter		 <b>Frog</b>	Sunda Toad Bulter’s Rice Frog Dark-Sided Chorus Frog Banded Bullfrog	Greenback Frog Three Striped Frog Common Treefrog Malayan Slender	Treefrog Dark-Eared Treefrog Grass Frog Rough-Sided Frog
 <b>Birds</b>	Lesser Adjutant Grey-Headed Fish Eagle	Great Hornbill Red-Crowned Barbet Red Throated Barbet	Mangrove Pitta Green Iora Black-Bellied Malkoha Rhinoceros Hornbill	 <b>Lizards</b>	Spiny Tailed House Gecko Flat-Tailed House Gecko Many-Lined Sun Skink	Garden-Fenced Lizard Green Crested Lizard Water Monitor	Common Butterfly Lizard Clouded Monitor
 <b>Turtles</b>	Southern River Terrapin Painted Terrapin	Southeast Asian Box Turtle	Malayan Softshell Turtle	 <b>Crocodile</b>	Estuarine Crocodile		
 <b>Freshwater Fish</b>	Puyu Tahi Lalat Haruan Tilapia Keli Kayu	Bulan Selat Sepilai Sepat Siam Sepat Kedah	Keli Bunga Pelampong Jaring Seluang Tembok Tebing Patung Julung	 <b>Seawater Fish</b>	Serinding Tahi Lalat Duri Kapas Ubi	Bawal Bulan Belanak Bolos Buntal Julung	Gerut Siakap Kekek Udang Ketam Nipah Udang Galah
 <b>Insects</b>	Bees Wasps Ants Flies Mosquitoes Beetles Weevils Moth	Bugs Treehoppers Cicadas Termites Cockroaches Dragonflies Damselies Mantids	Butterflies Grasshopper Katydid Cricket Caddisflies Barkflies Earwig Lacewings				

# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## BIODIVERSITY PROTECTION AND CONSERVATION PROGRAMMES

As a conscientious corporate citizen, PGB remains committed to undertaking biodiversity protection and conservation programmes which seek to maintain the ecosystems essential for present and future generations. To strengthen our efforts, we continue to collaborate with other industries, non-governmental organisations (NGOs) and regulators in Malaysia to implement environmental conservation programmes.

In 2022, PGB collaborated with several local government bodies and NGOs on the Sayangi Pantai Kita (Love Our Beaches) programme that aims to preserve coastal ecosystems. Through this initiative, we worked together with these parties to improve the coastal and ocean ecosystem by ensuring that marine life was kept safe from indiscriminately disposed waste and that the aquatic life cycle was not disrupted by toxic waste materials.

*The details of our combined efforts can be found in the sub-section titled "PGB's Environmental-Related CSR Efforts" within the Environmental section of this Report.*



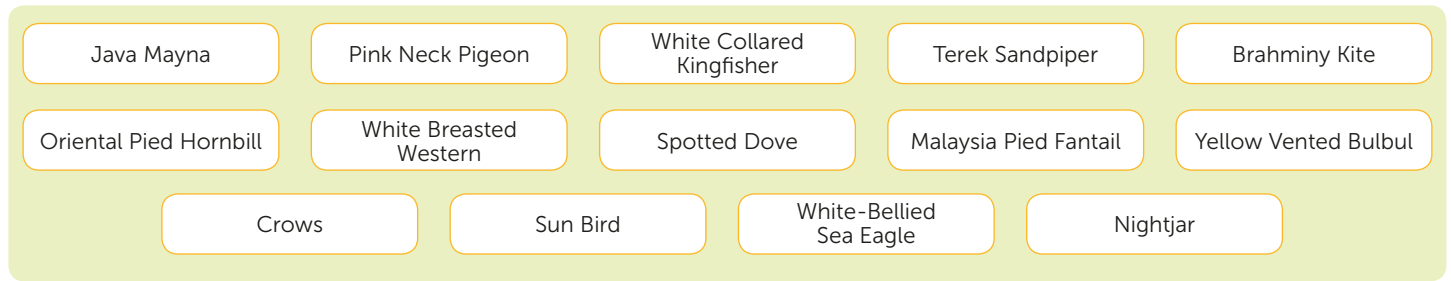
Apart from promoting awareness on the importance of preserving the environment using an educational approach, we aim to continuously build good relationships with the relevant authorities, NGOs and communities. We continue to engage with several government officials including representatives from various district offices, state DOEs, state drainage and irrigation departments, state forestry departments and state education departments. On top of this, our engagement efforts extend to state assemblyman, municipal councils and police departments.

### Sayangi Sungai Latoh Programme

We continue to support numerous local community programmes in the areas surrounding our operations. The Sayangi Sungai Latoh Programme at Kampung Sungai Latoh located in Kongkong Laut, Johor, is a five-year environmental conservation programme in collaboration with the Malaysian Nature Society (MNS). It aims to preserve and restore the ecosystem and related species within the Sungai Latoh area as well as prevent erosion along riverbank. It centres on the collection of data on the ecological stability of flora and fauna as well as river conservation activities, all of which serve to benefit all parties concerned, especially those residing within the area, which is close to our right-of-way gas pipeline.

As of 2022, a total of 9,625 mangrove samplings were planted since the initiative was introduced in 2018. In tandem with this, a comprehensive study on the habitat of the flora and fauna of Sungai Latoh has been undertaken by MNS experts, a local university as well as through syndication with the local authorities. The mangrove planting programme was carried out using the comp-pillow technique introduced by Forest Research Institute of Malaysia (FRIM). It is an innovative planting technique made from palm fibre, which is 100% natural, non-hazardous, biodegradable and environmentally friendly. We regularly monitor the survival and growth rate of the mangrove trees planted to ensure the success of the programme. As of 2022, a total of 9,234 mangrove trees have survived since 2018.

Following a biodiversity survey conducted at Sungai Latoh, several instances of species growth at the conservation area have been identified including the following species:



## Outcome of the Sungai Latoh Programme and Mangrove Planting Journey

No.	Date	No. of Trees Replanted	No. of Surviving Trees	Remarks
1	4 October 2018	350	216	PGB-MNS MNU Signing Ceremony
2	10 October 2018	100	70	Planted together with PGB-MNS MNU
3	7-10 January 2019	2,200	1,760	Planted with experts, PIFWA from Penang as well as the local community
4	28-30 January 2019	100	30	Planted using the comp-pillow technique
5	2-6 April 2019	2,300	2,070	Planted with local volunteers
6	13 April 2019	500	475	PGB Sentuhan Alam – Mangrove Replanting Programme
7	29 April-3 May 2019	1,300	1,300	Planted with local volunteers
8	3 November 2019	475	450	PGB Sentuhan Alam – Mangrove Replanting Programme
9	21-30 January 2020	2,000	1,960	Planted with local volunteers
10	28-31 March 2021	200	170	Planted with local volunteers
11	20 July 2022	764	733	PGB planted together with PGB-MNS MNU
<b>Total</b>		<b>10,289</b>	<b>9,234</b>	

Besides stabilising the ecosystem and preventing erosion along the riverbank, this initiative has helped build goodwill and enduring ties with local communities in the area.



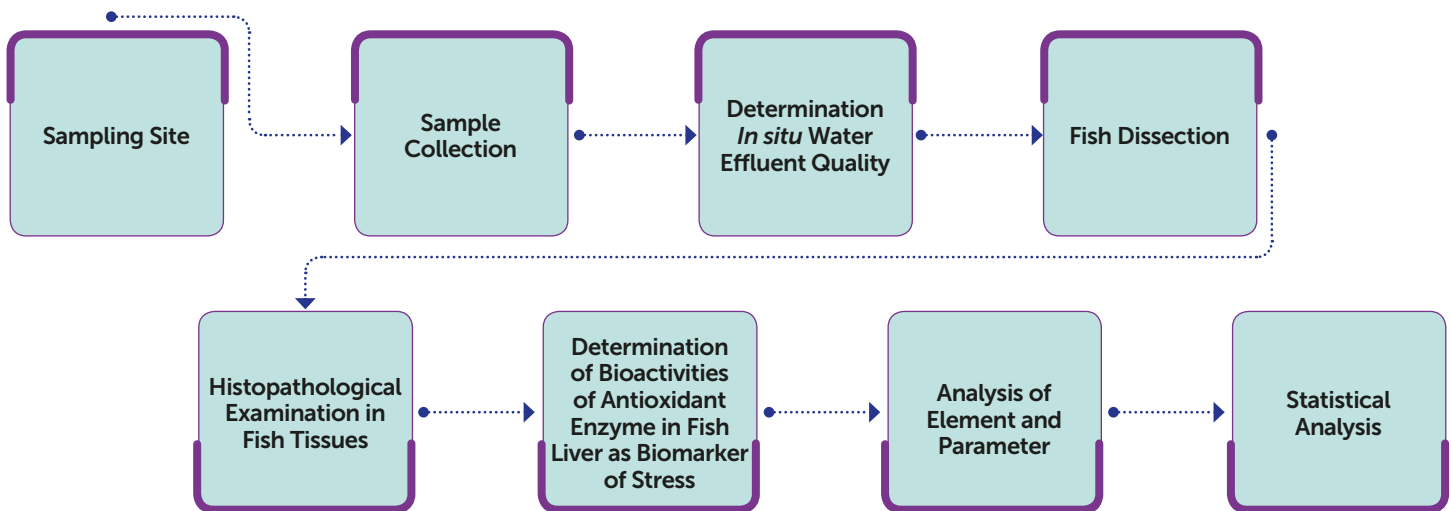
# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## WATER QUALITY STUDY AND ECOLOGICAL RISK ASSESSMENT

In 2022, PGB collaborated with University Malaysia Terengganu (UMT) to conduct ecological risk assessment activities\* relating to effluent water quality in the drains surrounding the PPIC. The study helped us to identify the related biomarkers and the impact of plant operations on surrounding aquatic life, as well as obtain a better understanding of the ideal water conditions that are required for healthy aquatic life during the monsoon and dry seasons.

\* Ecological or environmental risk assessment is defined as the estimation of the adverse effects of potential contaminants and other anthropogenic activities on ecosystems. A widely used approach to assess pollution in aquatic environments is the chemical analysis of water and sediments (Prabhakaran et al, 2017). Biomonitoring, or biological monitoring, is employed to determine the condition or changes of the environment by measurement of living organisms' responses, which are termed as biomarkers

The PGB-UMT water quality and ecological risk assessment study involved the following processes:



As a result of the study, the parameters that proved hazardous to the aquatic life at the PPIC area were identified and solutions were developed to mitigate the risks.

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

We continue to undertake EIAs at our projects to assess the impact of our operations on the environment and the biodiversity within the area. Recently, EIAs were conducted on new pipeline installations within the states of Selangor and Terengganu. As a result of the biodiversity risks assessment, the biodiversity impact for both pipeline installations have been categorised as low risk.

## ENVIRONMENTAL ASPECT IMPACT

The Environmental Aspect Impact enables us to identify and assess risks and the related mitigation activities as well as opportunities at our operations and projects. These findings which have both beneficial and adverse impact to environment and biodiversity are then incorporated into PGB's business management system for monitoring purposes.

## ENSURING WATER SECURITY

**PGB's Health, Safety and Environment (HSE) Policy spells out our commitment to upholding the safety of people, assets and the environment. In line with this, we are to protect and make the best use of our natural resources in a sustainable manner by improving operational efficiencies and mitigating any issues related to the usage of natural resources. Water is one of the key natural resources that we are committed to optimising and we have implemented several measures to reduce water wastage throughout our business operations.**

**The PGB HSE Policy calls for our businesses to implement measures to protect the environment, prevent pollution, and make optimal use of natural resources in a sustainable manner.**

## WATER MANAGEMENT GUIDELINES

PGB acknowledges the importance of incorporating water conservation practices into our decision-making processes and operational management activities. Our water management efforts are aligned with PETRONAS' Guidelines on Water Practices (WAPS) as well as PETRONAS Technical Standard (PTS) for Wastewater Management and Water Management. These guidelines are helping us to ensure that water is used in an optimal manner throughout our operations and that we minimise the impact of our water discharge on surrounding water bodies.

Five out of 11 PGB assets, namely GPK, GPS, TSET, UK and Utilities Gebeng (UG), have already complied with the PTS which includes the need for a water management plan, covering the details of a water recycling system.

## FRESHWATER WITHDRAWAL

Water withdrawal describes the total amount of water withdrawn from surface water or groundwater sources. In 2022, PGB recorded a total water withdrawal of 8.15 million m<sup>3</sup> compared to 7.90 million m<sup>3</sup> in 2021 marking a 3% increment in our water withdrawal activities.

The increase in water usage in 2022 was mainly due to:

- An increase in production demand by 4%;
- Maintenance activities related to tank, column cleaning and the brine reverse osmosis system; and
- Scheduled turnaround activities at two plants including water jetting for equipment cleaning.

### Key Achievements in 2022

- Saved 226,000m<sup>3</sup>** in relation to freshwater withdrawal
- Operated within the **intensity limit**
- Zero fines** and non-compliance incidents

# COMMITTED TO SAFEGUARDING THE ENVIRONMENT

## Municipal Freshwater Withdrawal

Location	2019 (mil m <sup>3</sup> )	2020 (mil m <sup>3</sup> )	2021 (mil m <sup>3</sup> )	2022 (mil m <sup>3</sup> )
GTR	0.25	0.20	0.27	0.38
GPU	7.39	6.93	7.63	7.77
PGB	7.64	7.13	7.90	8.15

### Freshwater Intensity GP (m<sup>3</sup>/tonne production)

#### 2022

Q1: 0.2098  
Q2: 0.1908  
Q3: 0.2271  
Q4: 0.2164

# 0.2099

#### 2021

Q1: 0.2066  
Q2: 0.2004  
Q3: 0.2128  
Q4: 0.2013

# 0.2051

### GP Freshwater Intensity Limit (m<sup>3</sup>/tonne production)

# 0.2890

### Freshwater Intensity UT (m<sup>3</sup>/tonne production)

#### 2022

Q1: 0.4035  
Q2: 0.4434  
Q3: 0.4636  
Q4: 0.4131

# 0.4305

#### 2021

Q1: 0.3536  
Q2: 0.3652  
Q3: 0.4344  
Q4: 0.3991

# 0.3877

### UT Freshwater Intensity Limit (m<sup>3</sup>/tonne production)

# 0.4710

Our main source of freshwater water supply is from municipal potable water. Meanwhile, at our regasification terminals namely RGTSU and RGTP, seawater is being utilised to heat up LNG and turn this into sales gas. We continue to monitor the temperature discharge of the seawater to ensure the discharge temperature does not become overly cold for marine life.

## Total Water Withdrawal by Source

No.	Source	2020 (mil m <sup>3</sup> )	2021 (mil m <sup>3</sup> )	2022 (mil m <sup>3</sup> )
1	Surface Water from Rivers, Lakes, Natural Ponds	0	0	0
2	Groundwater from Wells, Boreholes	0	0	0
3	Used Quarry Water Collected in the Quarry	0	0	0
4	Municipal Potable Water	7.13	7.90	8.15
5	External Wastewater	0	0	0
6	Harvested Rainwater	0.21	0.24	0.25
7	Sea Water, Water Extracted from the Sea or Ocean	97.00	62.00	128.00
<b>Total</b>		<b>104.00</b>	<b>70.00</b>	<b>136.00</b>

## Total Water Discharge by Destination

No.	Source	2020 (mil m <sup>3</sup> )	2021 (mil m <sup>3</sup> )	2022 (mil m <sup>3</sup> )
1	Ocean Total Discharge	97.00	62.00	128.00
2	Surface Water Total Discharge	3.45	4.09	3.50
3	Subsurface/Well Total Discharge	0	0	0
4	Off-Site Water Treatment Total Discharge	0	0	0
5	Beneficial/Other Use Total Discharge	0	0	0
<b>Total</b>		<b>100.45</b>	<b>66.09</b>	<b>131.50</b>

## Power Generation Water Withdrawal/Consumption Intensity

All power generation at PGB is derived from gas turbine generation and rooftop solar panels. Thus, no water consumption or withdrawal is required to operate the facilities.

## Water-Stressed/Scarce Regions

Two of PGB's assets i.e., UG and the Regasification Terminal in Sungai Udang (RGTSU) site office in Melaka operate within water-stressed regions. In 2022, the water withdrawals/consumption in water-stressed regions increased due to:

- High turbidity from the feed intake that led to high blowdown at the UG cooling water system; and
- An underground water pipe leak at the RGTSU Melaka municipal supply for which repairs were completed in April 2022.

No.	Category	2020 (mil m <sup>3</sup> )	2021 (mil m <sup>3</sup> )	2022 (mil m <sup>3</sup> )
1	Water Withdrawal at Water-Stressed Area (UG)	0.8030	1.1890	1.2160
2	Water Consumption at Water-Stressed Area (UG)	0.5870	0.2760	0.7590
3	Water Withdrawal at Water-Stressed Area (RGTSU)	0.0006	0.0005	0.0020
4	Water Consumption at Water-Stressed Area (RGTSU)	0.0006	0.0005	0.0020
<b>Total</b>		<b>1.3912</b>	<b>1.4660</b>	<b>1.9790</b>

During the 2022 water crisis at Gebeng, approximately RM1 million was spent to address the matter in order to ensure continuous operations.

	Costing Category	Cost (RM)	Remarks
a	Costs Associated with Water-Related Risks	RM968,268	Cost for purchasing and transporting water during the crisis
b	Investments in R&D to Mitigate Water-Related Risks	RM15,000	Cost for a rain harvesting study and installation at RGTSU

## Stakeholder Engagement at Water-Stressed Site

PGB has joined the Gebeng Industrial Support Group (GISG) to support the Pahang State Government and other relevant government agencies in addressing frequent water supply interruptions in the Gebeng area. A series of physical engagement sessions was conducted with Pengurusan Air Pahang Berhad (PAIP) and Badan Kawal Selia Air Pahang to discuss the issues and potential short-term and long-term solutions to mitigate the water shortage situation in the area.

## Assessment at Water-Stressed Site

In 2022, PGB and Petronas Group HSE performed a freshwater availability assessment within the Gebeng area to identify the potential risks to water availability and to make recommendations for water management plans to mitigate the risk of freshwater withdrawals. The assessment incorporated the following objectives:

- Assess future freshwater availability against projected demand from the years 2021-2070 through a detailed water availability projection modelling; and
- Identify current and future risks associated with freshwater availability and develop appropriate mitigation actions.

The assessment has enabled PGB to evaluate its freshwater management position for its high freshwater withdrawal assets.

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## WASTEWATER MANAGEMENT

### Wastewater Discharge by Location

Location	2019	2020	2021	2022
GPK (Sungai Kertih) (m <sup>3</sup> )	40,388	46,613	36,279	30,340
GPS (Sungai Paka) (m <sup>3</sup> )	206,291	279,548	109,514	48,925
UK (Sungai Kertih) (m <sup>3</sup> )	775,054	752,264	889,906	792,005
<b>Total (m<sup>3</sup>)</b>	<b>1,021,733</b>	<b>1,078,424</b>	<b>1,035,700</b>	<b>871,270</b>

### Wastewater Chemical Oxygen Demand Loading

Year	2020	2021	2022
COD Loading (t onne)	23.19	33.15	31.29

We measure the Chemical Oxygen Demand (COD) of our wastewater to assess how much oxidisable material it contains. The higher the COD, the lower the dissolved oxygen level in a water body, which is harmful to living organisms. All of our wastewater is treated prior to discharge and monitored regularly to ensure compliance with the Standard B limit Environmental Quality (Industrial Effluent) Regulations 2009. All wastewater that we discharge is channelled into rivers and seas, and not to enclosed water bodies. Regular monitoring is conducted to ensure our wastewater discharge will not pose a threat to the populace and the environment.

The COD level is one of the key parameters that we monitor regularly monitored. In 2022, our COD level reflected a reduction by two tonnes in terms of COD loading as compared to 2021. This was mainly due to the lower wastewater flow received.




## WATER CONSERVATION INITIATIVES

Each of PGB's assets has developed specific procedures that suit their respective operating conditions. For example, the GPU and GTR Divisions have developed their own process equipment and technology performance procedures. In the same manner, they have adapted and developed water management guidelines specific to their operations. The following are some of the measures undertaken to date:

<p><b>Improved Cycle of Concentration for the Boiler System</b></p>	<p>Both the UK and UG sites have conducted improvement studies and made operational adjustments to strengthen their respective boiler system's cycle of concentration from 10 cycles to 35 cycles. The cycle of concentration aims to reduce the boiler blowdown water and subsequently reduce water consumption by producing water and reducing the chemical consumption at the boiler system. In 2022, the water reduction amount for both plants was 50,174 m<sup>3</sup>.</p>
<p><b>Improved Cycle of Concentration for the Cooling Water System</b></p>	<p>Both the GPK and UK sites have established advanced chemical treatment programmes through substituting the use of polymer chemicals with the latest robust polymer technology. These measures are not only helping to enhance the corrosion and scaling protection for the sites' cooling water systems, they are also improving the operating cycles of the cooling water systems from four cycles to a minimum of six cycles, which in turn reduces cooling water system blowdown. In improving the cooling water cycle, water and chemical consumption has dropped about 176,000 m<sup>3</sup>/year and 13% respectively.</p>
<p><b>Water Balance and Cooling Water Side Stream Filter Installation Project at TSET</b></p>	<p>TSET has developed water balance calculations which enable it to identify potential water wastage and improvement opportunities. From the study, TSET's installation of a Cooling Water Side Stream Filter unit has proven to reduce turbidity with low installation and operational costs. The side stream filter has been able to remove the suspended solids from the municipal water supply, hence increasing the water quality and reducing the cooling water blowdown. This project helped reduce water consumption by some 8,000 m<sup>3</sup>/year. On top of this, total cost savings of RM70,000 was realised in relation to the plant's operating expenditure on the back of reduced water purchases from the municipal and lower chemical costs.</p>
<p><b>Collaboration with Customers to Recycle Condensate Water</b></p>	<p>The UK and UG sites continue to produce a wide range of products such as electricity and steam as well as industrial gases such as oxygen and nitrogen, together with demineralised water, raw water, cooling water and boiler feed water to customers in the surrounding vicinity. To ensure water resources are used in a sustainable manner, we work hand-in-hand with our customers to buy back and recycle the condensate from the steam supplied. The recycled external industrial condensate water serves as input for boiler operations at the UK and UG sites.</p>

Our efforts to date have centred on strengthening environmental practices by developing more robust and integrated energy, air, materials, waste and water environmental strategies that go beyond meeting basic compliance standards. We intend to continue strengthening our KPIs, policies and various measures by tapping innovation and industry best practices to ensure that PGB truly preserves the environment for future generations.

PGB is deeply committed to upholding and enriching the well-being of our stakeholders for a sustainable future. We continue to foster positive relationships with our employees, partners and the communities in which we operate by keeping them safe and adding value to their lives through effective and tangible measures.



**COMMITTED TO UPHOLDING EFFECTIVE, SUSTAINABLE HSSE PRACTICES**

PGB recognises that the care of our people directly correlates to the success and sustainability of the Group. We endeavour to create a secure and safe environment that ensures the well-being of our employees and the contractors under our care. Our efforts are guided by our PGB's Health, Safety and Environment (HSE) Policy which are stringently enforced across our operations.

**PGB'S APPROACH TO MANAGING HEALTH AND SAFETY RISKS**

As a leading industry player, PGB is committed to continuously strengthening our role as a reliable, responsible and caring employer that prioritises the safety of our people, assets and the environment. Our efforts are spearheaded by the Group's Leadership Team or LT who are committed to overseeing the implementation of PGB HSE Policy. This sets guidelines for how all employees and representatives of PGB are to conduct themselves to ensure we operate in a sustainable and responsible manner.

PGB's HSE Policy also defines risk and hazard management in accordance with ALARP standards, which are the benchmark for workplace risk management. "ALARP" is short for "as low as reasonably practicable" and involves weighing a risk against the trouble, time and money needed to control it.

All HSSE aspects of our business are governed by the Group's HSE Management System (HSEM System) which is aligned with the International Organisation for Standardisation's ISO OHSMS 45001:2018 and ISO EMS 14001:2015 criteria, seven of the 17 UN SDGs, and the four strategic Sustainability Lenses.

PGB Board and LT oversee the integration of the Group's HSE Policy into every aspect of our organisation. The LT also participates in continuous engagements with our employees and partners to ensure that all our stakeholders acknowledge and are committed to uphold the Group's HSE targets and key performance indicators.



**Our Commitment to Good HSSE Practices**

**MANAGEMENT LEADERSHIP**  
PGB is committed to HSSE Excellence in every aspect of our activities.

**WORKSITE ANALYSIS**  
PGB is committed to eliminate hazards and reduce risks to as low as reasonably practicable.

**WORKER PARTICIPATION**  
PGB shall provide consultation and participation to all employees and other interested parties.

**HAZARD PREVENTION & CONTROL**  
PGB shall provides safe and healthy work conditions for prevention of work-related injury.

**HEALTH & SAFETY TRAINING (COMPETENCY)**  
PGB shall provide the necessary resources, organisation and engage with key stakeholders on relevant HSE matters.

**CONTINUAL IMPROVEMENT**  
PGB shall ensure continual improvement of the HSE management system and enhance HSE performance.

**HEALTH AND SAFETY IN 2022**

In April 2022, Malaysia entered the endemic phase of the COVID-19 pandemic where majority of the Malaysian workforce returned to working at their offices. As the country embarked on the pathway to recovery, PGB continued to implement strict COVID-19 prevention measures to ensure the safety of our people and the continuity of our businesses.

The second quarter of 2022 saw PGB's employees returning to the office while upholding COVID-19 preventive measures. Ongoing COVID-19 monitoring and monthly reporting activities were put to good effect to mitigate the spread of COVID-related infections amidst the relaxed guidelines.

Aside from our COVID-19 measures, we continued to ensure that our work spaces and sites remained safe and secure. Our aim is to maintain zero incidents in loss time-injury (LTI) and fatalities across our operations.

To achieve this, the Group continues to implement its Generative HSSE Culture initiative which aims to inculcate a HSSE-centric consciousness among our stakeholders. Our Generative HSSE Culture as well as HSSE strategies and management activities emphasise the Group's efforts to care for the safety and well-being of people by embedding high safety standards into all aspects of our systems and processes. By setting high process safety benchmarks across our organisation, our LT is making a conscious effort to persuade all employees and contractors to embrace HSSE as individuals as much as it is a collective responsibility.

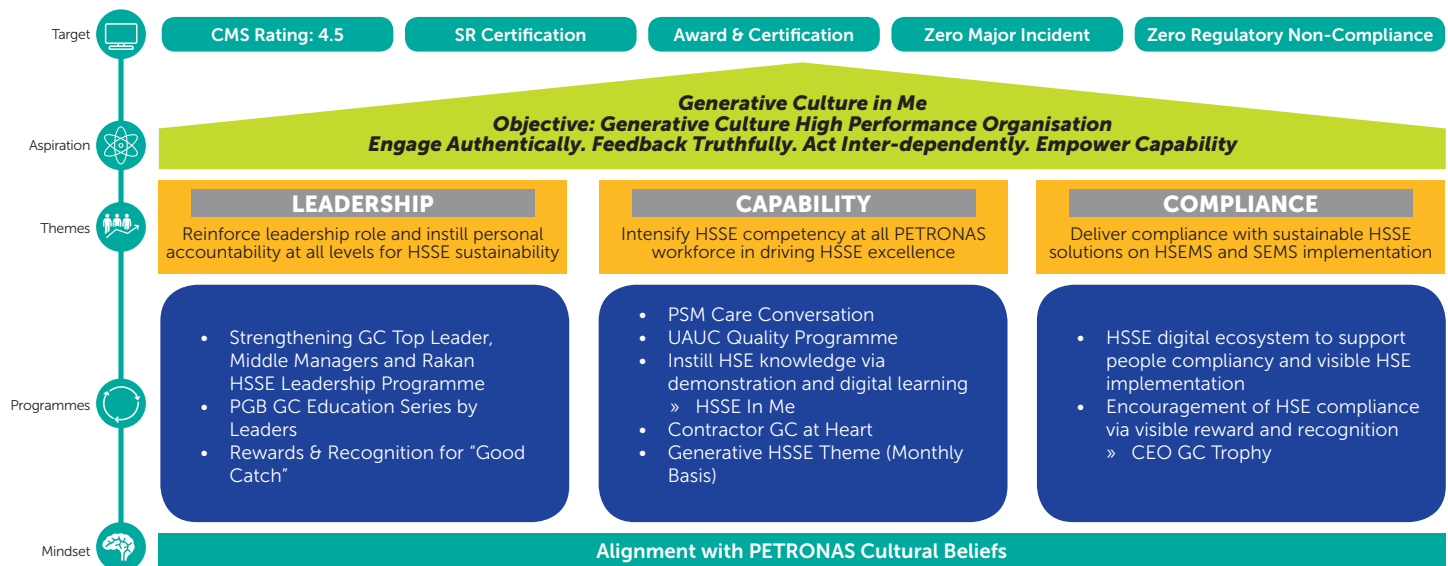
Our target is to achieve and sustain a culture maturity level generative score of 4.5 and above by 2024. As such, the Group has executed various programmes and initiatives to help us achieve our targets.

One of the initiative is PGB's Generative HSSE Culture in Me programme which encourages individual ownership of HSSE matters for the betterment of the corporate HSSE culture within the Group.

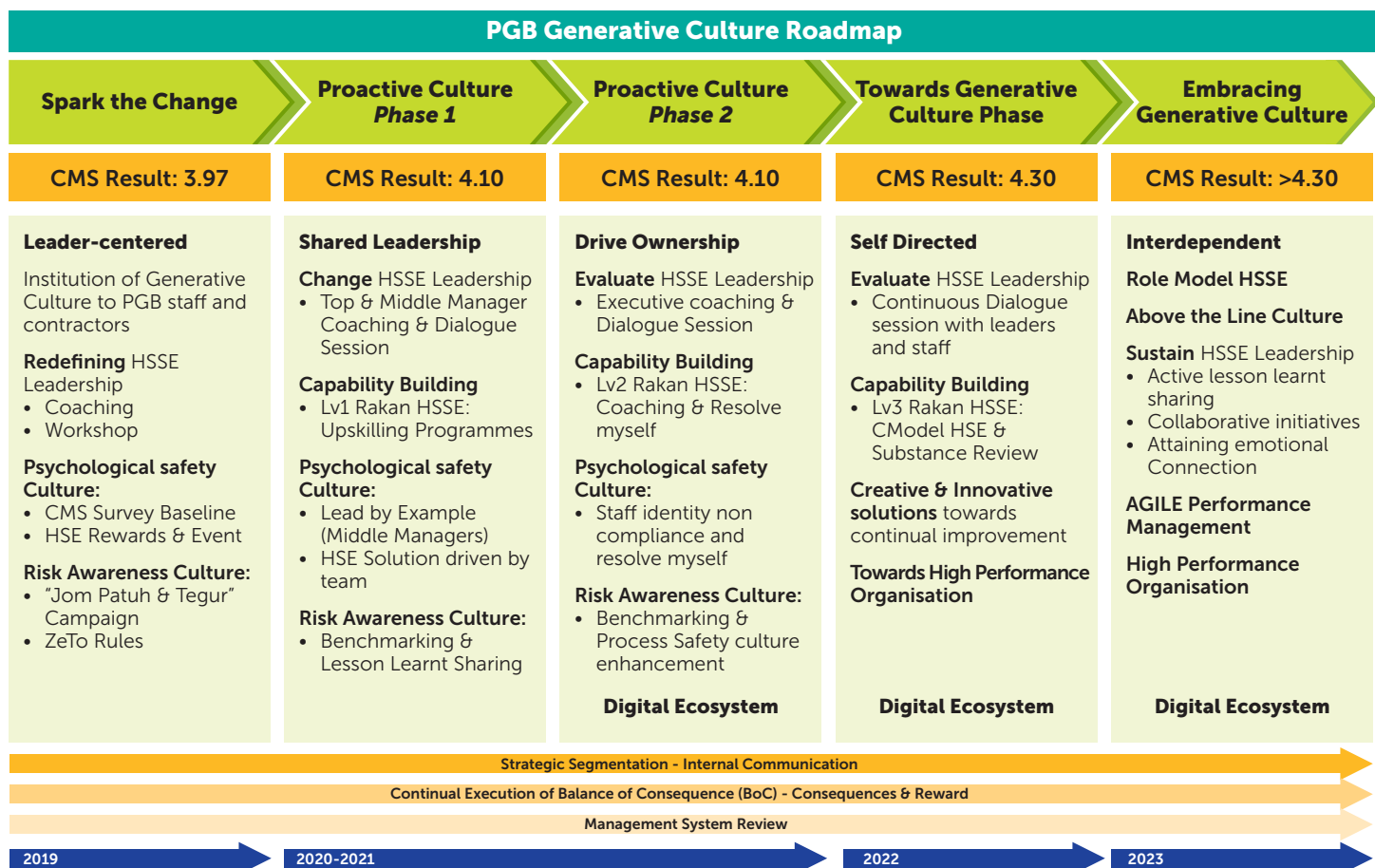
**With PGB's adoption of PETRONAS' Generative HSSE Culture, all stakeholders are highly-encouraged to uphold the following behaviours:**

- While our leaders are to serve as role models, everyone is to take ownership of HSSE matters to create true value for the Group;
- All of us are to be mindful about what we do and how our actions can impact others;
- We are all to look out for one another and keep potential risks and errors at the top of our minds; and
- We are all to create a safe space to intervene when any of us sees unsafe conditions or behaviours.

# ENSURING POSITIVE SOCIAL IMPACT



PGB scored 4.15 (Proactive level) in the Culture Maturity Survey 2022, maintaining our score from the year prior. While commendable, PGB will continue to enhance our HSSE culture as we work towards achieving a culture maturity level generative score of 4.5 and above by 2024.



For the year in review, the team at PGB delivered a strong HSSE performance as per the KPIs below:

Lagging Indicator	Limit	PGB Result		Benchmark	Leading Indicator	Target	PGB Result	
		2021	2022				2021	2022
Fatality	0	0	1*	American Petroleum Institute (API) U.S. Petroleum Industry Workforce Benchmark	Unsafe Act, Unsafe Condition (UAUC) – Person/Month	2	2	2
Lost Time Injury	1	1	1*		First Line Assurance Implementation – Schedule Compliance	100%	99%	99%
Lost Time Injury Frequency	0.13	0.09	0.08		HSSE Mandatory Training –Attended	100%	99%	99%
Major Fire	0	0	0	API Recommended Practice 754	Compliance Against MOC System, SSOW-Compliance	100%	100%	100%
Major Loss of Primary Containment (LOPC)	0	1	0		Culture Maturity Survey	4.5	4.15	4.15
HSE Regulatory Non-Compliance	0	0	1**	SO OHSMS 45001:2018 and ISO EMS 14001:2015	Management Walkabout/Lesson Learnt Sharing Per Month	1	2	2

Notes:

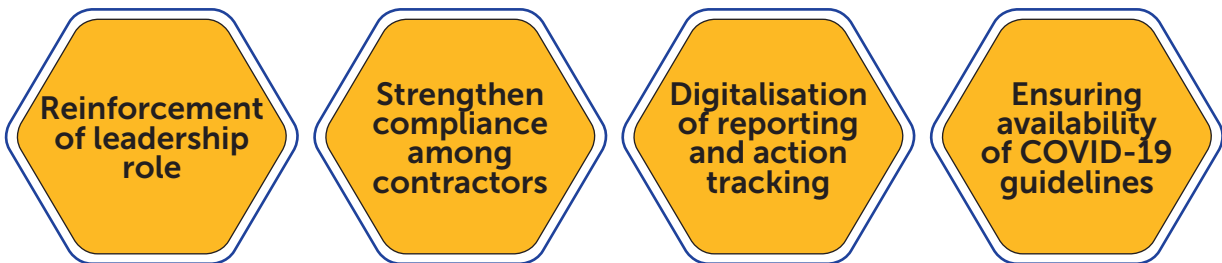
- \* 1 fatality & LTI referring to the same incident involving a contractor at project site.
- \*\* Notice of Probation (NOP) from Department of Safety and Health Terengganu received due to the fatality incident. The NOP was lifted in July 2022.

We will continue to chart our HSSE objectives and targets to ensure that we address all gaps in our performance as we focus on delivering stronger results. LT plays an important role to inculcate HSE excellence throughout our organisation by the implementation of initiatives such as the Group's Generative HSSE Culture programme.

Through effective implementation of our HSE Policy, we are set to achieve and maintain our "Four ZERO" targets – 0 fatalities, 0 major fires, 0 major Loss of Primary Containment (LOPC) incidents, and 0 major security incidents – by 2025.



PGB's mandate of safety is inclusive of our contractors and suppliers. The following lines of action, serve to support our safety model within the company and improve the safety performance of our contractors.



Recognising the integral role of our workforce in sustaining a Generative HSSE Culture, in 2022 we focused our efforts on:

<p><b>Communication</b></p>	<p>Share lesson learnt from major HSSE incidents in PETRONAS openly with all the staff for their learning and reflections.</p>
	<p>HSSE is a <b>two-way communication</b> between all levels and not driven by policy top leaders.</p>
	<p>Management to <b>surface out the real root cause</b> of incidents, especially the major ones. The outcome of the investigation must be communicated to all staff. In addition, the HSSE team should establish a platform for near-miss reporting.</p>
	<p>Practice a <b>culture of discussion</b> and open-mindedness to allow subordinates voice out their opinions.</p>
<p><b>Culture</b></p>	<p>Educate HSSE team to be more <b>effective in supporting O&amp;M</b> towards safe and reliable workforce.</p>
	<p>Align HSSE activities with those of other teams to <b>foster collaboration and empowerment</b>.</p>
	<p>Leader must <b>believe in HSSE</b> as a culture in order to ensure all personnel buy in to it.</p>
	<p>Internalise the HSSE culture, and <b>encourage feedback</b> even if it's not in line with the management.</p>
<p><b>Implementation &amp; Monitoring</b></p>	<p><b>Focus</b> on core business and work deliverables, and avoid activities that may affect performance.</p>
	<p>A matter or incident must be <b>investigated transparently, fairly and equitably</b>.</p>
	<p><b>Education or understanding</b> of safety among all staff and contractor.</p>
	<p>Review data from safety reporting system (i.e. UAUC system) to gauge on the reports quality.</p>
	<p>Ensure internalisation of <b>HSSE cultures by contractors</b>.</p>

Through our effective implementation of these actions, PGB sustained zero record of fatalities and LTIs from 2020 to 2022 among our employees. This result was made achievable through the strong leadership values demonstrated by the management, as well as the employees' commitment to achieve Generative HSSE Culture.

Work-related Injuries (Employee)	Target (2022)	2020	2021	2022
Loss Time Injury (LTI)	0	0	0	0
Total Recordable Cases (TRC)	0	0	0	2
Fatalities	0	0	0	0
Employee Accident Rate				
Loss Time Injury Frequency (LTIF)	0.09	0	0	0
Total Recordable Case Frequency (TRCF)	0.20	0	0	0.25
Fatal Accident Rate (FAR)	0	0	0	0
Manhours		4,856,076	4,026,334	4,001,044

*Loss Time Injury Frequency (LTIF) is defined as the number of Lost Time Injuries per million man-hours worked as defined by The Occupational Health and Safety Administration. A Lost Time Injury is further defined as a work-related injury or illness which renders the injured person unable to perform his normal duties on any day immediately following the day of the incident. It includes fatality, permanent total disability, permanent partial disability and loss of workday case. The Lost Time Injury Frequency is based on aggregated employee and contractor man-hours.*

In 2022, we recorded two total recordable cases (TRC). In the first incident, the injured person (IP) sustained a finger injury while adjusting limit switch metal rod. In the second incident, the IP injured his back as he slipped off a scaffolding ladder.

Among the effort made to avoid future recurrence are as follows:

- Updated the current Do Troubleshooting Procedure and 1<sup>st</sup> Line Troubleshooting Checklist that includes hazard-precautions and PPE requirements;
- Performed a reliability study on limit switches;
- Communicated to staff the right ascending and descending technique (i.e. three-point contact, right PPE); and
- Revisited the Work at Height (WAH) procedure to include the installation of a ladder support position.

**HEALTH & SAFETY STRATEGY AND MANAGEMENT SYSTEM**

In ensuring we approach safety in a holistic manner, PGB has set the following safety strategies:

- A well-established Generative HSSE Culture within the company and collaborating companies;
- Active employee involvement and commitment through the establishment of a HSE Committee;
- A contractor management system that controls and monitors contractor's HSE performance;
- An integrated occupational health and safety management system audited and certified by SIRIM (formerly known as the Standard and Industrial Research Institute of Malaysia);
- Corrective and prevention measures by ensuring closure of action items from incidents and assurance programmes;
- Competency training for employees and contractors that are tailor-made for their specific job scope;
- Full utilisation of digital tools across businesses and projects e.g., myAssurance for assurance and corrective measures tracking, HSSE IM for incident management and investigation, and Unsafe Act and Unsafe Condition (UAUC) for safety observation reporting;
- Periodic reporting of health and safety performance at leadership team meetings, steering committee meetings and digital reporting via PGB's Monitoring and Reporting System (MARS – an integrated and centralised system to report, record and monitor HSSE performance indicators).

**RISK MANAGEMENT: DUE DILIGENCE**

Due to the occurrence of HSSE incidents that took place in 2022, high risk in health and safety were identified within the PGB Enterprise Risk Profile. We addressed the gaps accordingly and continue to ensure we maintain top-notch, sustainable HSSE performance which complements our ongoing efforts to attain a Generative HSSE Culture.

Causes	Existing Control		Net Risk Rating
	Preventive	Effectiveness	Likelihood
1. New norm of working in view of current Covid-19 pandemic. 2. Challenges towards sustaining HSSE culture i.e., based on culture survey 3. Ageing assets and facilities 4. Unaware of changes in existing or Introduction of new policy/ regulations 5. Lack of technical competency towards regulatory requirement compliance 6. Negligence by contractor and projects 7. High manhours due to growing projects at PGB assets	1. Established SOP for managing the global change to COVID-19 in terms of HSE and operational. 2. Downloading and communication to PGB staff, CARE conversation i.e., downloading programme with leaders and relevant staff. Rakan HSE implementation. 3. Asset life cycle study, obsolescence study. Asset integrity Management System, Inspection Testing and Preventive Maintenance (TPM) programme, PETRONAS Risk Based Inspection (PRBI), TA and PRR 4. Formation of Self-Regulatory (SR) Division at PGB level supporting governance and standard requirement for asset integrity including for aging assets. 5. LOPC reduction framework programme i.e., site analysis, focus areas and issues, recommendation improvement. 6. Regular engagement with authorities to discuss current issues and updates. 7. Engagement/trainings in place to build and enhance HSE capabilities 8. Engagements with contractors i.e., toolbox sessions, Contractor's Forum. 9. Accountability and Behaviour Reinforcement (ABR) Management implementation 10. Enforcement of Global change to ZeTo Rules & Stop Work Authority implementation 11. Assurance and audit programmes in place e.g., first, second and third line assurance. 12. Implementation of Mandatory Control Framework. Asset Integrity, Contractor HSE Management.	1. Satisfactory 2. Good 3. Good 4. Satisfactory 5. Satisfactory 6. Good 7. Good 8. Good 9. Satisfactory 10. Good 11. Good 12. Satisfactory	Possible  Basis: Fatality incident at project site, Restricted Work Case (RWC) and Medical Treatment Case (MTC) at GPS in 2022
Consequences	Recovery	Effectiveness	Impact
1. Suspension of operating license/stop operations 2. Fines/penalty by or imprisonment regulatory bodies 3. Reputation tarnished.	1. ERP and BCP in place 2. Regular drills and tabletop exercise 3. Covid-19 operational response strategies	1. Satisfactory 2. Satisfactory 3. Satisfactory	Major  Basis: Worst case on single fatality

**RISK ASSESSMENT AND MANAGEMENT**

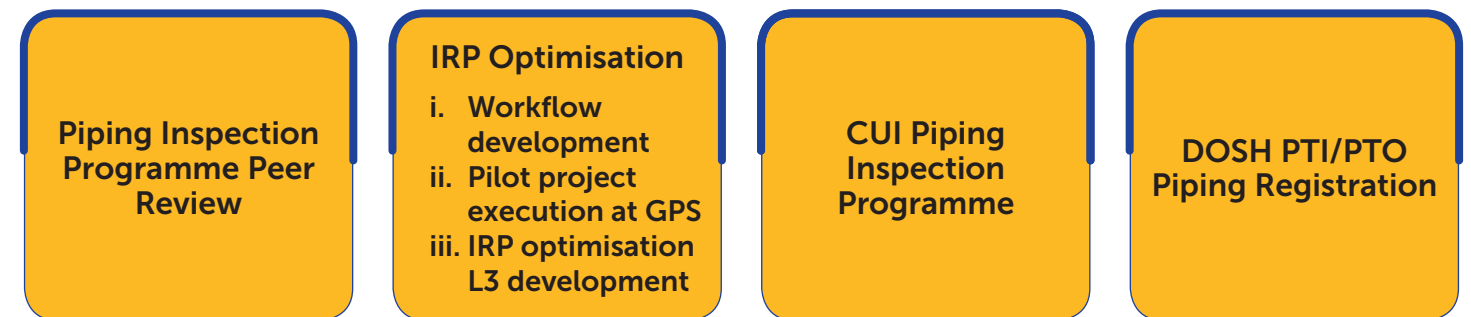
To prevent major process safety incidents with serious impact, we apply the Process Safety Principles. These principles cover the Group's facility-based designing, building, operating, maintaining and inspecting activities, while taking future emerging risks into consideration. In 2022, we continued to focus our efforts on developing and adopting digital initiatives by applying a "mistake-proofing" concept. This will enable us to enhance the monitoring of the integrity and reliability of process safety barriers, ensure compliance standardisation, data integrity and data transparency, as well as leverage analytical capabilities in terms of HSSE core modules.

The following are some of the process safety digital initiatives in place at PGB today:

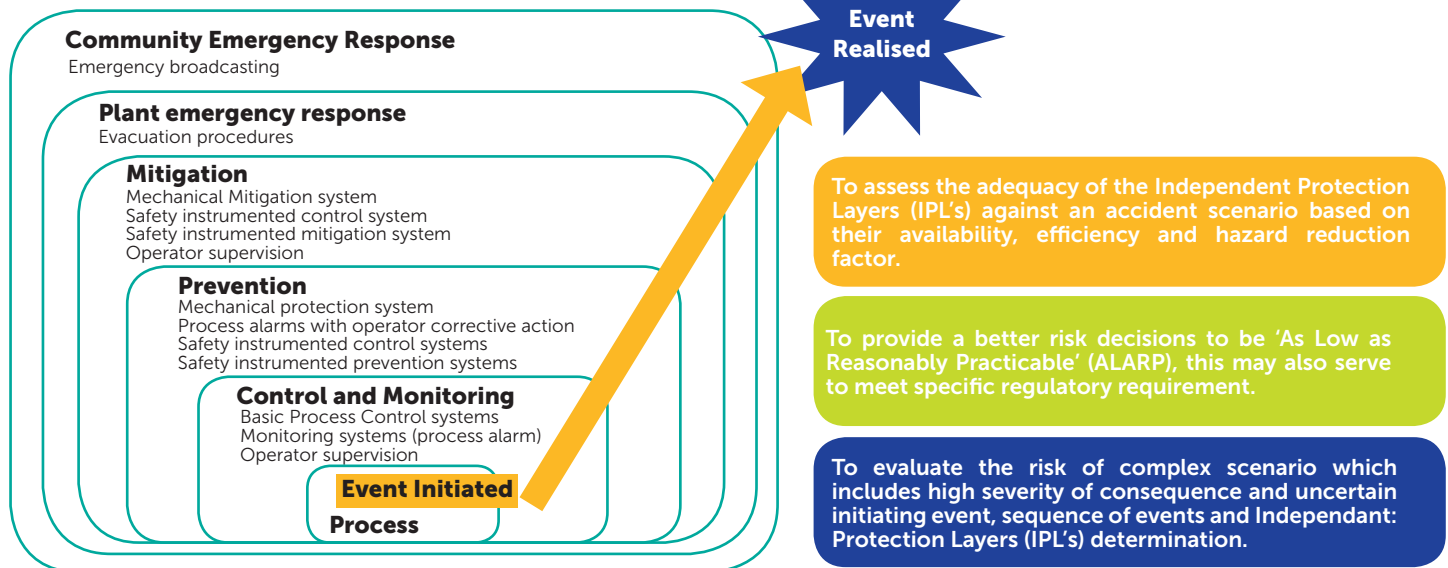
- Integrated Process Safety Solution (IPSS) for the Management of Change (MoC) and Hazard Identification and Risk Assessment (HIRA);
- e-Permit to Work plus (e-PTW+) integrated with Safe System Bypass/Override Certificate (SSBC);
- e-Permit to Work plus (e-PTW+) integrated with Energy Isolation (EI);
- Facilities Status Management (FSM) for safety critical equipment preventive and corrective maintenance management;
- Alarm Management Plant State Suite (PSS) which serves as an alarm management tool at GPU;
- Temporary Repair – Temporary Repair Digital Management;
- Enhanced EDMS system with 3D plant view to manage Process Safety Information;
- Inspection – drone inspection;
- Corrosion Analytic for plant piping and equipment corrosion prediction; and
- Integration between EDMS with PETRONAS Risk Based Inspection for plant risk visualisation.

During the year in review, PGB embarked on futureproofing our operational performance so as to ensure the prevention of major incidents related to plant reliability. In doing so, we minimised the risk of major disruptions to our core businesses. These initiatives are listed as follows:

**Enhanced Loss of Primary Containment (LOPC) Framework: Improvement of Critical Piping Inspection Programme**

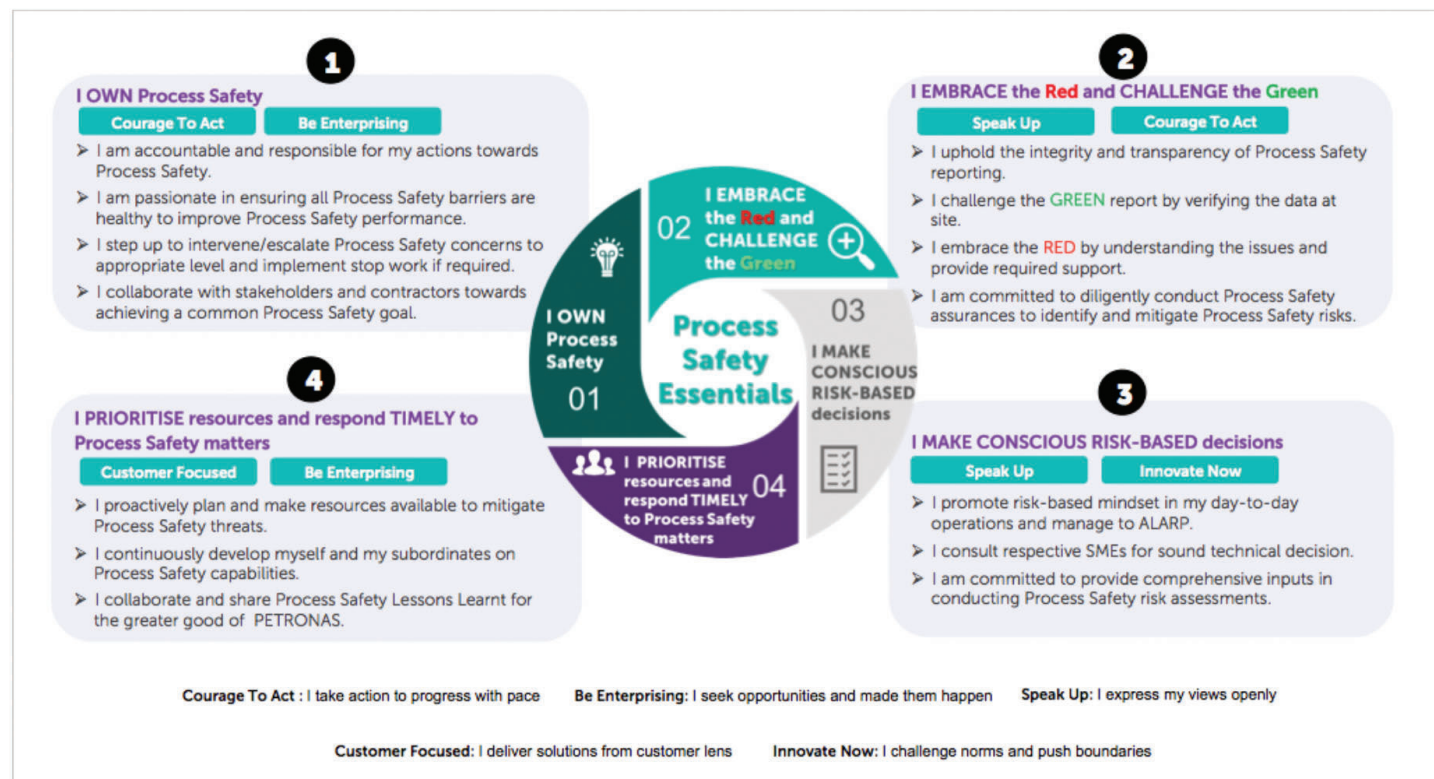


Layer of Protection Analysis (LOPA)



Continuous Programme on CARE Conversations

The Group's Process Safety Essentials are continuously cascaded to internal staff so as to cultivate a culture that is aimed at constantly improving our process safety performance.



Proactive Communication on Process Safety Management

We actively promote process safety management (PSM) via email and engagement with our staff and contractors.



As part of our aim to achieve "No Process Safety Accidents", we carefully monitor and ensure that our processes are aligned with the PETRONAS standards without any gaps. This exercise is carried out at every level of our organisation as part of a consolidated effort by our LT, staff and our frontliners. Moving into 2023, we will continue to focus on process safety even as we look to strengthen our asset integrity as well as our process safety mandate across the Group.



**Leveraging Digital Tools to Shape Our HSSE Culture**

In creating a culture of trust, transparency and unity, we strongly encourage our people to raise concerns and issues on unsafe acts and conditions. To strengthen this initiative, we provide the necessary tools to enable our people to voice out their concerns.

The Unsafe Act and Unsafe Condition or UAUC tool serves as the main platform for employees to proactively identify and report safety risks and hazards. By doing so, it enables the Group to facilitate appropriate interventions, e.g., unsafe conditions are rectified immediately to ensure safe working environments. PGB recognises the UAUC reports as a valuable opportunity for learning and as means of increasing HSSE awareness.

Countable activities were recorded as we increase our observance of Generative HSSE Culture:



**Digital HSSE at PETRONAS**

The myHSSE digital platform serves as our one-stop platform for all PETRONAS' HSSE digital solutions and their related system training resources. By adopting a single information platform that houses all 16 of our HSSE digital solutions—each of which addresses different business pain points—we are according users easier access and fit for purpose usage. Moreover, we are also enabling users to harness the power of HSSE data to derive insights on HSSE performance, trends, emerging risks and other important elements so that we can make proactive interventions. As we move towards our goal of realising predictive and even prescriptive HSSE analytics, we aspire for the Group's HSSE endeavours to rise several notches higher.

<b>SHIELD</b> <b>Stewardship, Health, Information and Environment Linked Database</b> A unified platform to manage the PETRONAS HSSE database. It contains modules on Occupational Health (OH), Industrial Hygiene (IH) and Product Safety (PS).	<b>IPSS</b> <b>Integrated Process Safety Solution</b> An integrated solution to optimise Process Safety work processes, provide governance oversight to minimise human error and ensure compliant driving, while providing valuable insights into risk management.	<b>EPICS</b> <b>Environment and Social Performance Integrated and Centralised System</b> An integrated system that provides holistic environmental and social performance data management for compliance and sustainability reporting.
<b>LegalEasy</b> A solution to create a specific entity's legal register and to conduct compliance audits against the legal register or selected legislation, based on a set of audit questions.	<b>SDS</b> <b>PETRONAS Safety Data Sheet</b> A search portal that provides valuable information on PETRONAS' products in terms of product composition, labelling for containers and transport, safe handling and storage, incident management and compliance with regulations.	<b>MARS</b> <b>Monitoring and Reporting System</b> An integrated and centralised system to report, record and monitor the HSSE performance indicators for PETRONAS groupwide.
<b>FMS</b> <b>Fatigue Management System</b> A centralised system to track and monitor the Hours of Service Limit (HSL) for PETRONAS' employees and contractors.	<b>E-Learning</b> <b>HSSE E-Learning</b> A centralised HSSE learning modules on a single digital platform.	<b>myHealth</b> <b>myHealth</b> One stop center for Approved Medical Examiner (AME) and medical practitioners to manage medical records submission.
<b>ICMS</b> <b>Integrated Contractor Management System</b> A system to screen contractors and prevent any blacklisted personnel from entering PETRONAS' premises.	<b>UAUC</b> <b>Unsafe Act, Unsafe Condition</b> A centralised platform to report, track and provide analytics of Unsafe Act, Unsafe Condition and Safe Observation for PETRONAS groupwide.	<b>AM</b> <b>Action Management</b> A centralised platform to record and track HSSE-related action items for PETRONAS groupwide.
<b>E-RGO</b> <b>Ergonomics Management System</b> An ergonomic risk management tool to minimise the risk of musculoskeletal disorders.	<b>IM</b> <b>Incident Management</b> A system to report, record and track actions on HSSE incidents and grievances for PETRONAS groupwide.	<p>You will find specific instances of how some of PETRONAS' HSSE digital solutions are being utilised throughout this Integrated Report. Just look for the myHSSE icon.</p>
<b>HIRA</b> <b>HSSE Integrated Risk Assessment</b> An integrated system to manage and perform HSSE-related risk assessments.	<b>CMIS</b> <b>Crisis Management Information System</b> A solution to minimise human actions by providing an assisted approach in managing a crisis through the use of technology and the system.	

PGB subscribes to PETRONAS' myHSSE digital platform, a one-stop digital hub for all HSSE digital solutions and their related system training resources. Comprising 16 HSSE digital solutions, each of which addresses different business pain points, the platform enables users to easily access the appropriate solutions. Users also have access to HSSE data to derive insights on HSSE performance, trends, emerging risks and other important elements which allows for proactive interventions. By leveraging this technology, PGB's HSSE achievements are set to improve even as we move towards predictive and more prescriptive HSSE analytics.



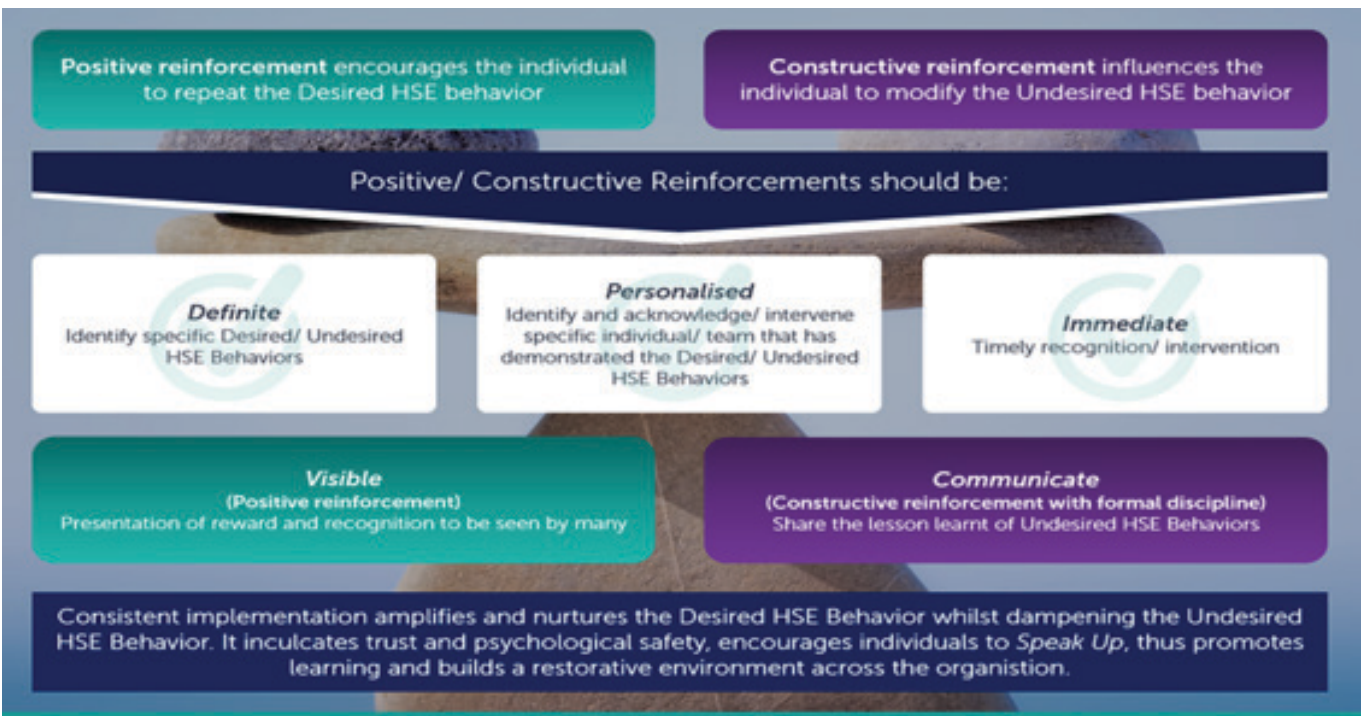
Since we digitalised our UAUC reports in 2018, our employees have been able to conveniently submit their reports via web-based and mobile applications. As a means of encouraging this practice, we regularly select winners based on their quality submissions through our Good Catch Reward programme. The programme enabled us to maintain our 100% quality observation score in 2022. Real-time data analytics aids in the development of various forms of predictive analysis models to prevent potential incidents, potential Zero Tolerance (ZeTo) Rules violations, and recurrence in the future.

PGB has also introduced the HSE Accountability and Behaviour Reinforcement (HSE ABR) tool. This tool aims to demonstrate and emphasise that unsafe behaviours are strictly not tolerated at PGB. Any misconduct found through incident investigation and assurance activities will be resolved by the Group.

The HSE ABR tool sets out deliberate processes and actions intended to reinforce behavioural misconduct and build a restorative environment following any error and violation. Aligned

with ISO OHSMS 45001:2018, this tool holds every employee, director of PGB and third party that perform work or services for or on behalf of PGB accountable to the PETRONAS Code of Conduct and Business Ethics (CoBE).

The HSE ABR framework is divided into positive and constructive reinforcement to ensure all incidents are dealt with in a holistic manner.



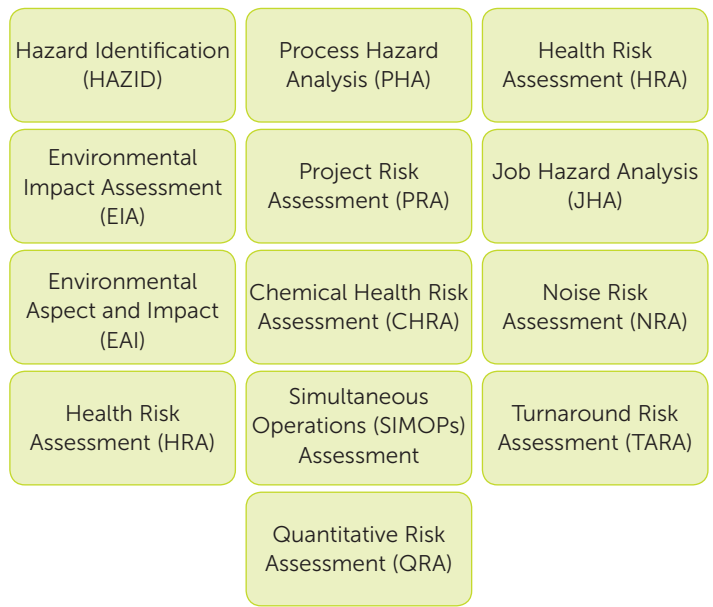
PGB continues to leverage on the following digital tools for our turnaround activities. These tools have helped to strengthen the effectiveness of our HSSE efforts while streamlining our processes.

Turnaround Initiative	Outcome	Impact
ePTW+ (electronic Permit to Work) application to replace manual permit.	<ul style="list-style-type: none"> <li>Paperless permit database enhances efficiency/time saving in relation to permit tracking, applications and approvals.</li> <li>Smooth Data Management and online tracking of any incident.</li> </ul>	Improves productivity
Online gas detection monitoring – the continuous tracking will give real-time conditions within confined spaces and enable the release of AGT (Authorised Gas Tester) from the operations team to perform other activities if needed.	<ul style="list-style-type: none"> <li>Real-time and continuous gas monitoring at site.</li> <li>Live reading is displayed via the online dashboard throughout shutdown execution.</li> <li>Enhanced safety for confined space activities.</li> <li>Data collection for gap analysis and improvement.</li> </ul>	Strengthens Zero Incident objectives
ITDIS (Integrated Turnaround Digital Solution) – the live TA dashboard provides real-time progress status and enables timely intervention by the scheduler and turnaround manager as and when necessary.	<ul style="list-style-type: none"> <li>Displays a high-level dashboard consisting of shutdown progress, HSSE information and manpower productivity, and enables monitoring of low-level details progress.</li> <li>Accessible anywhere through the ITDIS Dashboard on a laptop, phone or tablet.</li> <li>Incorporation of the Work Control Sheet (WCS) tracking feature in the dashboard improves work efficiency and assists in PASR closure.</li> <li>Displays shutdown worklist, and status of emergent work requests - either additions or cancellations. Features enhance work efficiency and assist in PASR closure.</li> </ul>	Enhances productivity and facilitates immediate intervention during any progress delay.
Explosion proof digital tablet – used by maintenance personnel for timely updates of progress status. Wireless connectivity at site enables the tablet to fulfil the ITDIS requirement.		Improves productivity and enables immediate intervention during any progress delay.
Biometric and temperature scanner – placed at the gate entry to support COVID-19 mitigation plan.	<ul style="list-style-type: none"> <li>An enhanced system equipped with face recognition features, temperature scanner and daily health declaration.</li> <li>Effective and safe COVID-19 screening with no human intervention required for temperature checks.</li> <li>Shortens the duration for manpower entering the plant.</li> <li>Furnished with auto blocking features for fatigue management and COVID-19 screening.</li> </ul> <p>Value Creation: 50% (1.6 hours) reduction in time entrance compared to the previous practice of 3.3 hours' time entrance.</p>	Reduces time of daily screening upon entry and improves overall productivity.
Real-time drone monitoring – can be viewed online and by those who are working from home.	<ul style="list-style-type: none"> <li>Enables monitoring of critical activities and working at height.</li> <li>Immediate intervention via attached camera and speakers.</li> <li>Reduces unsafe act and unsafe conditions.</li> </ul> <p>Value Creation: 60% (1,656 man-hours) reduction in manhours manning compared to previous practice of 2,761 manhours manning.</p>	Increases HSSE Self-Awareness, and improves overall productivity

**ENSURING EFFECTIVE RISK MANAGEMENT**

As we operate in a high-risk environment, PGB applies effective risk management to identify, assess, manage and mitigate risks to the lowest levels possible. The Group engages a risk-based prioritisation system which employs various controls and preventive measures to appropriately address risks. We also implement comprehensive processes to analyse HSSE risks as well as the impacts on our people, assets, reputation and the environment.

**HSE hazards and effects during operations and projects at PGB are identified via a risk-based approach that encompasses our entire value chain. We employ these techniques among others:**



To identify the type, relative likelihood and the consequence of a major accident that might occur at our plants, we are guided by the Control of Industrial Major Accident Hazards (CIMAH) Report. The report also provides recommendations for the safe operation of activities, outlines the controls for a serious deviation that could lead to a major accident, and spells out emergency procedures at the site.

The PETRONAS Technical Standard or PTS HSSE Due Diligence process serves to examine and identify all potential merger and acquisition projects and new operations through due diligence assessments. The due diligence assessments focus on the following key areas:



Based on the assessment, there are no due diligence identified in 2022.



**PREVENTION OF RISK AT COLLABORATING COMPANIES**

**Implementing Reliable Contractor HSSE Management**

PGB's contractors and staff are expected to abide by all our safety requirements to ensure that work is being performed safely at our facilities. All contractors are required to undergo a detailed prerequisite screening prior to entering our premises and before contracts are awarded to them. We have also enhanced our pre-award and post-award processes with more stringent requirements, which enables us to maintain a continuous and effective dialogue with Group Procurement on implementing the best possible way to execute the strategy without any misconceptions.

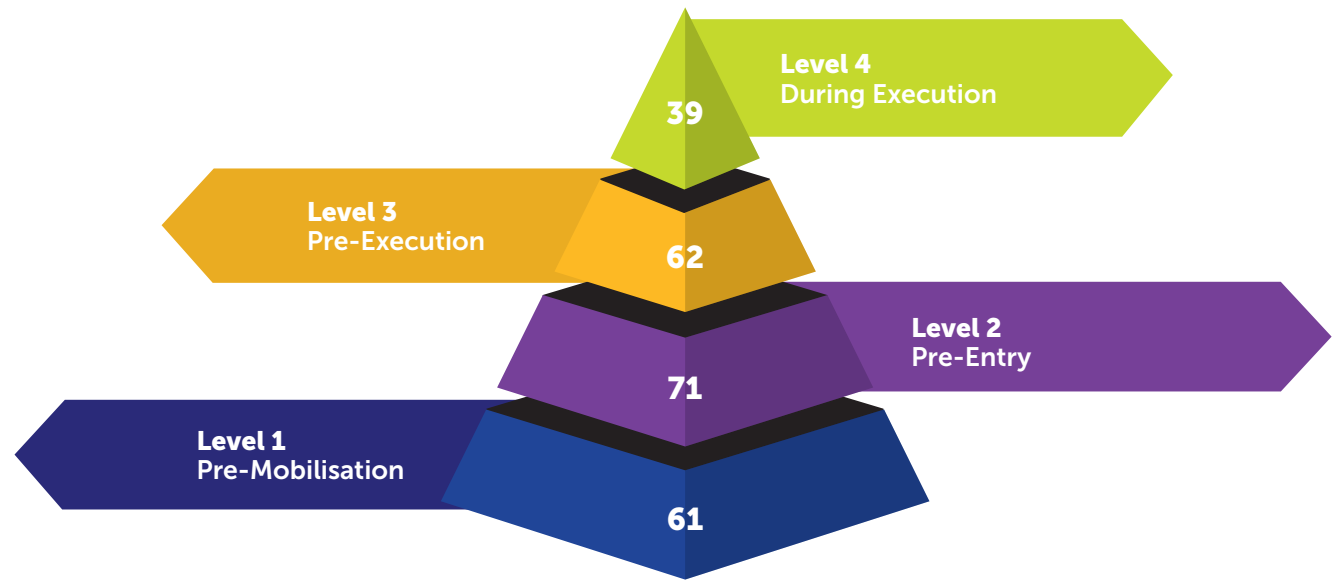
Contract owners are now required to conduct an overall risk assessment strategy that leverages PGB's hazard register. This strategy has allowed for contracts to be thoroughly evaluated prior to being implemented at our facilities, thus improving PGB's overall risk mitigation efforts. We have also improved our HSE Technical Evaluation Criteria for contracts worth RM2 million and above. Assessing and addressing safety issues during the pre-award phase enables the data to be used in the contractor's HSSE plan. All risk-mitigation activities during the post-award phase are monitored and audited by contract owners.

PGB also annually engages with the contractor's top management to ensure that a line of communication for contractors to address contracting issues is established. Following the completion of every project, contractors are evaluated on their work performance, quality, timeliness and HSSE criteria. Any gaps and non-compliance towards these elements will be recorded as credentials for the next award process and future improvements. To date, we have conducted 100% upskilling for contract owners via the obligatory myLearning training.

In 2021, the Group introduced a more stringent approach to managing our contractors' performance. Our efforts to manage hazards and risks are spearheaded by the External Risk Management (Ex-RM) programme, a structured method to evaluate contractors based on their HSSE performance (Post Award). The programme is aligned with PTS 18.03.03 Contractor HSSE Management and L3 Contractor HSSE Management.

Ex-RM comprises of two main pillars which are Level-4 Assurance and Contractor Profiling. Level-4 Assurance is a structured assurance process that helps the Group to focus more on managing onsite risks (residual risks) inside our plant as the programme tackles inherent risks before they enter the plant. Contractor Profiling is targeted at recording and analysing contractors' HSSE performance to evaluate their capabilities in delivering HSSE excellence. The Ex-RM programme was piloted at Gas Processing Kertih (GPK) and will be implemented progressively across PGB.

**Through the team's continuous efforts, we prevented 681 external hazards (inherent risks) from entering PGB plants.**



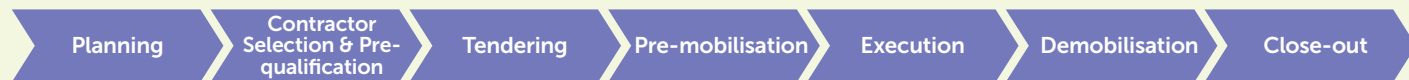
**Empowering Contractor Management at PGB**

Over the years, statistics have shown that the performance of our contractors has had a significant influence on PGB's most serious incidents. As such, PGB is committed to ensure safety compliance is stringently adhered by our contractors. We will also strive to reduce safety incidents with collaborating companies while meeting business needs.

To achieve these goals, we have developed contractor management system as follows:

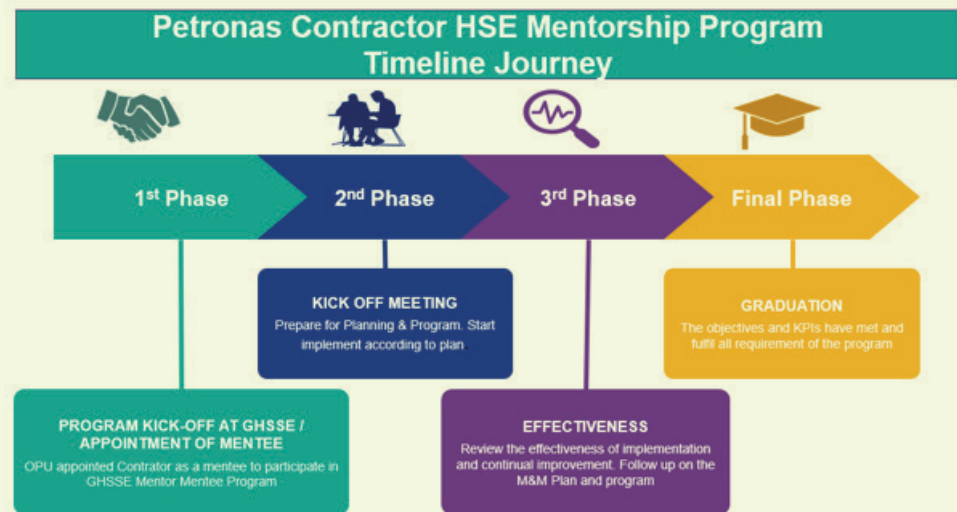
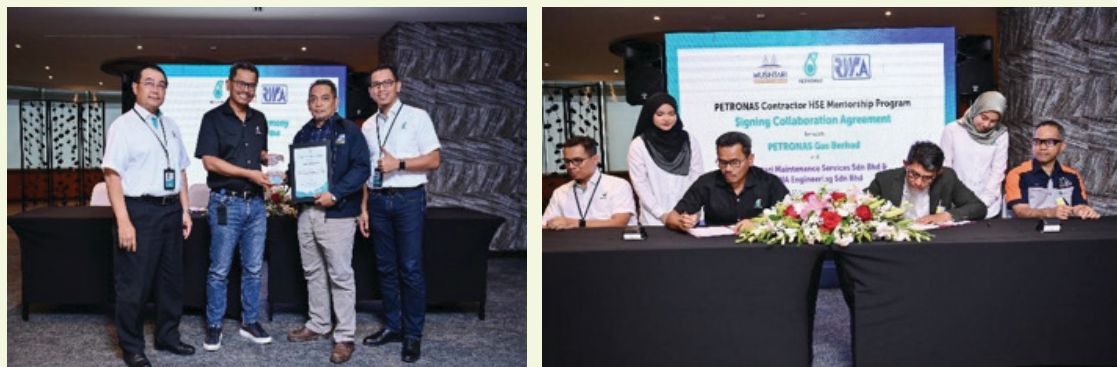
**A Comprehensive Contractor Management Structure**

It comprises of eight stages on managing contracting strategy:

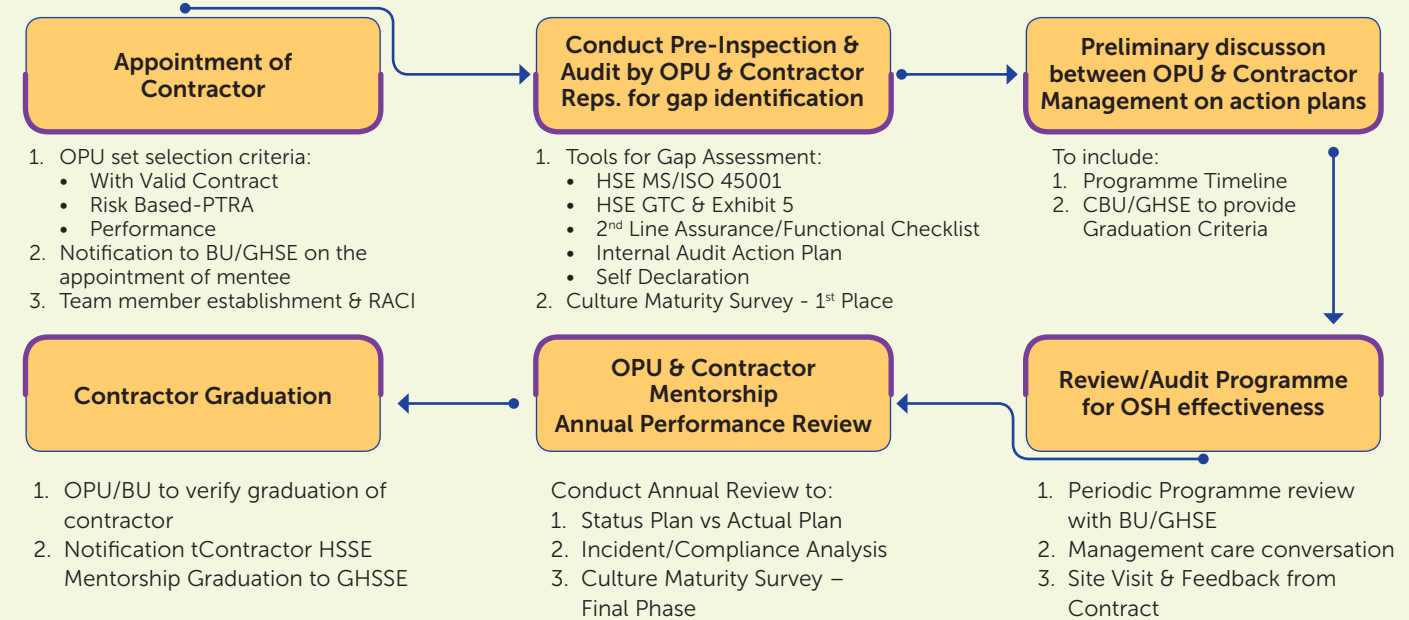


**Contractor HSE Mentorship Programme**

This programme is one of PGB's initiatives under Generative Culture which aims to strengthen contractor capabilities in HSSE Management and reduce incidents caused by contractor management. In 2022, RWNA Engineering Sdn Bhd and Mushtari Maintenance & Services Sdn Bhd, graduated from this programme.



**PETRONAS Contractor HSE Mentorship Programme Processes**



**Express Registration for External Service Supplier (XPRESS)**

Since October 2021, the XPRESS system was developed by PGB. The system serves to increase PGB's efficiency in managing contractor registration online. The registration process requires contractors to disclose their competencies as well as medical and security information. As the system carries centralised worker personal track records, this helps deter any misconduct.

**Contractor HSE Engagement Series**

We conduct quarterly engagements at the asset level to strengthen networking with partners as well as provide a platform for contractors to share any Occupational Safety & Health (OSH) concerns. At these events, contractors pledged to carry out activities safely and to meet the agreed upon targets set by PGB and the collaborating companies.

**Safety Observation Reporting via the UAUC Digital Tool**

Contractors are encouraged to utilise the Unsafe Act Unsafe Condition or UAUC tool in place of the older manual reporting system to enable easy tracking of reports and closure of gaps. Additionally, monthly rewards are given to contractors that submit quality UAUC reports.

**Enhancements to Turnaround and Shutdown Procedures**

In 2022, the Engineering Department introduced new initiatives and enhancements for effective management during turnaround and shutdown procedures at GPP3 and GPP4.



Turnaround Initiative	Outcome	Impact
Revision of Turnaround (TA) and Shutdown Permit To Work (PTW) Management	<ul style="list-style-type: none"> <li>Guideline for TA team to execute work activities during turnaround and shutdown</li> <li>TA PTW management coverage as below:                             <ul style="list-style-type: none"> <li>Operation permit type matrix</li> <li>PTW process flow, standard permit application</li> <li>Turnaround ePTW+ system</li> <li>ePTW+ requirements</li> <li>Agreed conditions</li> <li>Internal TA PTW arrangement</li> <li>PTW Grouping</li> <li>Joint site visit exclusion list</li> </ul> </li> </ul>	Eased and standardised the arrangement for PTW issuance and coverage during pre, execution and post-turnaround / shutdown.
COVID-19 Proactive Screening	<ul style="list-style-type: none"> <li>Onsite Coronavirus Mobile Test Strategy</li> <li>Gate entry and shuttle point demarcation</li> <li>TA/SD latest COVID-19 Guidelines</li> </ul>	Zero case outbreak during GPP3 and GPP4 shutdown
HSE Cosplay Programme	<ul style="list-style-type: none"> <li>Create awareness of and recreate the experience of the impact of incidents for staff and contractors involved in turnaround activities</li> </ul>	Zero recorded incidents during GPP3 and GPP4 turnaround activities

**Onsite COMBAT Strategy**

**Random screening**

SESSION	DATE	TARGET	TIME	VENUE
1	23 July 2022	S: 30, P: 120		
2	27 July 2022	S: 30, P: 120		
3	1 August 2022	S: 30, P: 120	0730am - 1200pm	Gate I
4	5 August 2022	S: 30, P: 120		
5	9 August 2022	S: 30, P: 120		
6	12 August 2022	S: 30, P: 120		

**REVISSED**

SESSION	DATE	TARGET	TIME	VENUE
1	21 July 2022	S: 15, P: 60		
2	23 July 2022	S: 15, P: 60		
3	25 July 2022	S: 15, P: 60		
4	27 July 2022	S: 15, P: 60	0730am - 1200pm	Gate I
5	29 July 2022	S: 15, P: 60		
6	31 July 2022	S: 15, P: 60		
7	2 August 2022	S: 15, P: 60		
8	4 August 2022	S: 15, P: 60		

**Gate Entry & Shuttle point Demarcation**

CATEGORY	DURING GPP4SD	
	ENTRANCE	SHUTTLE TEST (MARS)
Staff operation/ Mtu / TAS/ Project	Main gate	Onsite - Gate A1
Shutdown partners	Gate j	Gate j
GPXIA, COGEN, TANK Q4-711 Partners	Gate j	Gate j
Daily partners	Main gate	GPU/GPK Arrangement

\* Random test will be done at Gate-j

As a result, there were zero HSSE incidents in relation to our turnaround activities in 2022. This was equivalent to 550,908 total safe manhours during turnaround for RGTSU, GPP3 and GPP4. We will continue to implement digital initiatives to ensure we achieve safe turnaround execution.

**CONTRACTORS' PERFORMANCE**

Work-related Injuries Non-Employed Workers (Contractors)	Target (2022)	2020	2021	2022
Workplace Loss Time Injury Accidents (LTI)	0	0	1	1*
Total Recordable Cases (TRC)	0	2	1	1
Fatalities	0	0	0	1*
Contractors Accident Rate				
Loss Time Injury Frequency (LTIF)	0.09	0	0.13	0.12
Total Recordable Case Frequency (TRCF)	0.20	0.31	0.13	0.12
Fatal Accident Rate (FAR)	0	0	0	11.57
Manhours		6,516,110	7,557,858	8,639,726

Notes:  
\* 1 fatality & LTI referring to the same incident.



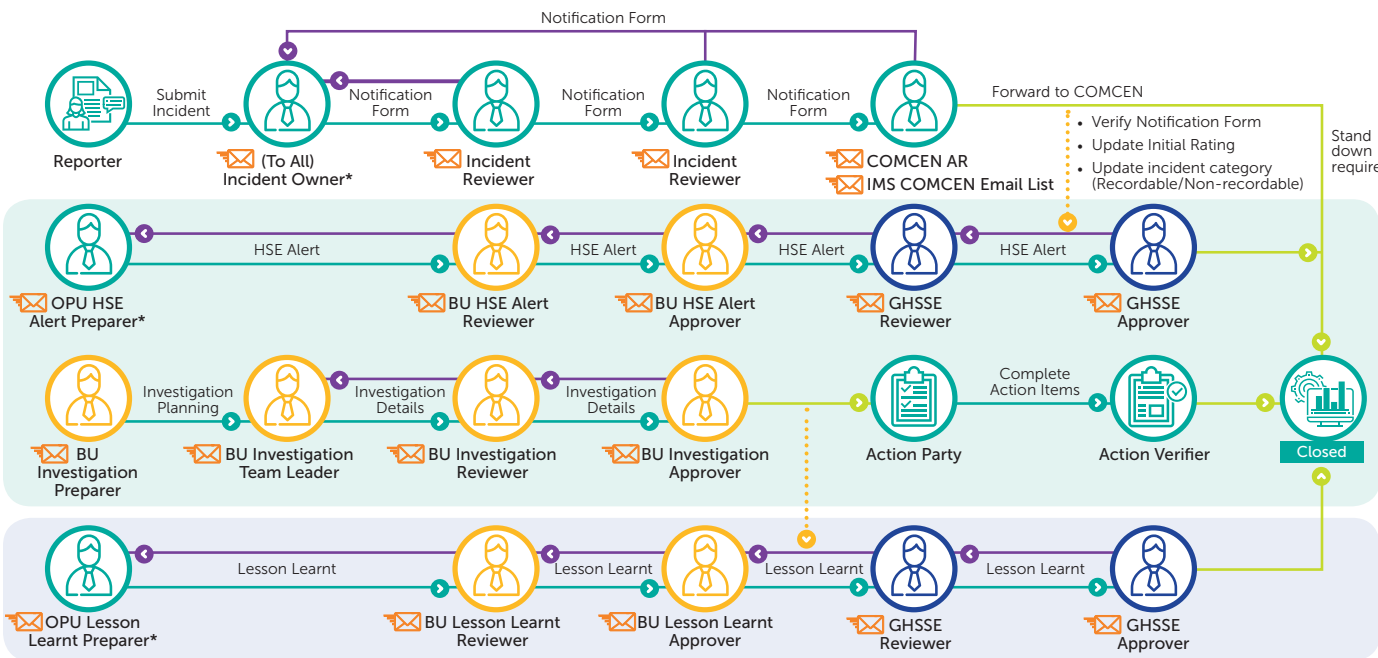
In June 2022, an incident occurred at an onshore pipeline project during a 48-meter length pipe string fit-up activity. The injured person was sent to the hospital, after which he succumbed to his injuries two days later. In response to this unfortunate event, an independent investigation team came up with prudent recommendations which include:

- Establishing work criticality criteria to incorporate risk from geographical and pipe strings condition;
- Establishment of lifting plan which includes centre of gravity (COG) information and a lifting methodology for critical lift and high-risk tie-in work activity for the tie-in inside trench;
- Placing an emphasis on the "line-of-fire" during lifting activities;
- Temporarily halting activities first, to assess and address risks properly before proceeding with work for any site adjustment; and
- Spreading awareness on site-specific hazards to project and contractor personnel during training and toolbox sessions;

To prevent a similar incident from recurring, the lessons learnt from the incident are continuously being communicated across PGB by the LT. At the same time, we have committed to conducting thorough regular internal audits at all project sites.

**MANAGEMENT AND INVESTIGATION OF ACCIDENTS AND INCIDENTS**

PGB has adopted the following Incident Rating 3 Workflow which is based on the PETRONAS Technical Standard 18.06.01 - Incident Notification, Investigation and Reporting. All incident reporting are to be recorded and monitored via the HSSE Incident Management System (IMS).



PGB prudently observes the investigation and analyse any incidents to determine the best course of action to lower accident rates, enhancing operational safety, and minimise risk.

The following process flow for investigation is as follows:



Proper planning is crucial to a good investigation as it ensures that all resources are effectively utilised, time is well managed and the required evidence collected properly. The planning process is as follows:



The investigation process adopts the following approach:



After an investigation has been carried out, the investigation findings are presented and reported to site and PGB management:



**Purpose of Investigation**

The investigation process requires the participation of all individuals related to the incident in determining the causes of the incident. These include workers' line managers, the workers involved, and workers' representative. At PGB, the use of the HSSE Incident Management (IM) System ensures that all HSSE incidents are reported and managed in a centralised system. This system is able to record, report and track actions on HSSE incidents as well as feed the data from the HSSE IM to the HSSE Monitoring and Reporting system (MARS), so that a monthly HSSE Performance Report can be readily extracted.

NEW WAYS OF WORKING	KEY FEATURES
<ul style="list-style-type: none"> <li>All processes are fully based on guidelines outlined in the PETRONAS Technical Standards 18.06.01.</li> <li>Centralized monitoring of HSSE Incident through dashboards and reports.</li> <li>Allow users to report and track actions on HSE and Security incidents for PETRONAS group wide.</li> <li>Optimized the business processes related to PETRONAS IM activities and procedures to ensure workplace safety and reduce risks of incidents in PETRONAS.</li> </ul>	<ul style="list-style-type: none"> <li>Generate notifications to COMCEN digitally</li> <li>Manage investigation end-to-end</li> <li>Provide centralized reporting and notifications for HSSE incidents in PETRONAS</li> <li>Integrate with Monitoring and Reporting System (MARS)</li> <li>Automated HSE alert and lessons learnt creation and communication.</li> </ul>

**COMMUNICATION TO EMPLOYEES AND ACTION PLANS**

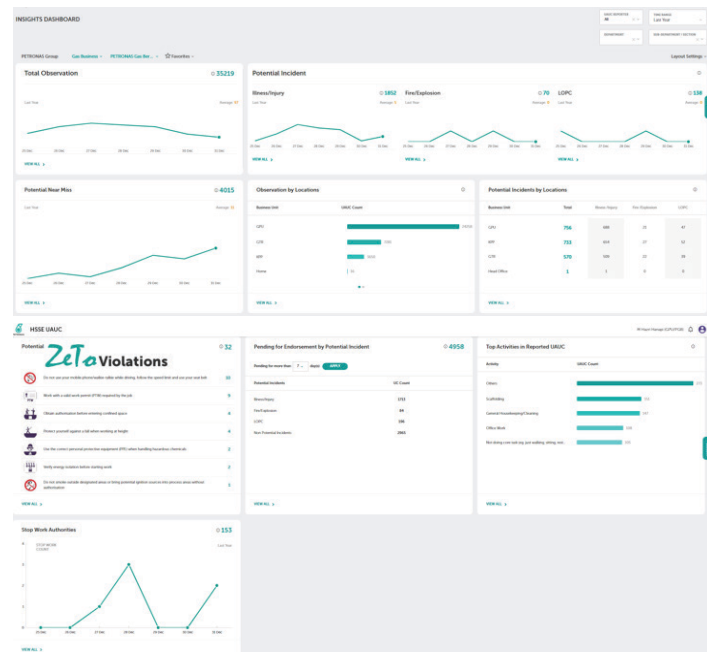
Communication is vital in ensuring that PGB's business objectives and expectations on safety are readily cascaded down to all staff members at all levels of the Group. Employees play an important role in improving health and safety by contributing and taking part in meetings and HSE programmes. PGB's MD/CEO organises engagements on a quarterly basis with staff to communicate the status of the Group's HSE performance in line with our business performance. To strengthen our communication, we also rolled out the following activities in 2022:



- a. Quarterly HSE committee meetings to review the effectiveness of the HSSE Management System programme and to recognise HSSE achievements.
- b. Email promotions from the Empowerment Team to increase awareness among staff.



- c. The Rakan HSSE programme to empower our front-liners to become Change Agents who will rally their peers by equipping them with the necessary communication and supervisory skills to push the Generative HSSE Culture agenda. Rakan HSSE participants are given three months to complete their individual projects before they graduate. These programmes aspire to create an environment where everyone takes ownership of HSSE, looks out for each another, and has the courage to intervene when dealing with unsafe behaviours or conditions.
- d. Monthly meetings with the PETRONAS LT to present HSE performance and discuss underlying issues that contribute to performance results and the necessary mitigation actions to be taken.
- e. Monthly safety observation reporting and stop work implementations through digital UAUC.



- f. Participate in first line assurance and close tracking and monitoring of action items through myAssurance and Power BI.



- g. The Group's Code on Business Ethics or CoBE.
- h. Management system review disclosures and close tracking and monitoring of action items through OETrack.
- i. PGB KAPENAS (workers union) Engagement 2022

**PGB KAPENAS Engagement 2022**



- j. COVID-19 Status Meeting and the Pandemic Preparedness Response Team directive with everyone's return to the office.

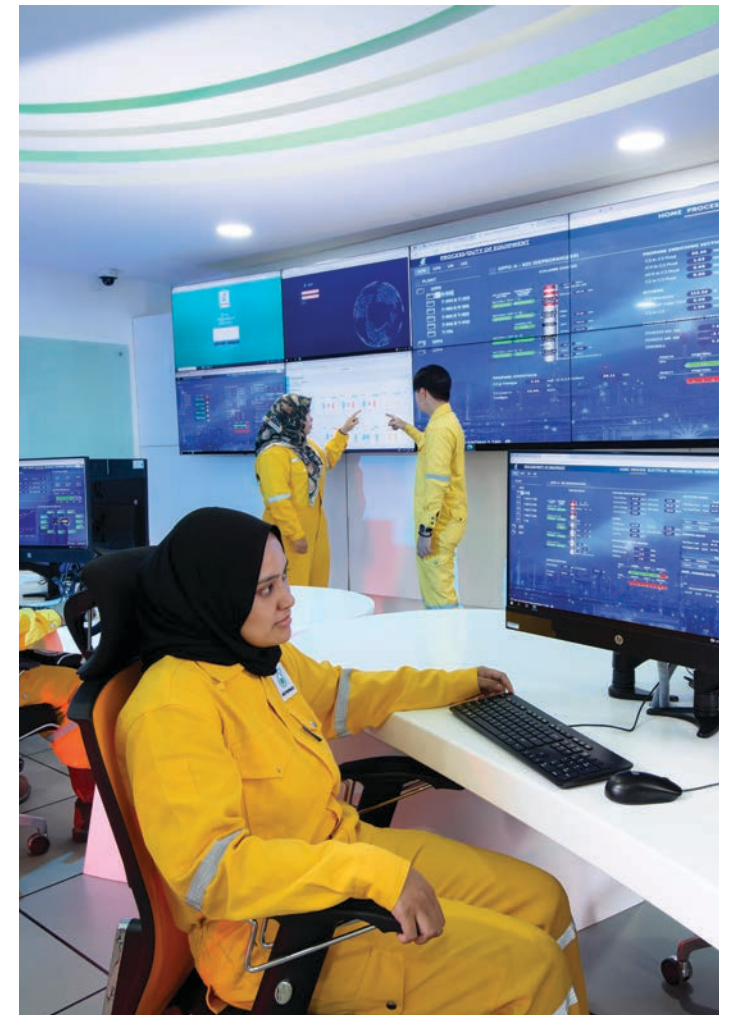
**Ensuring Effective HSSE Performance at All Levels Within PGB**

PGB's goal to continuously improve our safety performance and to achieve zero incidents are guided by our Annual HSSE Scorecard KPIs. The KPIs are based on historical data and improved year-on-year. Our HSSE risks, incidents, performance and issues are deliberated at the monthly LT meeting, discussed in depth during HSSE Steering Committee meetings chaired by the MD/CEO, and subsequently reported to the Board.

PGB also conducts HSSE management review to appraise the effectiveness of the previous HSSE plan to improve the following year's strategic objectives. PGB's HSSE plan is benchmarked against the previous year's performance as well as the performance of the PETRONAS Group's Operating Units.

Worksite HSE Committee meetings are held on a monthly basis to deliberate onsite-specific HSSE issues, programmes and performance. These meetings require the participation of both employees and management representatives to ensure comprehensive reviews. Any escalation of strategic HSSE matters is to be communicated back to the LT for future improvements.

PGB's internal responsibility system serves to reconcile and promote understanding on occupational health and safety issues in the workplace. Comprising health and safety committees and representatives, the system is based on cooperation between employers and employees.



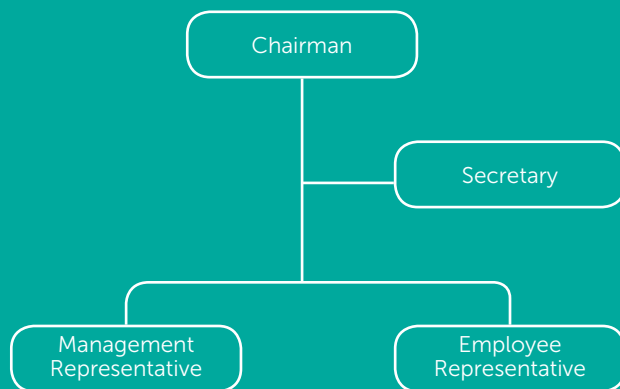
**PGB'S HSSE Committee – Mandate and Structure**

PGB has established an HSSE Committee at every asset level within the Group, namely PGB Headquarters, GPU – GPK, GPU-GPS, GPU-TSET, GPU-UK, GPU-UG, GT Gurun RO, GT-Sitiawan RO, GT Shah Alam RO, GT-Seremban RO, GT-Segamat RO, GT-Pasir Gudang RO, GT- Kuantan RO, GT-Kertih RO, Regas Terminal Sungai Udang and Regas Terminal Pengerang.

All HSSE Committees subscribe to the following Terms of Reference:

- To review the effectiveness of the HSSE Management System programmes and implementation and to recognise HSSE achievements;
- To promote employee awareness, positive thinking and behaviour towards HSSE excellence;
- To deliberate on ways to eliminate or reduce injuries, property damage, environmental pollution and occupational illnesses and diseases;
- To review and analyse the trending of incidents or accidents; and
- To comply with OSHA 1994 (Safety & Health Committee) Regulations 1996.

**HSSE Committee Structure**



HSSE Committee meetings are held on a quarterly basis (at a minimum) at every site base, as per the OSHA 1994 (Safety & Health Committee) Regulation 1996. However, depending on the urgency, the frequency may vary.

The following are sample of the issues typically brought up and deliberated during HSSE Committee meeting:

Example of Issues Brought Up at the HSSE Committee Meetings
Biological hazard at sites and offices
Scheduled waste management
Repetitive non-compliance in excavation activity by contractor
Issue of permit for work issuance
Unfit personnel

The HSSE Committees are also responsible for promoting Generative HSSE Culture among workers and contractors via walkabouts as well as awareness and HSSE campaigns. The following are some of the typical initiatives undertaken by the committees.

Examples of Some HSSE Campaigns
ZeTo Rules Violation campaign
Hand Safety Campaign
COVID-19 Compliance Campaign
Working At Height Campaign
Chemical Handling Campaign during Turnaround
Scheduled Waste Compliance Campaign during Turnaround
MestiFit4Health campaign

**TRAINING AND AWARENESS**

PGB organised a total of 280 training classes on health and safety in 2022. A total of 11,230 participants were involved in the HSSE Training Matrix plan which is based on the PTS 18.03.02 – HSE Competence Assurance. We also conducted a total of 116 classes for a total of 1,740 contractors. All contractors are required to undergo training prior to working with PGB. The list of training sessions provided to staff is showed in the table below:

Training	No of Hours	No of staff trained
HSE Management System	4	1,642
Emergency and Crisis Management	8	51
On Scene Commander	24	61
Advanced Industrial Fire Fighting	16	772
Hazardous Waste	4	1,227
Safe Handling of Chemicals (SHOC)	16	1,150
Noise & Hearing Conservation Awareness	4	1,337
Certified First Aider & AED Training	16	730
Safe Critical Protection Device (SCPD)	8	30
Energy Isolation	8	1,236
Permit to Work (PTW)	16	1,317
Scaffolding Appreciation	8	202
Working at Height	16	989
Lifting Supervisory	16	48
Crane Inspection Course	16	222
Forklift Operation	16	216

**CERTIFICATION AND SAFETY AUDITS**

PGB utilises PETRONAS Assurance Framework to manage the assessment of HSSE compliancy across the Group. The Framework is a structured approach based on three lines of assurance which are managed through an online platform known as myAssurance. The online platform, which enables all assurance processes to be conducted digitally, is used for all of PGB's assets nationwide.

The Group's motivation to drive stringent HSSE compliance among our contractors has seen PGB conduct compliance assurance assessments for identified high-risk contractors. We also evaluate the competency and efficiency of contractors using the HSSE Pe-mobilisation assessments. The assessments appraise the HSSE plans of contractors in line with our strict HSSE requirements before they enter our premises. Not only does this exercise ensure that our contractors are capable of upholding our HSSE requirements, it also drives sustainable HSSE management within their own organisations.

To ensure that our HSSE practices are holistic and sustainable, PGB annually conducts the Health, Safety, Security and Environmental Management System (HSSEMS) review. The HSSE Steering Committee analyses the findings from this and all our other assurance assessments on a quarterly basis. The reviews of our assurance programmes are in line with our annual Management Review that ensures strategic improvements are made for the purpose of strengthening future assurance.

In 2022, the Department of Occupational Safety and Health (DOSH) conducted an audit on our Malaysian operations which resulted in zero non-compliance findings. PGB will continue our good track record through our consistent implementation of robust HSSE initiatives to ensure full compliance with OSHA 1994 Laws and Regulations as well as sustain our good performance.

In line with our drive for HSSEMS excellence across the Group, all of PGB's subsidiaries are internationally certified. Our health and safety data are assessed via independent third-party verification in line with the requirements of local and international standards including the National Fire Protection Association (NFPA), ISO OHSMS 45001:2018, ISO EMS 14001:2004, ISO EMS 14001:2014, and OSHA 1994 standards. This certification covers 100% of the sites at PGB.



The table below spells out the details of the certifications accorded to PGB's assets as at 31 December 2022:

ISO OHSAS 45001:2018	Year of Re-Certification
GP Santong	2022
TSET	2022
GT Gurun RO	2022
GT Sitiawan RO	2022
GT Shah Alam RO	2022
GT Seremban RO	2022
GT Segamat RO	2022
GT Pasir Gudang RO	2022
GT Kuantan RO	2022
GT Kertih RO	2022
RGT Sungai Udang	2022
RGT Pengerang	2022
GPU (HSSE, ETS, FNA)	2021
PGB Headquarters Office	2021
GP Kertih	2021
UT Kertih	2021
RGT Pangerang	2020
RGT Sungai Udang	2020

The independent verification by SIRIM QAS International Sdn Bhd on health and safety data is based on the ISO 45001:2018, ISO 14001:2015 and ISO 9001:2015 standards.

**EMERGENCY RESPONSE AND PREPAREDNESS**

To facilitate speedy and effective responses and recovery activities during an emergency or crisis, PGB leverages PETRONAS Resiliency model (PRM) which provides an integrated view of the strategy for managing risks in three areas, namely Enterprise Risk Management (ERM), Crisis Management (CM), and Business Continuity Management (BCM).

PGB continues to conduct emergency drills to maintain the competencies and preparedness of our responders in managing emergencies. These drills also help us to ensure the readiness of the emergency facilities. In 2022, PGB organised 319 small-scale emergency drills under Tier 1 and two emergency drills with the support of external response agencies under Tier 2 base. These drills were conducted in compliance with the requirements of the PTS 18.40.01 – PETRONAS Contingency Planning Standard. The planned exercises covered Incident Action Plans (IAP) based on potential credible scenarios and major hazard related scenarios including the Control of Industrial Major Hazards (CIMAH) and Hazard and Effect Management Process (HEMP). Moving forward, we will continue to enhance our responders' decision-making and response capabilities through these frequent exercises. We will also continue to reinforce good cross-team interaction as well as our interactions with external response teams.

**RGTSU First Full-Scale Oil Spill Drill**

In line with our aim of improving environmental-related emergency preparedness, RGTSU collaborated with the Department of Environment (DOE), Melaka in September 2022 to organise a full scale Oil Spill Drill (Tier 2 Drill). The drill was conducted to test the readiness of the newly revised RGTSU Oil Spill Contingency Plan which supports the launch of Pelan Tindakan Pembersihan Pantai Negeri Melaka. Bahagian Air dan Marin JAS Putrajaya, JAS Melaka and other related Melaka-based agencies, authorities, associations and organisations participated in the programme. Through this programme, diverse knowledge and skills related to oil spill emergency preparedness were shared between the agencies and the emergency responders.

**OUR WORKFORCE**

As a subsidiary of PETRONAS, PGB has adopted PETRONAS' aspiration towards improving workforce diversity. To this end, we are committed to cultivating a workforce that reflects our acceptance of people from different experiences, cultures, backgrounds and talents.

**Approved Positions**

Indicator	2021	2022
Number of Approved Position at PGB	1,670	1,806

**Staff Voluntary Turnover Rate**

Indicator	2021	2022
Staff Turnover Rate	7%	2.8%

**Percentage of Contract Staff Vs Permanent Staff**

Indicator	2021	2022
Total Number of PGB Staff	1,670	1,763
Percentage of Contract Staff (%)	0.2%	1.0%
Percentage of Permanent Staff (%)	99.8%	99.0%

**Amount of Time Spent on Employee Development Training**

Indicator	2022
Total Time as a Company (Hrs)	115,373 hours
Total Training Man-Days	14,422 man-days
Average Hours Per Employee	69 hours
Average Day Per Employee	9 days

**Training Type**

- HSE
- Technical
- Business Excellence
- Leadership
- Functional

**Nationality and Disability**

Indicator	2021	2022	
Nationality (%)	Malaysian	100	100
	Other Nationalities	0	0
Disability	0	0	

**Distribution of Workforce**

Indicator	2020	2021	2022	
Distribution by Gender (%)	Female	13	12	12
	Male	87	88	88
Leadership Team (%)	Female	33	44	30
	Male	67	56	70
Board of Directors (%)	Female	50	40	33
	Male	50	60	67

**Age Diversity**

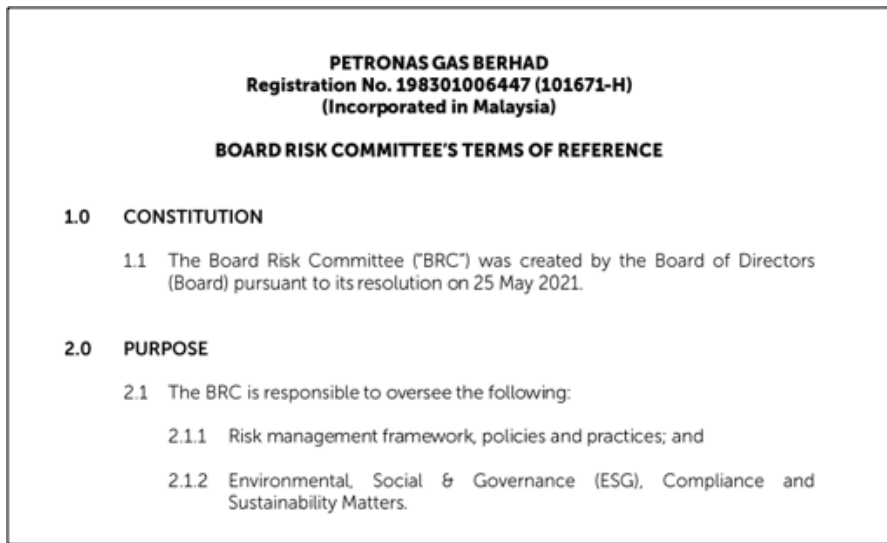
Indicator	2020	2021	2022	
Age Diversity (%)	Baby Boomers	1	1	1
	Gen X	36.1	32	34.4
	Millennials	61.8	65	59.3
	Post Millennials	1.2	3	6.1

**UPHOLDING HUMAN RIGHTS AND LABOUR STANDARDS**

We understand how important it is to uphold human rights and labour standards. These principles form an integral part of PGB’s sustainability agenda as they ensure the well-being and fair treatment of all who work for us and with us.

**PROACTIVE HUMAN RIGHTS MANAGEMENT**

On quarterly basis Board Risk Committee convenes to deliberate human rights and labour standard issues at PGB.



The identification of human rights and labour issues in existing operations and projects are carried out via Social Risk Assessments (SRAs). In 2022, PGB conducted a SRA to proactively assess human rights impacts on all ongoing major projects at our Gas Processing & Utilities (GPU) sites. As a result of the assessment, PGB implemented the following mitigative actions in an effort to close all identified performance gaps:

1. Cascaded human rights elements down to contract owners, contractors and subcontractors;
2. Conducted site visits to existing projects that included worker accommodation to ensure contractor/subcontractor compliance with Act 446 (Workers' Minimum Standards of Housing and Amenities Act 1990);
3. Ensured the inclusion of all nearby vulnerable community groups (i.e. asnaf, single parents, persons with disabilities, senior citizens) into PGB's stakeholders list. These groups were our main focus when executing our CSR activation and were given the necessary assistance in line with their needs;
4. Communicated the PGB Contractor Code of Conduct on Human Rights (CoCHR) requirements at kick-off meetings and enforced the requirements through the HSE Plan.

We also identify human rights issues through our engagement with stakeholders via an assessment conducted every three years, or as and when required.

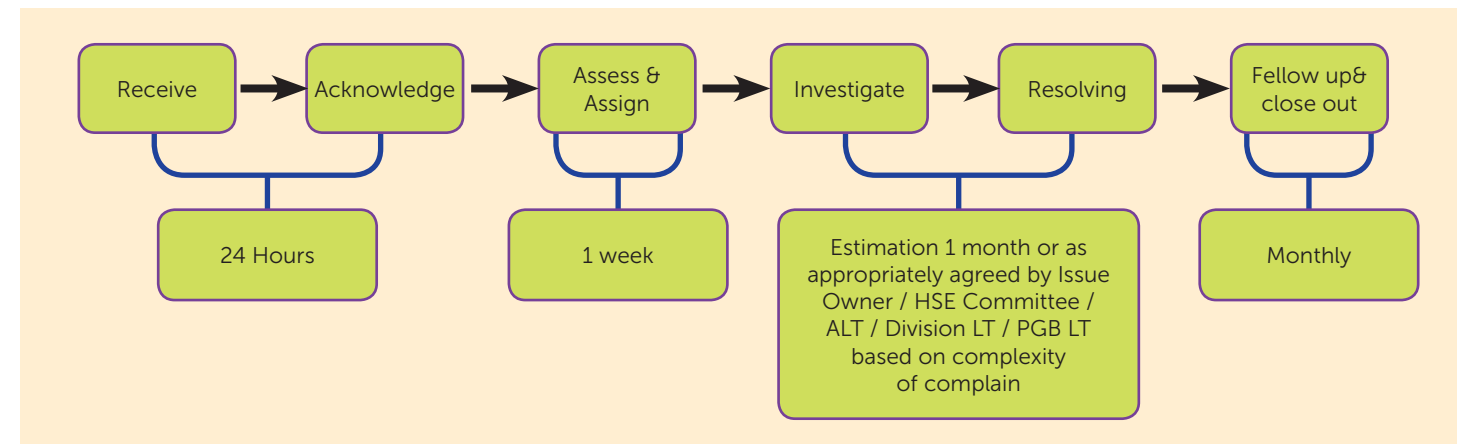
**Grievance Mechanisms**

PGB has a dedicated grievance mechanism for both internal and external stakeholders. This procedure addresses salient, industry or business-specific human rights issues. Made available in most languages, the grievance mechanism covers human rights explicitly and guarantees confidentiality and anonymity.

Human Rights Elements	Potential Issues
Labour and Working Conditions	a. Forced labour b. Child labour and young workers c. Non discrimination d. Freedom of association e. Workplace/accommodation health and safety f. Conditions of employment
Responsible Security	a. Conduct of third-party security b. Mechanism to report on security personnel
Community Well-being	a. Land management (right of way, compensation, access to natural resources) b. Indigenous peoples c. Cultural heritage d. Community health and safety e. In-migration f. Grievance mechanism
Supply Chain Management	a. Contractor/Supplier performance related to labour and working conditions, responsible security and community well-being

The **Grievance Mechanism** Guidelines aims to:

- i. Illustrate the process flow for the grievance mechanism from the point of receiving grievances to close-out;
- ii. Guide staff in handling Group-related grievances via the established process flow;
- iii. Ensure that both official complaints or grievance issuances are recorded and addressed accordingly to prevent minor grievances from escalating to bigger issues; and
- iv. Provide an avenue for stakeholders who believe they have been affected by PGB's businesses to submit their grievances to PGB.



**Grievance Form - English**

PETRONAS East Coast  
Grievance Form

**Name of Complainant:**  
**Contact Details:**  
**Town / Community / Company:**  
**Grievance Title:**  
**Grievance Reference Number:**  
**Details of Statement:**

Signature: \_\_\_\_\_ Signature: \_\_\_\_\_

Complainant Name: \_\_\_\_\_ CLO Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Date: \_\_\_\_\_

**Borang Aduan - Bahasa Malaysia**

PETRONAS Pantai Timur  
Borang Aduan

**Nama:**  
**No Telefon:**  
**Bandar / Komuniti / Syarikat:**  
**Tajuk Aduan:**  
**No. Aduan:**  
**Perincian Aduan:**

Tandatangan: \_\_\_\_\_ Tandatangan: \_\_\_\_\_

Nama Pengadu: \_\_\_\_\_ Nama Pegawai Perhubungan Komuniti: \_\_\_\_\_  
Tarikh: \_\_\_\_\_ Tarikh: \_\_\_\_\_

All action items highlighted in grievance mechanism are properly tracked and monitored for closure. To ensure the effectiveness of our grievance process, we have established a dedicated grievance mechanism – First Line Assurance – which is evaluated and completed by an appointed focal person on a quarterly basis.

**myASSURANCE** Organization Hierarchy Gas Processing & Utilities (GPU)

ASSESSOR / AUDITOR [Click here to edit](#)

Data Migration

**LIST OF ASSURANCE PLANNING: 8 ITEM(S)**

Reference No	Title	Status	Assurance Type	Checklist	Lead Assessor	Team Leader	Year	Month	Assurance Start Date
AAP/GPU/2021/Gas Processing Santong (GPS)/FA/0024/01	First Line/HSE/Grievance Mechanism/February 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Abd Karim Shaikh Abd Nasir		2021	February	01 Feb 2021
AAP/GPU/2021/Health Safety Security & Environment (HSE)/FA/0005/01	First Line/HSE/Grievance Mechanism/May 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Nor Fadhiah H Zuki		2021	May	01 May 2021
AAP/GPU/2021/Facilities & Administration/FA/0006/01	First Line/HSE/Grievance Mechanism/June 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Nurathrah Natalia H Zain		2021	June	01 Jun 2021
AAP/GPU/2021/Tanjung Selang Export Terminal (TSET)/FA/0023/01	First Line/HSE/Grievance Mechanism/May 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Ammar Badruzaman		2021	May	01 May 2021
AAP/GPU/2021/Utilities (UT)/FA/0024/02	First Line/HSE/Grievance Mechanism/July 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Hohamad Yasser H Anuar		2021	July	01 Jul 2021
AAP/GPU/2021/Utilities (UT)/FA/0024/01	First Line/HSE/Grievance Mechanism/July 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Rostam A Ghani		2021	July	01 Jul 2021
AAP/GPU/2021/Gas Processing Kerteh (GPK)/FA/0023/01	First Line/HSE/Grievance Mechanism/May 2021	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Adiba Farhana Abu Bakar		2021	May	01 May 2021
AAP/GPU/2020/Health Safety Security & Environment (HSE)/FA/0009/01	First Line/HSE/Grievance Mechanism/June 2020	Assurance Report Closed	Functional Assessment	Grievance Mechanism [M, Y]	Nor Fadhiah H Zuki		2020	June	01 Jun 2020

As part of our procedure requirements, we ensure stakeholders are informed about how and where to report grievances publicly (e.g., via brochures, posters, telephone line, Control of Industrial Major Accident Hazard (CIMAH) engagement, village heads, townhalls, etc.).

For example during CIMAH Day we engaged the community and educated them on how to submit a complain or report regarding human rights issues related to our businesses. An information booklet regarding the grievance process was also distributed during the event. The last CIMAH programme was organised in 2020 and the next programme will be held in 2023.



In regard to day-to-day issues, PGB has appointed dedicated resources for handling grievances issue which cover human rights and labour law violations. These resources include the following:

Roles	Responsibilities
Community Liaison Officer (CLO)/ Grievance Manager (GM) or Equivalent	<ul style="list-style-type: none"> <li>Forms a cross functional team for GM cases.</li> <li>Acts as focal person to engage with communities and to receive grievances</li> <li>Manages grievance procedures</li> <li>Conducts initial assessments on grievances</li> <li>Advises the OPU Heads to assign an issue owner e.g., area owner/asset owner that is linked to the cause of the grievance</li> <li>Promotes grievance resolution to complainants</li> </ul>
Issue Owner/Area Owner/ Asset Owner or Equivalent	<ul style="list-style-type: none"> <li>Forms and leads an investigation team upon assignment by the CLO/GM</li> <li>Provides the necessary feedback to the CLO/GM on the validity of the grievance/complaint for the CLO/GM's assessment</li> <li>Proposes options for resolution</li> </ul>

**Human Rights Engagement Sessions**

We periodically conduct a series of engagements with our stakeholders. These engagements help us to ensure that all communications regarding human rights are cascaded down in an appropriate manner. The sessions also facilitate two-way communication between stakeholders and PGB, of which the feedback received is used to continuously improve our human rights endeavours.

In 2022, PGB organised the following human rights-related events:

- Human Rights Engagement Session with PGB Staff (conducted in September 2022 with 256 participants);
- Woman Rights Engagement Session with the Head of HRM GAS/PGB (conducted in October 2022 with 100 participants);
- PGB Staff Human Rights Engagement Sessions with Contractors/Partners (conducted in October 2022 with main contractor Mushtari Maintenance Service Sdn Bhd with 30 participants, and in November with main contractor RWNA Engineering Sdn Bhd with 36 participants); and
- Work Professional Etiquette Session with PGB Staff (conducted in December 2022 with 300 participants).



During the year in review, PGB recorded one human rights violation on workplace harassment while there were zero non-compliance cases in relation to labour standards as per the following table:

Indicator		2022
Human Rights Violation	On-going	0
	Closed	1
	Total	1
Labour Standards Violation	On-going	0
	Closed	0
	Total	0

**Ensuring Compliance via Strict Codes and Guidelines**

In compliance with local labour laws, PGB has established a dedicated guide on the procedures and commitments relating to industrial relations matters as well as the Code of Conduct and Business Ethics (CoBE). These guides aim to ensure that PGB employees are adequately protected and well-treated, while preventing the possibility of any child labour or forced labour being used.

PGB seeks to work with contractors who share our values of integrity, committed to fight bribery and corruption.

As clearly stated in PGB's Contractor Code of Conduct on Human Rights or CoCHR, our contractors are required to:

- Respect internationally recognised human rights principles and comply with PGB's CoBE and all relevant legal requirements;
- Take reasonable steps to ensure policies and guidelines are in place to demonstrate their respect for human rights including those applicable to their employees and contract personnel providing services to PGB;
- To ensure these policies and guidelines include labour rights, workplace health and safety, security, and conditions of employment. The contents of these policies and guidelines shall be made known to employees and contract personnel in languages they understand;
- Provide human rights awareness training to their employees and contract personnel and ensure that all employees and contract personnel providing services to PGB attend the training;
- Establish a grievance mechanism for their employees, contract personnel and any party involved in providing services to PGB. This grievance mechanism shall be made known to them and in languages they understand; and
- Provide timely feedback to PGB regarding the contractor's human rights performance within the duration of the contract, as gathered through personnel engagements, questionnaires and other appropriate means as required.

As a minimum requirement, we require our contractors to adhere to the following Principles:

1. **Freedom of Labour**, by not engaging or employing people, under any circumstances, against their own free will or engaging in bonded labour/debt slavery;
2. **Prevention of Child Labour**, by not employing children below the legal minimum working age requirement of any country. Employees and contract personnel must be at least eighteen (18) years of age (unless otherwise determined by the local laws of the host country);
3. **Wages and Benefits**, by complying with all applicable laws related to employee compensation, including the minimum wage, overtime hours and legally mandated benefits;
4. **Working Hours**, by complying with local laws of the host country or agreements regarding working hours, overtime hours, and work during holidays;
5. **Establish Grievance Mechanisms**, which provide a means of grievance reporting and appropriate follow-up measures while ensuring that the identity of the complainant is protected;
6. **Non-Discrimination**, by respecting diversity in the workplace and not engaging in any form of unlawful discrimination based on gender, race, ethnicity, skin colour, religion, nationality, sexual orientation, age, marital status, pregnancy, political affiliation, or disability in hiring and employment practices;
7. **Freedom of Association**, by respecting the legal rights of employees to become members of a labour union or otherwise;
8. **Humane Treatment**, by respecting employee's rights and ensuring no harsh and inhumane treatment, including any form of mental or physical coercion, or verbal abuse of employees;
9. **Foreign or Migrant Workers**, where if foreign or migrant employees are engaged, they are to be employed in full compliance with the labour and immigration laws of the host country. Prior to hiring, the basic terms of employment must be provided to employees in their native language or language in which they understand. Passports and other forms of personal identification must remain in the employee's possession at all times and are never to be withheld by the contractor or any third party in full compliance with the labour and immigration laws of the host country.

These principles apply to all PGB contractors, subcontractors, consultants, suppliers, agents, representatives and others performing work or services for or on behalf of the PETRONAS Group of companies. It is the contractor's obligation to ensure that any party who is performing work and/or business for or on their behalf adheres to these principles as well. All communication regarding human rights and labour standards is conducted in language that stakeholders can understand i.e., English and Malay.

PGB's Human Rights Commitments are in line with the United Nation's guiding principles on Human Rights. These commitments are applicable to all PGB employees, contractors and any third-parties within our premises who are carrying out work on behalf of PGB in line with PETRONAS' CoCHR. PGB will assess the contractor's compliance from time to time by (but not limited to) the Contractors' Performance Indicator.

PGB also utilises a range of digital tool to ensure compliance:

**Express Registration for External Service Supplier (XPRESS):** PGB strictly prohibits the hiring of underaged children and forced labour and duly expects our contractors to follow suit. As such, all potential contractors and staff members are further filtered and verified through the PGB XPRESS system. We also include these requirements into all contractor contract clauses to ensure full compliancy with PETRONAS' CoHR and labour standards. Failure by a contractor to comply with the provisions and standards set out in these Principles may result in the termination of the non-complying party's relationship with PETRONAS and other adverse consequences.

**Fatigue Management System (FMS):** All PGB workers, including contractors, are subjected to the FMS, a system which tracks and monitors the Hours-of-Service Limit of PETRONAS employees and contractors to prevent fatigue-related incidents. Through the system, employees and contractors are able to assess their own fatigue compliance in accordance with local law. The system will deny access for entry of overworked personnel. This will protect employees, contractors and also PETRONAS' assets from potential incidents.

**SUPPORTING FREEDOM OF ASSOCIATION AND COLLECTIVE BARGAINING**

PGB also supports freedom of association and collective bargaining in compliance with local laws as per PGB's Human Rights Commitments. In this regard, PGB has established KAPENAS (Kesatuan Kakitangan PetroliaM Nasional Berhad) which is the Group's equivalent of a union for non-executive staff at the workplace. Comprising a representative from each of PGB's assets, PGB KAPENAS was formed in order to support freedom of association and collective bargaining for employees to raise any issues and concerns related to human rights.

**SUPPORTING WHISTLEBLOWING MANAGEMENT**

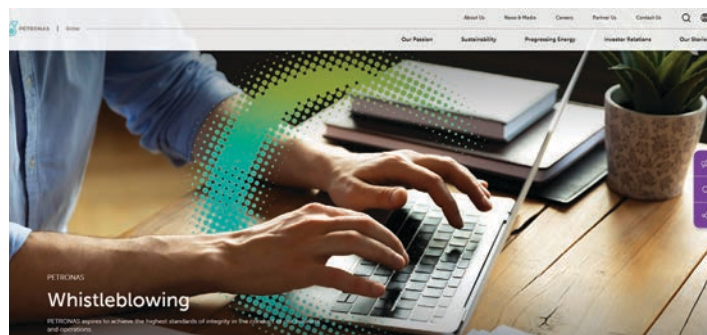
PGB is committed to providing a conducive working environment where the individual's right to protection from all forms of bullying, sexual harassment and unsolicited or unwarranted sexual overtures and advances is accorded due recognition. We are committed to upholding the highest standard of integrity, openness and accountability in the conduct of our businesses and operations. In this regard, PGB adopted the PETRONAS Whistleblowing Policy to ensure our aspiration of conducting our affairs in an ethical, responsible and transparent manner can be upheld.

PGB provides an avenue for all employees of PETRONAS and members of the public to disclose any improper conduct within PETRONAS. Any parties can report a whistleblowing complaint on any wrongdoings that they may observe and experience as following:

- Fraud;
- Abuse of power;
- Conflicts of interest;
- Misuse of company property;
- Bribery;
- Theft or embezzlement; and
- Non-compliance with procedures;

The above list is not exhaustive and includes any act or omissions, which if proven, will constitute an act of misconduct under the CoBE, or any criminal offence under relevant legislations in force.

Stakeholders may access the reporting channel/whistleblowing process via myPETRONAS.



The Whistleblowing Process is outlined in the following diagram:



Individuals who submit a disclosure via the PETRONAS Whistleblowing channels will be accorded protection and confidentiality of identity, to the extent which it is reasonably practicable. In addition, an employee who whistle blows internally will also be protected against any adverse and detrimental actions for disclosing any improper conduct committed or about to be committed within PETRONAS, to the extent reasonably practicable, provided that the disclosure is made in good faith. Such protection is accorded even if the investigation later reveals that the whistle blower is mistaken as to the facts and the rules and procedures involved.

PGB organises industrial relations training at the workplace with the aim of educating our line managers as to how to handle reports or instances of bullying or harassment to ensure they were equipped adequately to handle such cases at the workplace.

**BOLSTERING THE WORKFORCE**

**Training and Development:** PGB is committed in developing our employees to enhance their abilities and individual skills. Our employees are given opportunities to participate various development programme under technical, functional and leadership competency with preallocated training budget annually.

**Industrial Training Opportunities Programme:** In the year under review, a total of 78 undergraduates and diploma students from overseas and local universities were given the opportunity to undergo their internship programme at PGB under the Industrial Training Opportunities programme. A total of 47 students were attached to GPU, 21 to GTR and 10 to the Head Office. The students spent between three to eight months at their assigned departments and completed the internship programme with final presentations to their respective superiors on their projects.

**Graduates Employability Enhancement Scheme (GEES):** Under the GEES initiative, a total of 144 unemployed graduates were given the opportunity to undergo a one-year on-the-job programme at PGB in 2022. The number of intakes had increased compared to 2021 which saw PGB take in 86 GEES candidates. Throughout the placement period, they had the opportunity to observe our high performing work culture to prepare them for their future careers.

CARING FOR PEOPLE & SOCIETY

Leveraging CSR to Build Enduring Community Ties

PGB recognises that for any long-term relationship with a community to develop, trust and goodwill must first be built and then nurtured if any real growth or progress is to be seen. Our Corporate Social Responsibility (CSR) activities are opportunities for us to serve the communities in the areas where we operate by empowering them and contributing to their well-being. Giving back to these communities also means we can take an active role in community development, learn to work together with them, foster a sense of unity, as well as build enduring ties.

Leveraging effective partnerships and collaborations, we are able to implement CSR programmes that create tangible value and sustainable impact. Additionally, our contributions reinforce our commitment to ensuring that social development and effective CSR activities remain part and parcel of PGB's sustainable development ambitions.

Our Signature CSR Programmes

Today, PGB continues to leverage community engagement activities that have been adapted from the three pillars of the PETRONAS Foundation or Yayasan PETRONAS' CSR Framework, namely Education, Community Well-being and Development, and the Environment. Collaborations and partnerships remain an integral component of our CSR efforts and our strength is in the dedication of our team to create sustainable community solutions through ongoing, long-term interventions. Through our community work, we aim to create value for all parties involved, including NGOs, collaborators, local government bodies, and society.

The following are among the key community initiatives that we continue to roll out:

Sentuhan Kasih PETRONAS Programme

Each year, in conjunction with major celebrations in Malaysia, PGB together with Yayasan PETRONAS work together to cater to the basic needs of communities during major festive celebrations in Malaysia. The intent of the Sentuhan Kasih PETRONAS festive programme – a signature initiative under the Community Well-being and Development focus – is to accord the less fortunate a memorable celebration during the festive seasons.

Sentuhan Kasih CNY 2022 saw PGB organising the contribution of food hampers to selected families at Pasir Gudang in preparation for the Chinese New Year festivities. The event, a collaborative effort with PETRONAS Southern Office (PSO) and Yayasan Pasir Gudang, was held at Majlis Bandaraya Pasir Gudang in February 2022. The giveaways amounting to RM15,000 benefitted 100 families and individuals chosen by Yayasan Pasir Gudang on the basis of their being in the B40 group or struggling to make ends meet. The recipients included individuals with severe illnesses and single parents.

Sentuhan Kasih Aidilfitri 2022 saw us contributing basic necessities during the fasting month to 700 families/individuals at seven different locations surrounding PGB's key operations. The contributions amounting to RM91,200 positively impacted the communities at Johor (Segamat, Pasir Gudang and Pengerang), Melaka (Sg Udang), Negeri Sembilan (Seremban), Selangor (Shah Alam), Pahang (Kuantan), Terengganu (Kertih), Perak (Sitiawan), Kedah (Gurun) and Kuala Lumpur.

Sentuhan Kasih Deepavali 2022 saw our staff volunteers bringing cheer to those celebrating the Festival of Lights. The contributions amounting to RM25,000 benefited 400 students at SJKT Maha Ganesa Vidyasalai, Sitiawan. This included cash rewards gifted to 100 deserving students selected by the school.

PGB Young Professional Club (YPC) Educational Initiative at SMK BAS

We acknowledge that education is highly important at all levels, especially for the younger generation. In August 2022, the PGB YPC rolled out the Discovery PETRONAS Programme to 40 local community students from SMK Badrul Alam Shah (SMKBAS). Through this educational initiative, the YPC sought to motivate the younger generation to strive to achieve their best in the field of education by sharing the most effective learning strategies. The programme did not stop there, as the PGB YPC went on to "adopt" the students as "brothers and sisters" to ensure the continuous connection between YPC members and the students.



PGB Mangrove Tree Educational Programme with SK Kongkong Laut

We continue to strengthen ties with the communities around Sungai Latoh in Johor through our ongoing collaboration with the Malaysia Nature Society (MNS) to rehabilitate mangrove trees in the area. In 2022, PGB collaborated with SK Kongkong Laut in the area to organise an educational programme for 100 students and 20 teachers. The programme aimed to inculcate awareness of the importance of preserving mangrove trees as a medium to stabilise the coastline among the younger generation. The programme which involved around 200 participants including PETRONAS staff, SK Kongkong Laut students and MNS staff, was well received by the students.



Other Environmental-based Community Programmes

In 2022, we continued to inculcate sustainability awareness among communities through the following community-based environmental activities:

- Beach cleaning programme at Kijal, Terengganu;
• Beach cleaning programme at Pantai Kemasek, Terengganu;
• Beach cleaning programme at Teluk Kalong, Terengganu;
• Oil Spill Response Training to Agencies and Responders (Department of Environment or DOE Melaka)

The finer details of these initiatives can be found in the sub-section titled "PGB's Environmental-Related CSR Efforts" in the Environmental section of this Report.



In getting the community involved in our activities, we are making sure that we cultivate a sense of stewardship and ownership of the environment so as to positively impact future generations.



**Recycling Collaboration with FELDA**

We have been collaborating with the Federal Land Development Authority (FELDA) under our 4R programme. This initiative sees us recycling the spent perlite generated from our cold box replacement activities during shutdowns as fertilizer to improve soil conditions and boost plant growth at FELDA. In 2022, we contributed approximately 32 tonnes of spent perlite to FELDA Kertih 5 instead of disposing this material at landfills. Through this initiative, we helped the FELDA community generate cost-savings amounting to RM41,000. PGB also received positive feedback from a FELDA Officer regarding the contribution of perlite to their workplace.



During these programmes, PGB conducted surveys for the participants. The following highlights some of the feedback:

No	Feedback
1.	Increased awareness on environmental issues for children and ways to protect the environment
2.	The programme is proof that protecting the environment involves all parties, including our stakeholders
3.	The programme highlights environmental issues that are happening in the locality.



**Public Sustainability Awareness Events with the DOE**

In 2022, PGB collaborated with the DOE in various states to organise the following sustainability events for the public:

- *Sambutan Hari Alam Sekitar* in Terengganu: This state-level event saw the participation of the DOE Terengganu, the local Dungun community as well as industry players and NGOs.
- *Sambutan Hari Alam Sekitar* in Pahang: This national-level event involved the participation of the DOE Malaysia, the local communities in Pahang as well as industry players and NGOs.

These programmes aims to educate and inculcate an awareness of sustainability development and environmental protection among local communities. By doing so, we hope to reduce the impact of pollution on the environment so that the community's well-being is preserved. Participants also benefit from the programme by learning and gaining new knowledge regarding the environment and sustainable matters.



**Systemising Employee Volunteerism**

We actively encourage our employees to take the initiative to participate in CSR programmes and volunteer their time and effort. Staff are also encouraged to voluntarily organise and facilitate their own charitable events by leveraging the PGB myCareerX system developed by PETRONAS HRM.

In October 2022, one of PGB's staff took the initiative to collaborate with the Social Security Organisation (PERKESO) to educate 60 local hawkers at Sungai Ular, Kuantan on the benefits of subscribing to the Self-Employment Social Security Scheme (Skim Keselamatan Sosial Pekerjaan Sendiri or SKSPS). He was recognised for contributions to the community.



We continue to introduce specific measures to manage the potential impacts and risks to human rights from our projects and investments. We also ensure that sufficient resources are on hand if any corrective measures are needed. As PGB navigates through the new normal and the current socio-economic challenges, we stand firm in our commitment to ensure the well-being of people followed by the safe and optimal operation of our businesses across the value chain.

Acknowledging that good governance translates into sustainable business growth, PGB remains committed to upholding high standards of corporate governance as well as implementing robust risk management and internal control measures throughout the Group. These elements are not only ensuring continued shareholder value creation and sustainable, long-term business growth, they are also helping preserve PGB's reputation and strengthening stakeholder confidence as we lend support to PETRONAS as the custodian of the nation's gas resources.

For the year 2022, the Group continued to bolster its corporate governance practices in several key areas. The year saw PGB conducting a series of awareness and education programmes to ensure employees were aware of the guidelines and polices in play, particularly in relation to the Code of Conduct & Business Ethics (CoBE) and Anti-Bribery and Corruption Policy (ABC).

On a quarterly basis, the Board Risk Committee undertook periodic reporting and review of the Group's sustainability performance which included compliance with the CoBE and identifying any instances of non-compliance. Over the past four years, there have been no breaches of integrity nor have any corruption cases been recorded. There were also zero incidents of non-compliance in the way of adhering to policies, nor were any political contributions made.

For further details of how PGB has complied with the recommended practices applicable for Large Companies under the MCCG 2021, please refer to our standalone 2022 Corporate Governance Report which is published on PGB's website and submitted to Bursa Malaysia. These details can also be found in PGB's Governance and Financial Report 2022 which makes up one of three books in our Reporting Suite for 2022.



**COMMITTED TO ETHICAL AND GOOD GOVERNANCE PRACTICES**

Today, good business ethics and robust corporate governance practices serve as the guardrails that keep PGB on track and in check. To ensure integrity and ethical practices flourish at PGB and that a solid governance framework is in place, PGB continues to implement the following stringent policies and guidelines:

<b>Code of Conduct &amp; Business Ethics or CoBE</b>	<b>Anti-Bribery and Corruption Policy or ABC</b>	<b>PETRONAS Whistleblowing Policy</b>	<b>Directors' Fit and Proper Policy</b>	<b>Corporate Disclosure Guide</b>
provides policy statements on the standards of behaviour and ethical conduct expected of employees of the Group and others performing work or services for or on behalf of the Group	deals with improper solicitation, bribery and other corrupt activities that may arise in the course of business	offers an avenue for employees and other stakeholders to safely report misconduct within the Group	requires all Board members of PGB and its subsidiaries to have the necessary qualities, competencies and experience that allows them to perform their duties and carry out the responsibilities required of their positions in the most effective manner	describes the disclosures and conduct on the dissemination of information. The guidelines are based on the Bursa Malaysia's Main Market Listing Requirements (MMLR) and the Corporate Disclosure Guidelines (3 <sup>rd</sup> edition), which promotes transparency and accountability in the communication and dissemination of material information to the public





Even as the agenda of sustainability had gained more prominence and is now being embedded in greater measure within PGB, we have clarity on what we need to do as we set out to achieve sustainable business success and growth. To augment our sustainability efforts and ensure a balanced business strategy is in place, we will leverage the PGB Sustainability Blueprint which addresses all the essential elements within PGB's four Sustainability Lenses. This blueprint, which aligns with PETRONAS' Sustainability Agenda, seven of the UN SDGs, the FTSE4Good Bursa Malaysia criteria, PETRONAS' NZCE 2050 Pathway and the Oil & Gas Methane Partnership 2.0 framework, provides the Group a holistic roadmap which points out how we are to achieve our sustainability ambitions.

As we venture forth to realise PGB's sustainability aspirations, our leadership will adopt a laser-focused approach and leverage the approved initiatives and milestones specified in the blueprint. Their goal is to embed effective sustainability practices and inculcate a robust sustainability culture across all our business operations. Once the fundamental building blocks are laid, they will focus on rolling out our sustainability programmes in the most efficient manner to achieve and sustain the set targets.

While the pathway for our internal plan has been laid out, we are mindful that there are still a host of external challenges from the dynamic environment that we operate in which need to be considered. In order for PGB to be able to manoeuvre through the complexities of the marketplace, we will ensure that our internal structure and capabilities across the organisation are adequately resourced and well-primed. This will help us to address all risks and opportunities that may come our way in a timely and effective manner.

Moving forward, the agenda of sustainability will continue to serve as a central feature of our overall business strategy. We intend to make the best use of our existing sustainability initiatives and practices while remaining open and flexible to adopt new ones. This is all the more important given the uncertain, ever-evolving market landscape in which we operate. As we make the most of our value creation activities and good progress on the ESG fronts for the benefit of all, we remain confident of reinforcing PGB's position as a model for responsible corporate behaviour.



[www.petronas.com/pgb](http://www.petronas.com/pgb)