PETRONAS

PETRONAS
Activity Outlook
2020-2022

Our Story

The cover artwork depicts our people, the backbone of our organisation, promoting diversity in the workforce.

The background features silhouettes of an offshore platform and PETRONAS Floating LNG DUA (PFLNG DUA), the pride of PETRONAS, its second floating LNG facility. Complementing the scenic offshore is our onshore Pengerang Integrated Complex, PETRONAS' largest downstream investment to date.

The striking emerald green signifies balance and harmony with nature and environment, freshness and renewal with a sense of calm and clarity, fitting our Statement of Purpose: A progressive energy and solutions partner enriching lives for a sustainable future.

Cautionary Statement

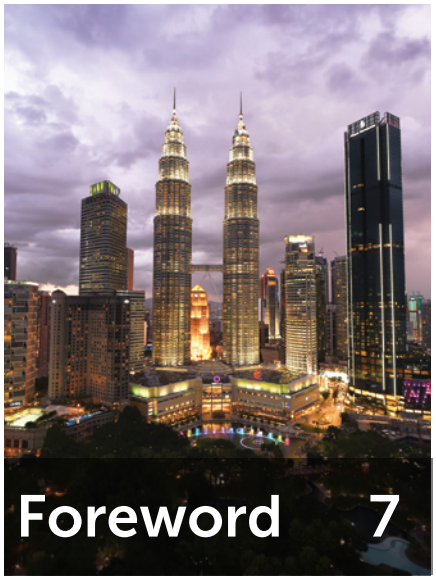
This report was developed based on currently available information from internal and external sources. PETRONAS believes that the expectations of its Management as reflected by such forward-looking statements are reasonable based on information currently available to it. PETRONAS makes no representation on the accuracy or completeness of any information provided in this report and expressly disclaims any liability whatsoever arising from, or in reliance upon, the whole or any part of its contents. PETRONAS undertakes no obligation to update or revise any of them, whether as a result of new information, future developments or otherwise.

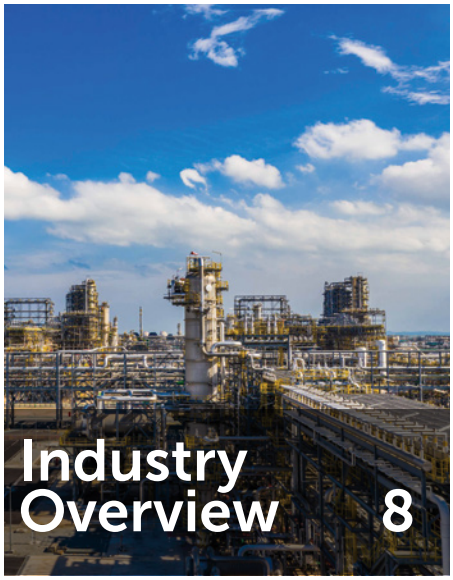
Accordingly, readers are cautioned not to place undue reliance on the forward-looking statements, which speak only as of the date they were made.

Images are for illustrative purposes only.

Released in December 2019.

Contents





Foreword

Dear Partners,

We are pleased to bring you this year's edition of the PETRONAS Activity Outlook, covering insights on the industry and demand outlook from 2020 to 2022.

The outlook for the industry remains challenging. This is driven by geopolitical upheavals, prolonged trade tensions, and a global economic slowdown resulting in demand disruptions. Given the persistent market volatility, the challenging landscape would require PETRONAS and all its partners to continue to be conscious in managing costs, implement activity levelling to sustain offshore activities and pursue innovative solutions to unlock value in our supply chain. While managing costs may have its limits, we must focus our efforts on **technological advancements, digitalisation of processes, and harmonisation of standards for equipment and services** to name a few, which will bring bigger benefits over a longer horizon in enhancing our competitiveness, speed, accuracy, agility, and ultimately resiliency to weather any storm that comes our way.

However, all the advancements in technology and development of people would be of no value if we do not nurture them in a culture of good governance and integrity. PETRONAS' shared values of loyalty, professionalism, integrity and cohesiveness are the very foundation of our business principles and underline our commitment towards exercising zero-tolerance against any form of bribery and corruption, in line with our Code of Conduct and Business Ethics (CoBE). In reinforcing the stance and in support of the Malaysian Government's aspiration to fight corruption to its roots, PETRONAS and its leaders have, on 4 November 2019, pledged zero tolerance for corruption. This demonstrates the seriousness of PETRONAS in preparation for the enforcement of the **Corporate Liability provision** of the Malaysian Anti-Corruption Commission (MACC) (Amendment) Act 2018, which comes into effect on 1 June 2020. This provision would have wider and far-reaching implications to individuals and commercial organisations. We advocate all partners, local and foreign, to proactively introduce adequate anti-bribery and corruption measures in your processes before the provision comes into force.

Finally, we look forward to more fresh and innovative ideas from all our partners through **Technology Challenge, Technology Marketplace, and Biddings in order to develop marginal and matured fields** for continued operations against the backdrop of today's challenging environment. Together, we shall forge stronger partnerships in order to enrich lives for a sustainable future.

Thank you.

Liza Mustapha
Vice President, Group Procurement

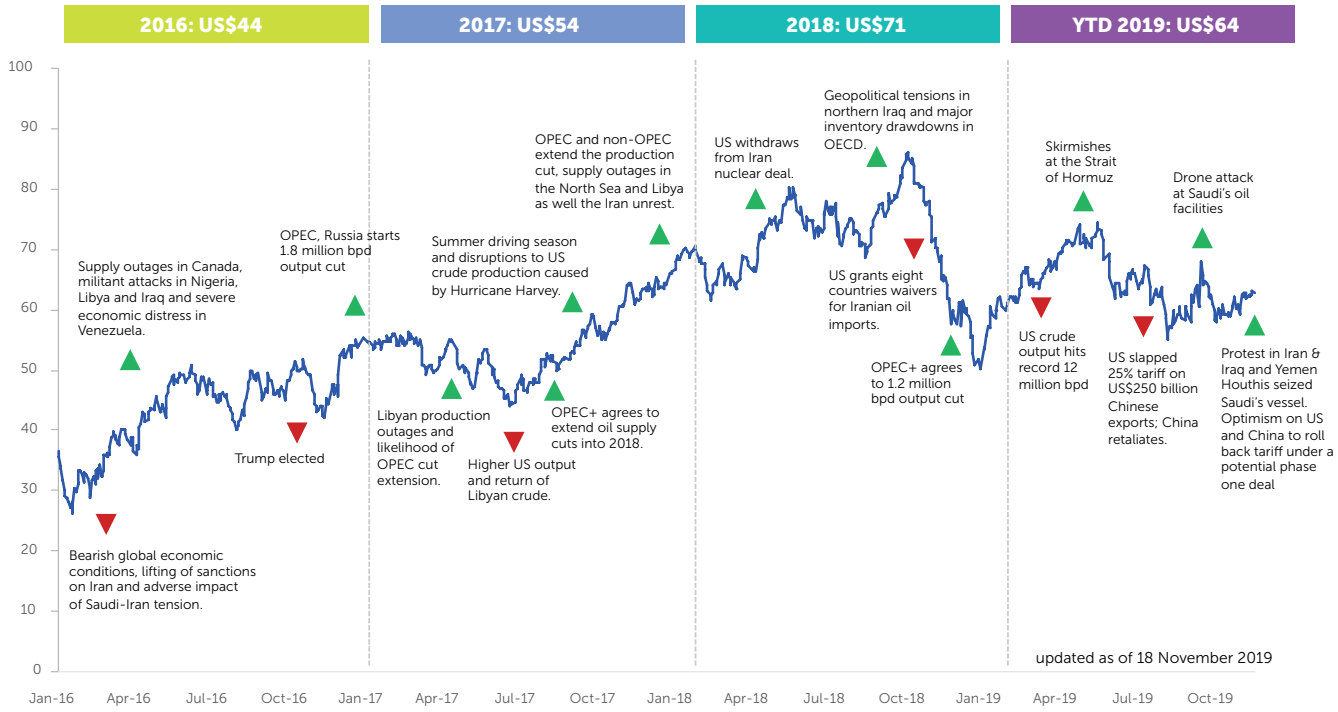
Industry Overview

Pengerang Integrated Complex

Oil Market Volatility Prevails

The oil prices in 2019 have fluctuated from a daily low of US$53 per barrel to a high of US$75 per barrel (as at November 2019) yielding an average of US$64 per barrel as compared with the average of US$71 per barrel in 2018.

Daily Dated Brent Price
Unit: US$/bbl



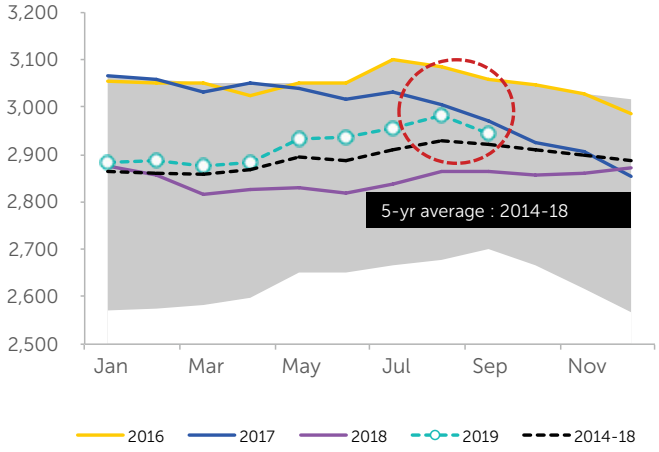
Source: Argus, SR analysis

The oil price at the start of 2019 continued its low streak from the final quarter of 2018 with concerns on increasing oversupply and weak demand. This in turn creates pressure on OPEC+ (Organisation of Petroleum Exporting Countries and its allies) to extend output cuts further on the back of low oil prices and continuing strong United States (US) crude oil production.

However, the weak demand together with robust non-OPEC supply more than offset OPEC+ output cuts, which were extended in July to March 2020. The oil market remained volatile and risk averse throughout 2019 amidst trade war, recession fears, and geopolitical tensions in key producing countries.

Protracted trade disputes continue to brew uncertainty and negative business sentiments, which in turn has a dampening effect on oil price outlook.

Monthly OECD Crude & Petroleum Products Stocks
Unit: mil bbls



Source: IEA (Nov 2019), SR analysis

Primary Drivers Shaping the Oil Market

Growing surplus could push oil price lower

The robust supply coming from non-OPEC producers predominantly from the United States (US), has caused a build-up in oil inventory. The US, currently the largest producer of crude oil, are targeting to be a net energy exporter by 2020, a first for the US in nearly 70 years.

In addition, there are other projects being ramped up in Canada, Brazil, Guyana, and Norway. The International Energy Agency (IEA) in its November 2019 report indicated that non-OPEC production is expected to continue to grow; adding 2.3 million barrels per day of oil supply in 2020.

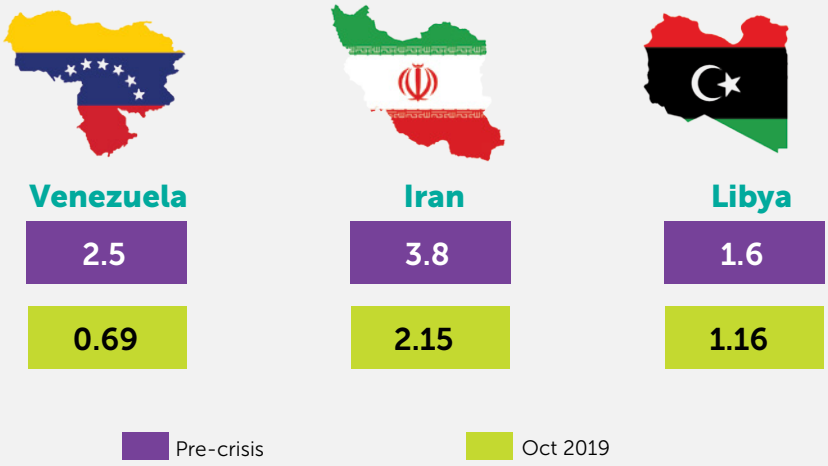
Trade sanctions and geopolitical instability in oil producing countries

Whilst the US sanctions on Iran and Venezuela have driven oil production from both countries to the lowest points in decades, the sanctions however, only caused ripples in the oil market since every barrel displaced is substituted by other oil producers.

Supply disruptions in major oil-producing countries such as Libya and Nigeria, coupled with tensions that jitter the oil market particularly in the Middle East, will continue to add to the volatility in oil prices.

Oil Production in Oct 2019 vs Pre-crisis

Unit: mil bpd

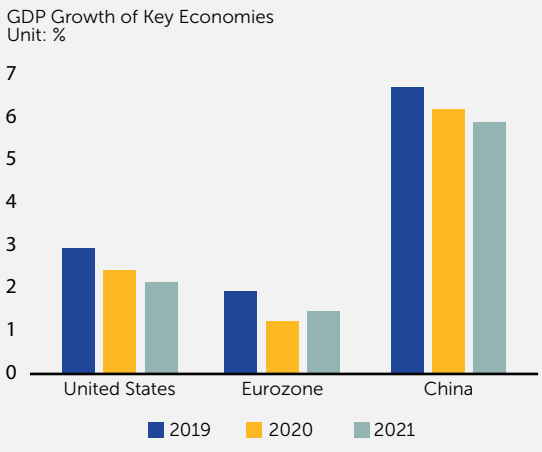


Source: IEA (Oct 2019) & SR analysis

Slower global economic growth could weaken growth of oil demand

The International Monetary Fund (IMF), in its latest report released in October 2019, revised its global gross domestic product (GDP) growth projection downward for 2019 and 2020 from 3.2 per cent to 3 per cent and 3.5 per cent to 3.4 per cent, respectively as compared with the projections made in April 2019. The downward revision is attributed to prolonged US-China trade tensions which may further decelerate China's GDP growth. In 2020, IMF projects China's economy to grow by 5.8 per cent. The trade war is a threat to oil prices as a slower economic growth could translate into lower energy demand.

Key economies forecasted lower economic growth for 2019 as compared to last year



Source: IMF (Oct 2019)

Production cut by OPEC+ to soak excess supply

Since 2017, OPEC together with 10 non-OPEC producing countries, the significant ones being Russia, Mexico, and Kazakhstan (OPEC+), have agreed on production cuts to reduce oil stocks to preserve the stability of the oil market. Participating producers in the recent meeting, held on 6 December 2019, have decided to deepen the production cut by 500 thousand barrels per day (bpd) to 1.7 million bpd effective January 2020, subject to the full conformity of participating members.

Conclusion

In summary, the outlook for 2020 remains challenging. The industry will need to focus efforts on prudent spending, coupled with a cost conscious mindset to ensure growth and sustainability against the backdrop of continued market volatility.

Conductor installation at Tembikai Non-Associated Gas wellhead platform, a marginal field offshore Peninsular Malaysia

In the Spotlight: 5 Features

Tangga Barat Platform, offshore Peninsular Malaysia

"We should never simply accept the status quo. As technology evolves, we want to be agile in seeking new frontiers in procurement."

Samsudin Miskon, Senior Vice President, Project Delivery & Technology, PETRONAS

TRAILBLAZING PROCUREMENT IN THE DIGITAL ERA

Realising the need to provide an improved experience for its partners, PETRONAS has embarked on its digital procurement transformation journey in 2017. Digital Advancement is a key success factor for business transformation.

PETRONAS is fully immersed in enhancing the overall procurement experience of 'DeeWoW' - Digitally enhanced and exciting Way of Working. Digital centralisation seamlessly integrates end-to-end procurement spectrum into one fluid workflow.

Designed as a flexible, cloud-native, and open platform to harness the potential of emerging technologies, suppliers are encouraged to gear up on their digital capability and infrastructure to take full advantage of the newly introduced platform that will be rolled out in phases from 2019 to 2020.

PETRONAS Group Procurement is a strategic solutions partner through end-to-end digitalisation of the procurement value chain.

PLAN

Strategic partner to businesses in building value-focused category strategies using insights from analytics

SOURCE

Shaping industry through supplier innovation to ensure business and industry sustainability

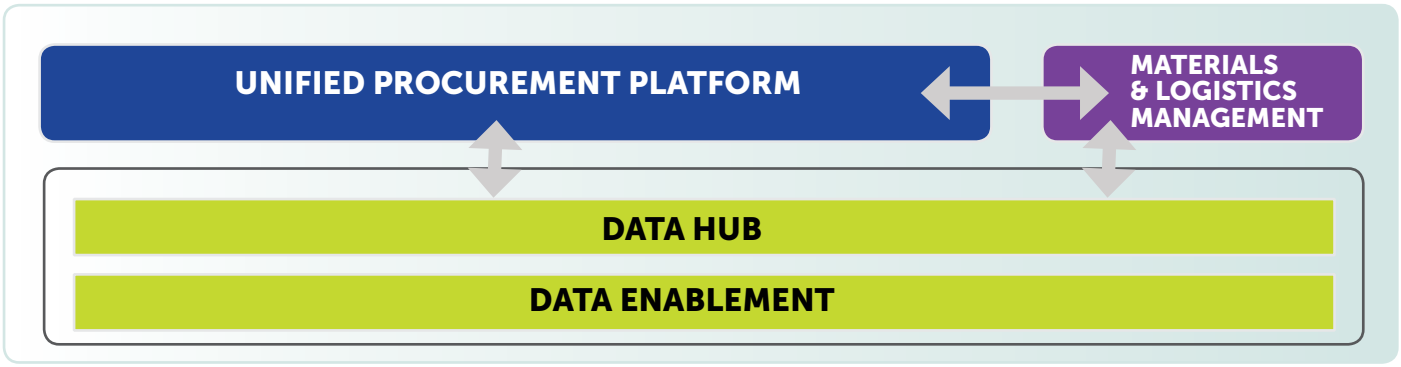
BUY

Innovating to provide an intuitive, guided-buying shopping experience for business users

DELIVER

Collaborating with industry players to optimise materials and logistics leveraging on digital tools

GROUP PROCUREMENT PLATFORM OF PLATFORMS



PLAN

Data-driven Planning

Data is the core of digitalisation, used to harness insights for smarter and faster decisions, ultimately unlocking significant foresights.

Data from PETRONAS' historical internal spending combined with external market intelligence and suppliers' tender bid data are invaluable sources for predictive analytics decisions and strategic planning.

SOURCE

Transforming the Core for Sourcing Excellence

Since 2019, PETRONAS has started to conduct its sourcing activities on SMART by GEP, a unified cloud-based platform that will enable streamlined transactions for selected tenders. By Q3 2020, the entire chain of procurement activities from sourcing to payment will be conducted on SMART by GEP.

All data coming into SMART by GEP will be analysed and harnessed for precise decision-making and benchmarking to bring greater value and transparency to the sourcing process. Potential service providers will be evaluated on commercial, quality, and reliability of services. Ultimately, analytics and transparency will produce a convergence of 'right cost' that is optimal for all parties and the key differentiating factor would be on the quality of services.

BUY

Intuitive Shopping Experience

Catalogue buying capability will be introduced in the second half of 2020. PETRONAS will be subscribing to the **Business-to-Business (B2B) Online Marketplace** where service providers are able to promote their products and services by setting up their catalogues on the marketplace.

With this move, PETRONAS is able to access a B2B network of verified service providers. Service providers will be able to market their products and services to PETRONAS' worldwide operations.

DELIVER

Best-in-class Materials Management & Logistics

ZENtory is a Materials Management tool that provides visibility of consumption patterns and equipment information for right stock and order decision-making. Service providers will need to be innovative in providing Just-In-Time products and services.

InteLogs is a Logistics Management tool that leverages on analytics to maximise efficiency of logistics assets through ride-sharing for crews among PETRONAS and Petroleum Arrangement Contractors (PACs). Movement, speed, and fuel will be tracked for optimum operation and cost management. This change is being implemented in phases starting in 2019 with full implementation by 2020. This can be achieved through the collaboration among PETRONAS, service providers, and business partners.

Preparing for the New Experience

To have the best experience using SMART by GEP, suppliers need to have the following:

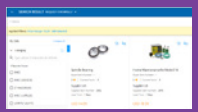
Screen resolution: 1280 x 960 pixels (minimum)

Internet Browser: Google Chrome

Internet Bandwidth: Minimum 20Mbps

Supplier Onboarding will be introduced on three different platforms

Current licensed service providers & contract holders



For current licensed PETRONAS service providers, please update your contact information via https://supplier-selfservice.petronas.com.my

Subscription to Marketplace (to be announced in Q3 2020)

Service providers can upload their catalogues onto the Marketplace

PETRONAS Global Products and Services Directory (to be announced in Q3 2020)

A dedicated platform will be established. For announcements on the directory, visit the same site as the PETRONAS Activity Outlook at **www.petronas.com/media**

Digital rollouts that require service providers' participation shall be updated on **www.petronas.com/media**

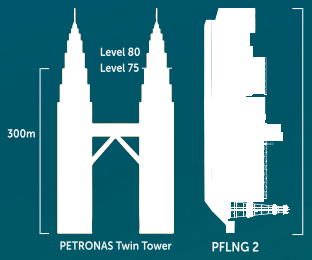
Our Latest Technological Marvel to Bring You Cleaner Energy

We are the only energy player in the world to own and operate 2 floating LNG facilities

PFLNG SATU the World's First Floating LNG Vessel	**PFLNG DUA** Bigger and Better

Get to Know PFLNG DUA

Water Depth of up to **1,500 meters**



overall length **393 m**

20 years design life

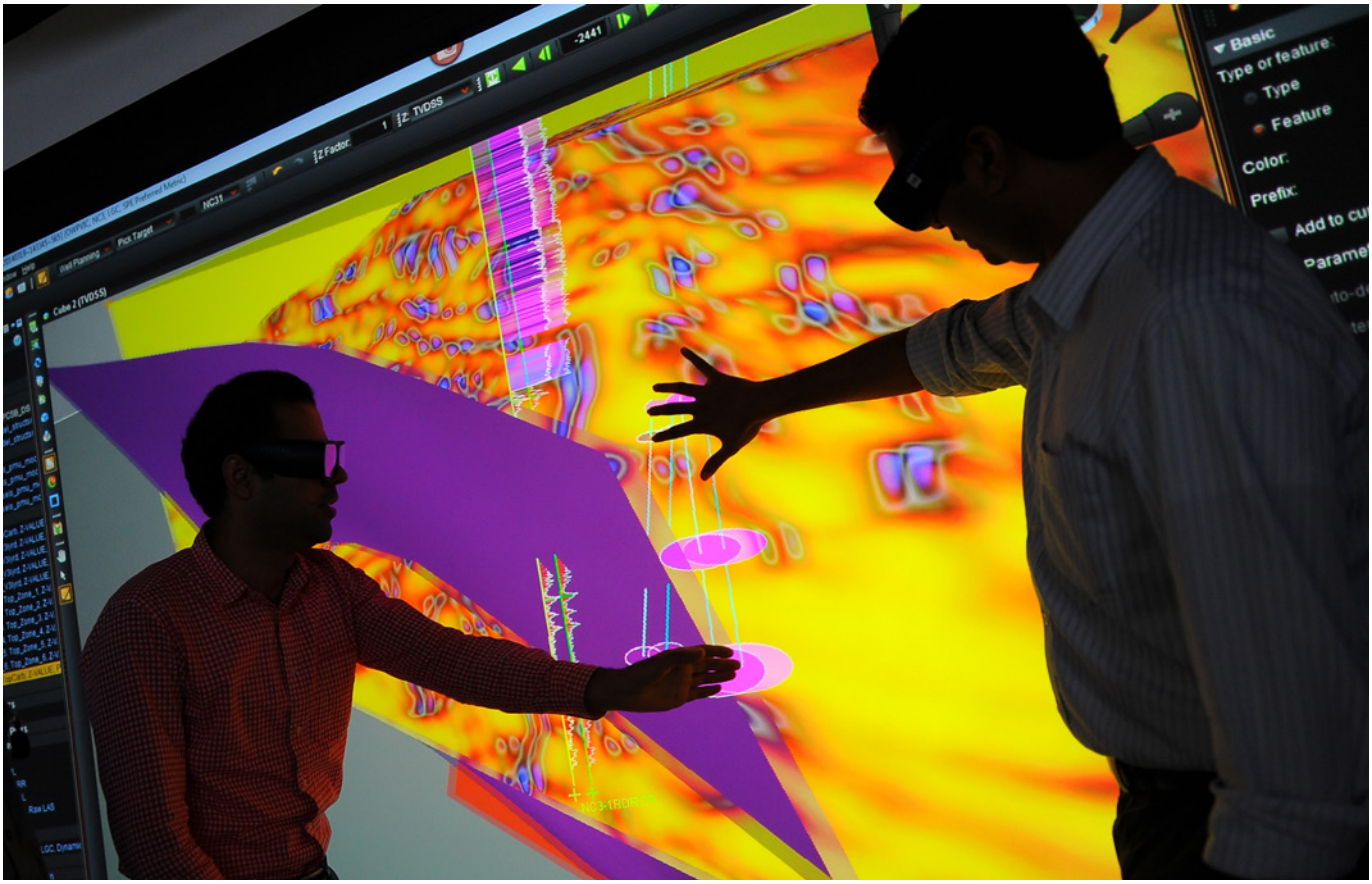
LNG tank **177,000m³** equivalent to more than **70 Olympic-sized swimming pools**

MTPA MTPA Capacity of up to **1.5 MTPA**

Will be located at Rotan Gas Field, **140km offshore Kota Kinabalu**

Technology Agenda

Spurring Homegrown Technology to Unlock Value



Research & Development (R&D) has become an indispensable tool to create a competitive advantage. In the energy business, cheaper and cleaner technologies emerge virtually every day, customer behaviours change ever so rapidly and markets shift without warning. Investing in new technology is key for business sustainability.

Technology as Differentiator

Technology for Operational Excellence (OE)

These are solutions to address gaps in current operational efficiency

Technology for Competitive Edge (CE)

These are solutions to unlock the value of challenging assets to gain competitive edge and new opportunities for growth

Technology for Future Positioning (FP)

These are solutions for new frontiers, to spearhead cutting-edge innovations and enable PETRONAS to strategically redefine itself in the long term as an **energy** company

Great ideas can come from anywhere. The **Innovation Gateway** was created as a one-stop crowd-sourcing centre for new technologies. All ideas for industry or commercial adoption are evaluated, and viable ones are piloted at the company's facilities and assets. The Innovation Gateway comprises two channels:

PETRONAS Innovation Gateway:
Crowdsourcing Local Technology

Technology Challenge

Challenges are issued to the global community, both individuals or organisations, to seek innovative solutions and increase operational excellence.

1. **Challenge publication**
   Information on topics and requirements.
2. **Proposal submission**
   Illustrate your ideas, with non-confidential information.
3. **Screening & evaluation**
   Your proposal will be reviewed and assessed by a multi-disciplinary team of experts. Those shortlisted will be informed.
4. **Winner announcement**
   Winners will be contacted and published on the Technology Challenge website.

Technology Marketplace

A gateway for anyone to propose technological solutions that may be of value to PETRONAS and the industry. All good ideas are welcomed, any time!

1. **Registration**
   Provide your details.
2. **Proposal submission**
   Illustrate your idea, with non-confidential information.
3. **Dissemination**
   Your proposal will be made accessible to the PETRONAS internal community.
4. **Communication**
   You will be contacted if your proposal has a potential fit to our needs.

Piloting/Validation

Deployment

Scan here to visit the Technology Challenge website.

Scan here to visit the Technology Marketplace website.

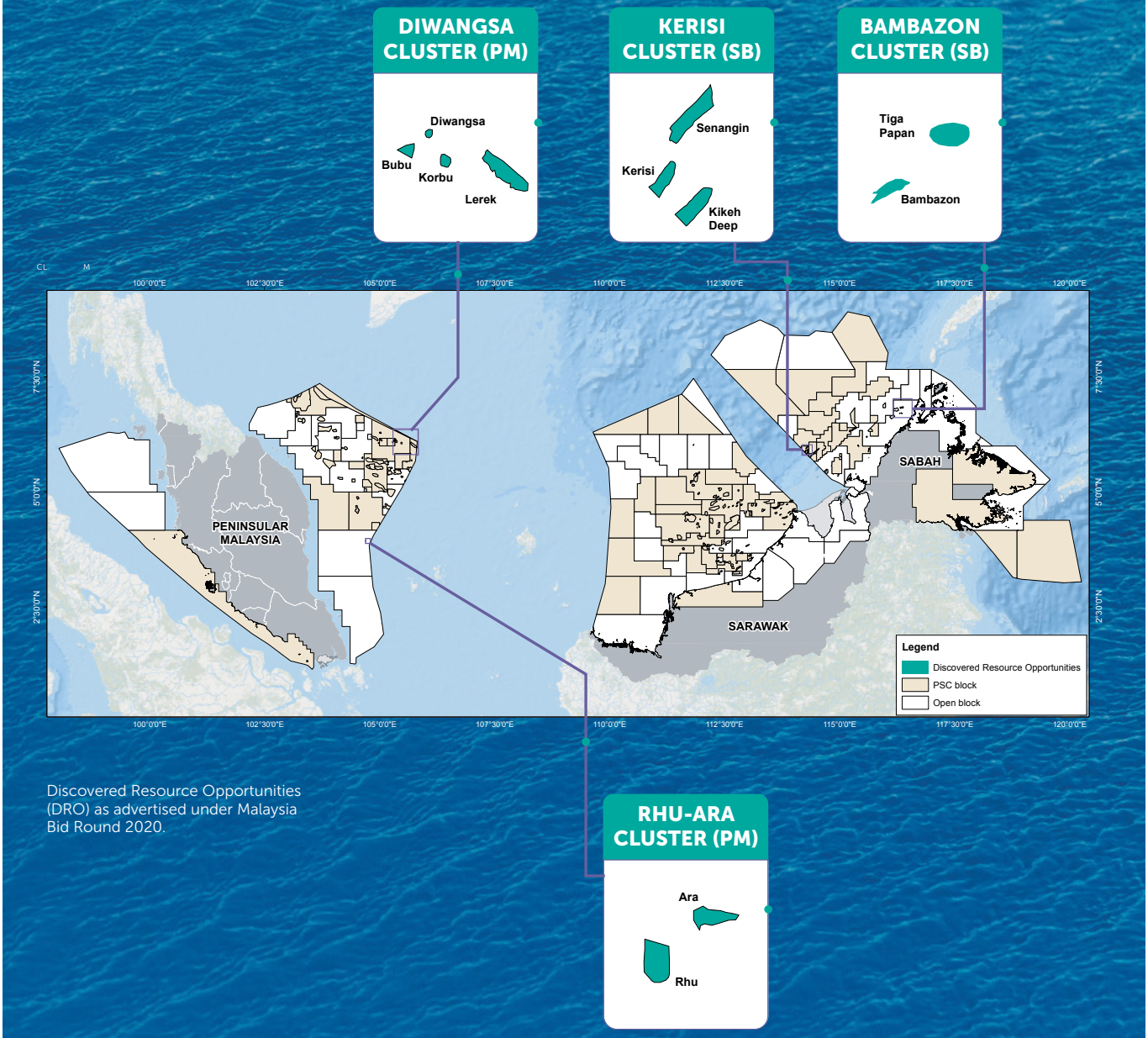
New Investment Prospects

Discovered Resource Opportunities (DRO) and Late Life Assets (LLA)

Tembikai Non-Associated Gas Platform, a marginal field offshore Peninsular Malaysia

For illustration only

Malaysia Bidding Round 2020



Discovered Resource Opportunities (DRO) as advertised under Malaysia Bid Round 2020.

New Investment Prospects

Discovered Resource Opportunities **(DRO)**
Late Life Assets **(LLA)**

Substantial opportunities within proven play and prolific reservoirs have seen successful development and monetisation of both oil and gas discoveries. Hundreds of exploration wells have been drilled and large amounts of seismic and Full Tensile Gravity (FTG) data have been acquired providing deep knowledge and understanding of the basins.

Malaysia has more than 12 billion barrels of oil equivalent (bboe) of undeveloped resources awaiting to be monetised. This presents great opportunities for new entrants and existing players to invest in marginal fields or **Discovered Resource Opportunities (DRO**) and extending value of **Late Life Assets (LLA)** until abandonment.

DRO Oil Fields
- Mostly are in close proximity to producing assets
- Single or clusters of fields for clustered development

DRO Gas Fields
- Some fields with more than 1 tcf
- Can be clustered for sizeable development
- Require technology to manage contaminants

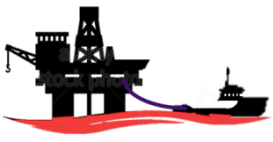
LLA
- Fields adequately developed with growing maturity
- Lower risk, size < 30 million stock tank barrels (MMstb)
- Single or clusters of fields for clustered development

PETRONAS has released the first Malaysia Bidding Round 2020 (MBR) for DRO and LLA in October 2019 with bid submission by May 2020 for:
- Four DRO clusters i.e. Bambazon, Diwangsa, Kerisi and Rhu-Ara.
- Technical studies for two LLAs i.e. MASA fields (Malong, Anding, and Sotong) and Tembungo.

Are YOU
Nimble? Low cost? Innovative? Financially sound?

Operating low cost assets

Lean maintenance philosophy



Experienced in asset decommissioning and wells Plug and Abandonment

Local players to partner with experienced international companies

Collaboration and strategic alliances are welcomed.

For details of MBR 2020, visit **www.petronas.com/mpm** or scan the QR code.

Simplification, Standardisation, and Replication

Simplification, Standardisation, and Replication

"Simplification, standardisation and replication will be our theme going forward."

Khairol Anuar Shukri
PETRONAS Head of Group Technical Solutions

PETRONAS Technical Standards (PTS) will be transformed through the **full adoption of the International Standards (IS) by end 2020.** The standardisation exercise will create a mutually-beneficial outcome for the industry in terms of safety, cost, schedule, quality, and reliability.

In the same spirit, PETRONAS is exploring the **Design 1, Build Many** concept, an integrated approach on design standardisation and volume consolidation. The design replication approach, to be applied for selected projects, enables users to have economies of scale, improve schedule efficiency, and subsequently lowering total installed cost.

The other key imperative of standardisation is the **harmonisation of industry standards.** The **International Association of Oil & Gas Producers (IOGP) JIP33** initiative is aimed at driving structural reduction in upstream project costs with focus on industry-wide, non-competitive collaboration, and standardisation of key equipment and materials.

For manufacturers, suppliers, and principals, the standardisation of specifications will reduce cost and open up opportunities to create greater value as they would be able to market their products globally on **PETRONAS Marketplace**, a soon-to-be-established digital platform.

Manufacturers, PETRONAS, Petroleum Arrangement Contractors (PACs) technical personnel, and IOGP committee discussing the hamonisation of standards at the IOGP Industry Day in Kuala Lumpur, Malaysia, on 7 November 2019.

Before JIP33

Many designs to meet different customer requirements.

Large inventory to accommodate all customer variations and spares.

Many variations on procedures and documents for different customers.

Benefits of JIP33

Core set of standard designs meet majority of user needs.

Smaller inventory, shorter lead times, and standardised items.

Common and well-developed procedures and documentation to cater for majority of customers.

Since 2016, JIP33 Phase 1 and 2 have produced 14 specifications that have been adopted by major global projects. Phase 3 is ongoing with 33 additional specifications for implementation.

Phase 1 (2015)

- IOGP S-562 Ball Valves
- IOGP S-561 Subsea Christmas Tree
- IOGP S-560 LV Switchgear
- IOGP S-563 Piping and Valve Material

Phase 2 (2016)

- IOGP S-611 Valve – Gate to API Spec 600 and API Spec 603
- IOGP S-612 Air Compressor Packages
- IOGP S-613 Air Dryer Packages
- IOGP S-614 Heat Exchangers
- IOGP S-615 Centrifugal Pumps
- IOGP S-616 Line Pipe Materials
- IOGP S-617 Offshore Cranes, Supplement to EN Standard
- IOGP S-618 Offshore Cranes, Supplement to API Standard
- IOGP S-619 Unfired Fusion Welded Pressure Vessels
- IOGP S-620 HV Switchgear

JIP33 specifications provide the following:

- Minimum functional requirements to standardise production processes to a cost-effective design.
- Pre-defined documents and data to be delivered by supplier.
- Quality requirement specifications.
- Equipment data sheet with options and project-specific information.

Vendors and manufacturers are encouraged to adopt industry standards harmonisation to improve technical integrity of equipment, materials, and offshore structures for more efficient operations and worldwide market growth.

For more details, please visit
www.iogp-jip33.org
or **scan this QR code:**

Corporate Liability

Corporate Liability Provision
Putting the **T.R.U.S.T.** in Everyone

On 1 June 2020, the Malaysian government will enforce the Corporate Liability provision under the new Section 17A of the Malaysian Anti-Corruption Commission (MACC) (Amendment) Act 2018. The Act steps up the fight against corruption and expands the coverage of MACC Act 2009 from persons to also include "commercial organisations and persons associated with the commercial organisation." This amended Act has wider and far-reaching implications to individuals, commercial organisations, and their partners.

What is the Corporate Liability provision?

New Section 17A
A commercial organisation commits an offence if **a person associated with the commercial organisation** corruptly gives, agrees to give, promises or offers to any person any gratification whether for the benefit of that person or another person with intent –

(a) to obtain or retain business for the commercial organisation; or

(b) to obtain or retain an advantage in the conduct of business for the commercial organisation.

Who is liable?

Where an offence is committed by a commercial organisation, a person –

(a) who is **a director, controller, officer** or **partner;** or

(b) who is **concerned in the management** of its affairs, at the time of the commission of the offence, **is deemed to have committed that offence,** unless that person proves that the offence was committed without his consent or connivance and that he exercised due diligence to prevent the commission of the offence as he ought to have exercised, having regard to the nature of his function in that capacity and to the circumstances.

What is the penalty for offenders?

Any commercial organisation who commits an offence under this section shall, on conviction, be liable to a fine of **not less than ten times the sum or value of the gratification** which is the subject matter of the offence, where such gratification is capable of being valued or is of pecuniary nature, or **one million ringgit, whichever is higher, or to imprisonment for a term not exceeding twenty years or to both.**

How do you defend yourself?

'Adequate Procedures' can be a defence for **commercial organisations** and their **'Associated Persons'** against Corporate Liability.

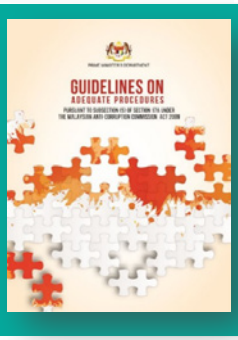
PETRONAS advocates for all its Malaysian and foreign vendors and partners to understand and proactively adopt and implement the **Adequate Procedures,** based on five **T.R.U.S.T.** principles, before the provision comes into force.

Five **T.R.U.S.T.** principles:

Top Level Commitment	**R**isk Assessment	**U**ndertake Control Measures	**S**ystematic Review, Monitoring, and Enforcement	**T**raining and Communication

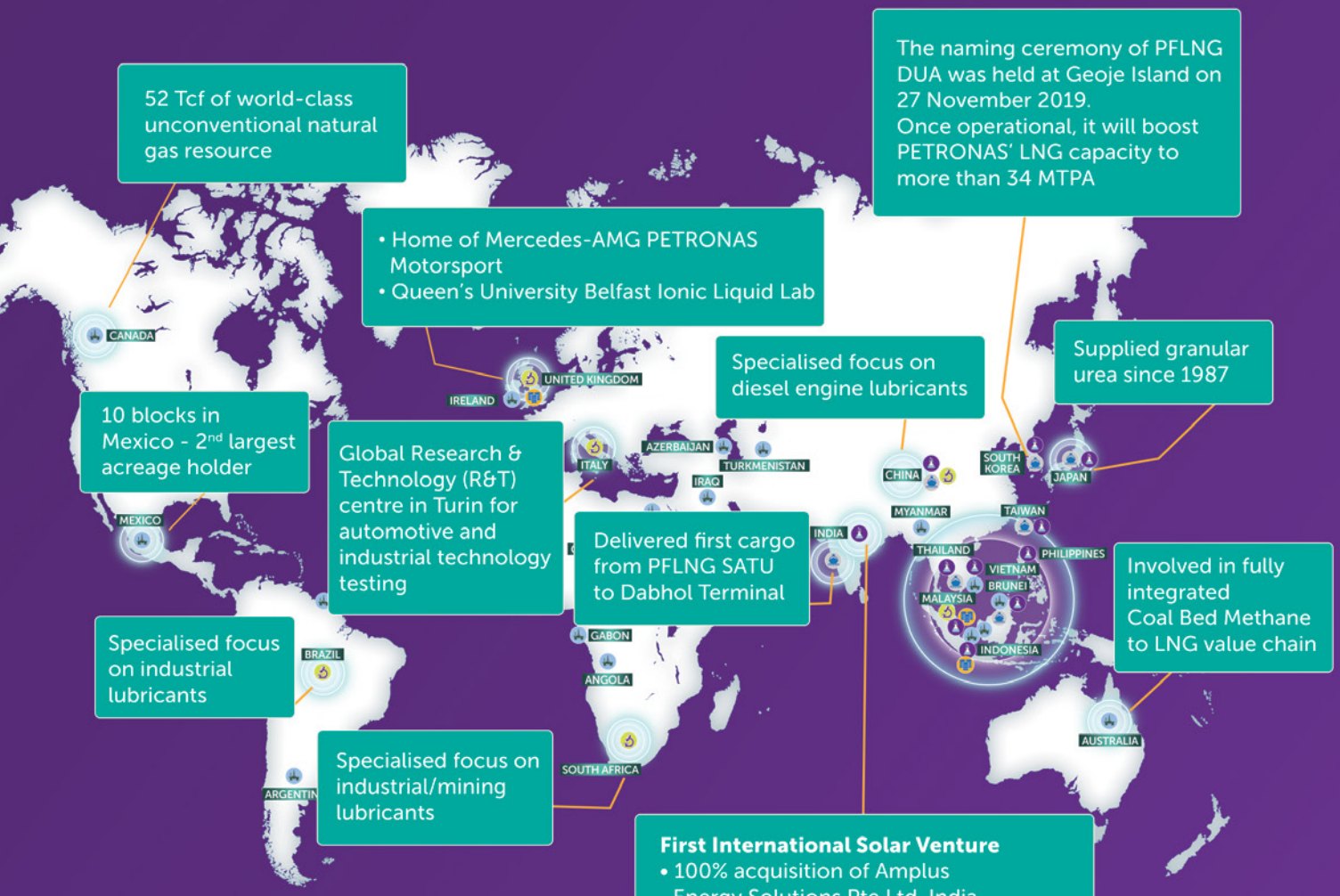
Examples of actions to be undertaken:

• Management pledge, committing to anti-bribery and corruption. • **Have a well-crafted anti-bribery and corruption compliance programme.** • Promote a culture of integrity; ensure the right level of communication on anti-bribery and corruption to internal and external parties. • **Practices the highest level of integrity and ethics.** • Complies fully with applicable anti-bribery and corruption laws and regulations. • **Effectively manages the key corruption risks of the organisation.** • Attend relevant anti-bribery and corruption trainings together with employees so there is increased visibility on leadership commitment to compliance.	• Establish a risk management framework. • **Conduct comprehensive corruption risk assessments.**	• Establish and implement policies and procedures on anti-bribery and corruption (e.g. conflicts of interest, gifts, entertainment, hospitality and travel, donations and sponsorship, facilitation payment, financial and non-financial controls, record keeping and enforcement). • **Establish and maintain regular monitoring programmes, internal audits, and external audits.** • Establish reporting channels. • **Conduct due diligence on third parties.**	• Ensure that regular audits are conducted to assess the performance, efficiency, and effectiveness of the anti-bribery and corruption programme, and ensure the programme is enforced. • **Identify the competent person(s) and/ or establish a compliance function to perform an internal audit, in relation to the organisation's anti-bribery and corruption measures.** • Conduct disciplinary proceedings against personnel found to be non-compliant to the programme.	• Communicate anti-bribery and corruption compliance messages to personnel, agents and contractors. • **Conduct anti-bribery and corruption trainings and communication of its policies and procedures to its stakeholders and third parties.**



Download the Guidelines on **Adequate Procedures** from the **Governance, Integrity & Anti-Corruption Centre (GIACC)** site at **www.giacc.jpm.gov.my**, or by scanning this **QR code:**

Our Worldwide Presence to Provide You Energy



First International Solar Venture

- 100% acquisition of Amplus Energy Solutions Pte Ltd, India
- Specialises in end-to-end solutions for rooftop and ground-mounted solar power projects
- Developing cumulative capacity of over 500MW of distributed energy assets across India, the Middle East and South East Asia

Reputable Crude Oil & Petroleum Product Trader

Regional Market Leader for Petrochemical Products

Exploration & Production Capabilities in > 20 Countries

Integrated LNG Solutions Partner

State-of-the-art Research & Technology Centres

Business Overview

PETRONAS Twin Towers

Upstream Malaysia

Samarang Platform, offshore Sabah

Upstream Overview

As the custodian of Malaysia's petroleum resources, PETRONAS is focused on pursuing sustainable value-driven production growth, monetising oil and gas resources, strengthening core capabilities and building niche competencies.

The below is a snapshot of Upstream Malaysia facilities dimension, operated by 21 Petroleum Arrangement Contractors (PACs) as at October 2019.

PLATFORMS & SUBSEA STRUCTURES

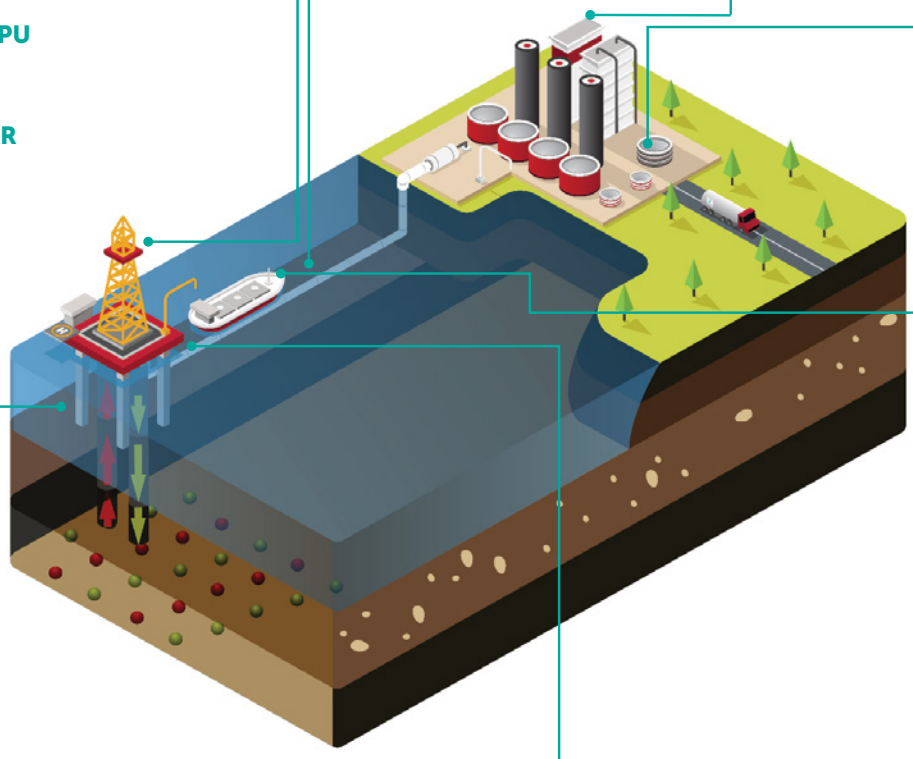
353 Offshore Platforms
1 Tension Leg Platform
14 Subsea Structures
1 MOPU
1 FPS
1 SPAR

PIPELINES

616 Lines
10,235 km Pipeline length

TERMINALS

4 Onshore Crude Terminals
7 Onshore Gas Terminals
2 Onshore Crude & Gas Terminals



SUPPLY BASES

3 Supply Bases
3 Airports
7 Ports

FLOATERS

7 FPSOs
8 FSOs
1 PFLNG

WELLS/STRINGS

3,935 Total Strings
2,191 Active Strings

ROTATING EQUIPMENT

182 Major Compressors
166 Crude Oil Transfer Pumps
76 Gas Lift/Gas Injection Compressors
21 Water Injection Pumps
281 Power Generators

SUPPORT VESSELS

56 Supply Run
31 People Movement
52 Field Support

Downstream Malaysia

Malaysian Refining Company Sdn Bhd

Downstream Overview

Downstream business comprises multiple businesses and plays a strategic role in enhancing value of molecules through an integrated operation, on the foundation of being operationally and commercially excellent. The diverse activities include refining, trading, and marketing crude oil and petroleum products as well as manufacturing and marketing petrochemical products for local and international consumption.

1

- **2 Refineries**
  - 1 Melaka >275 kbpd
  - 1 Terengganu >120 kbpd
- **Trading Office**
  HQ in Kuala Lumpur

2

- **17 Petrochemical Processing Plants**
- **Marketing Office**
  HQ in Kuala Lumpur

3

- **>1,000 Retail Stations**
- **1 Lube Oil Blending Facilities**
- **6 JV Depots and Facilities**
- **10 Bunkering Facilities**
- **38 Terminals**
  - 17 Fuel Terminals
  - 13 Aviation Terminals
  - 8 LPG Terminals and Bottling Facilities

4

- **PENGERANG INTEGRATED COMPLEX (PIC)**
  - 1 Refinery Complex ~300 kbpd
  - 1 Petrochemical Complex ~3.3 MTPA
- **Supported by 6 Associated Facilities**

PAMER
Water Supply Facility

ASU
Air Separation Unit

RGT2
PGPP
Regasification Terminal & Pengerang Gas Pipeline Project

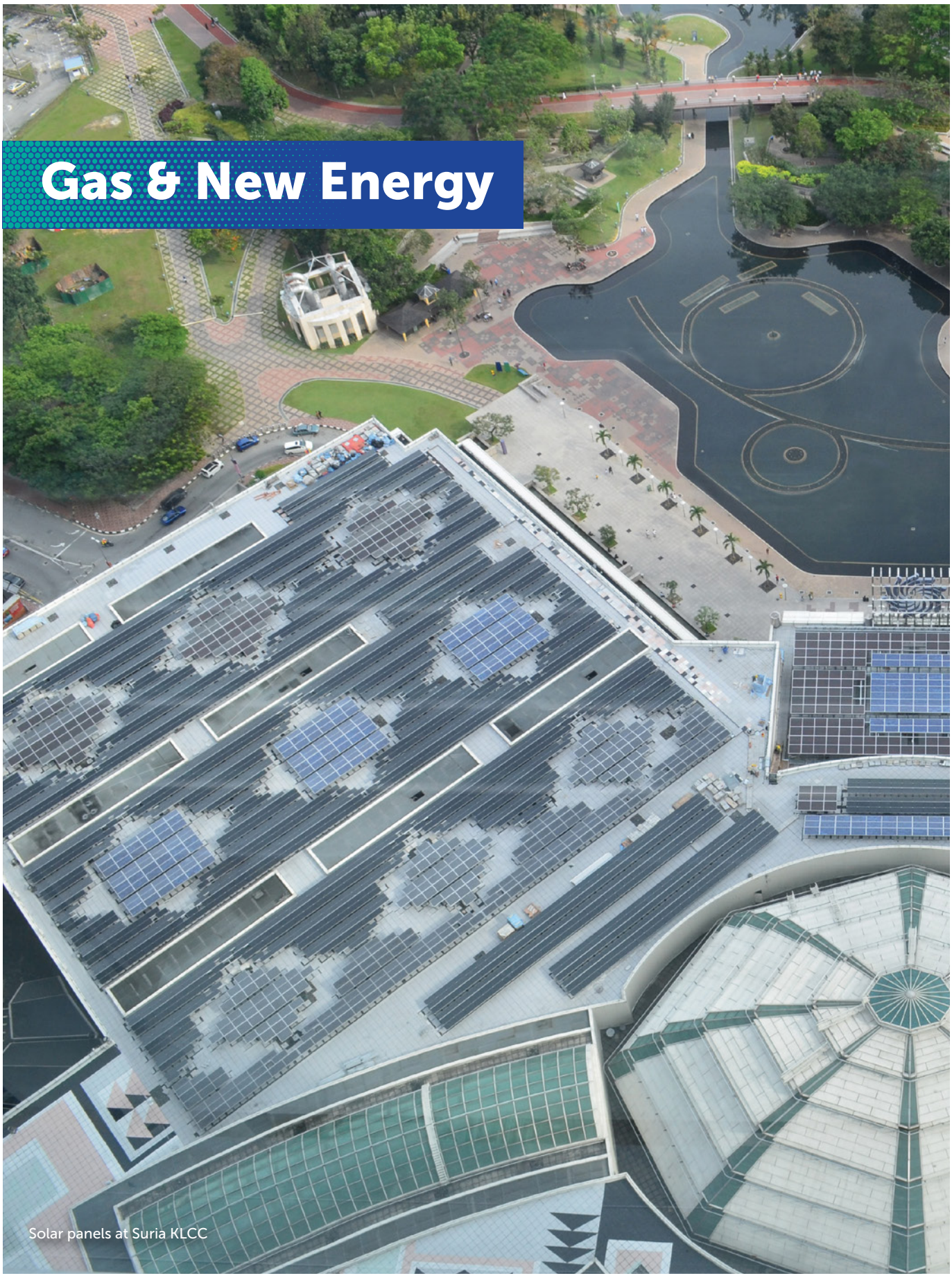
UF
Utilities and Facilities

PCP
PTL
Pengerang Cogen Plant & Pengerang Transmission Line

PDT2
Pengerang Deep Water Terminal

1 REFINING & TRADING
2 PETROCHEMICAL
3 MARKETING
4 PENGERANG INTEGRATED COMPLEX

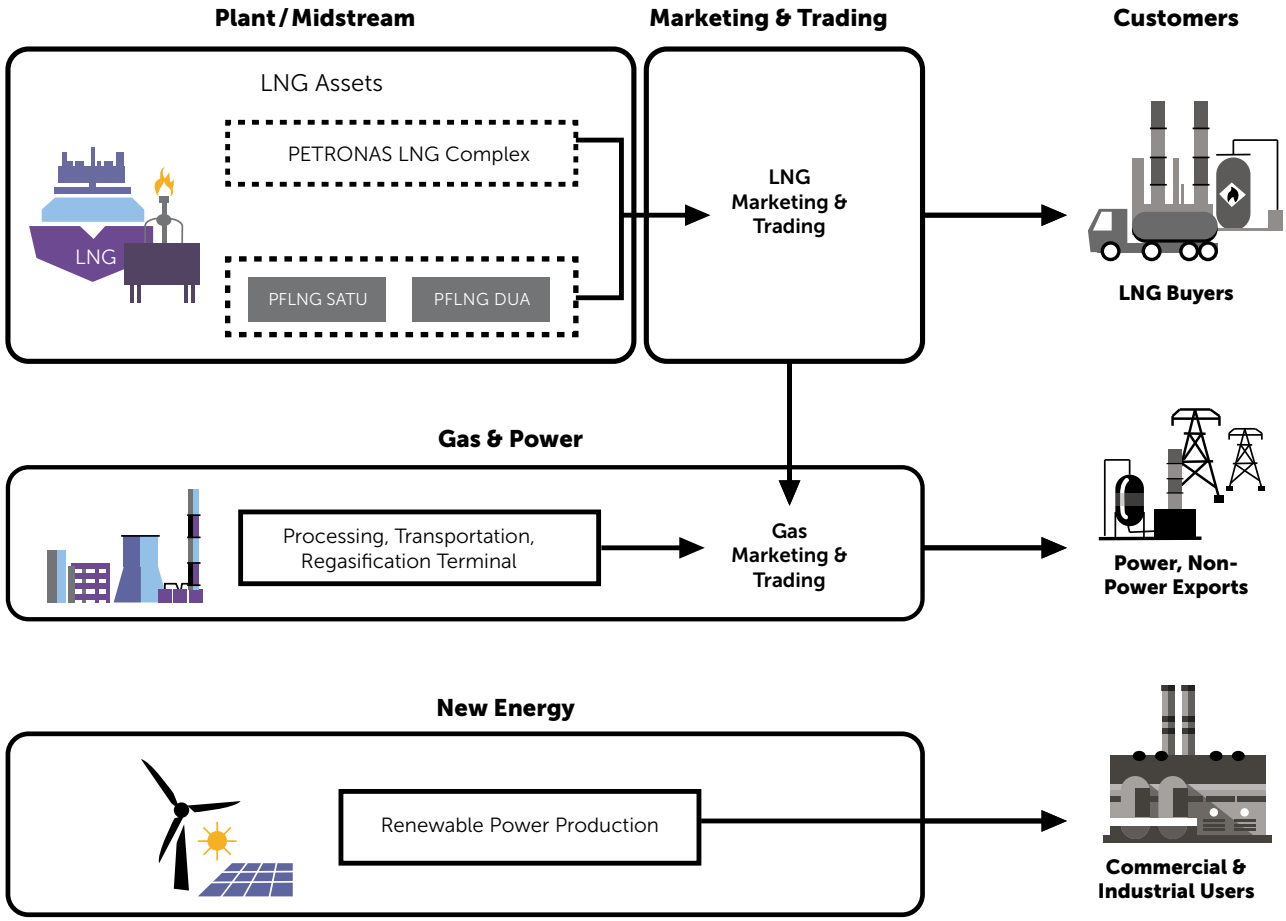
Gas & New Energy



Solar panels at Suria KLCC

Gas & New Energy
Overview

The formation of **Gas & New Energy** portfolio reflects our intent in PETRONAS' Statement of Purpose that places an emphasis on sustainability. The illustration below depicts the spectrum of domestic value chain for Gas & New Energy.



Gebeng Solar Power Plant

PFLNG DUA

Activity Outlook

Tangga Barat Platform, offshore Peninsular Malaysia

METHODOLOGY

Scope of Coverage

This section provides the activity outlook for core categories; serving as leading indicators to many other supporting services. Given the interdependencies of these activities, it presents multiplier-effects across the value chain.

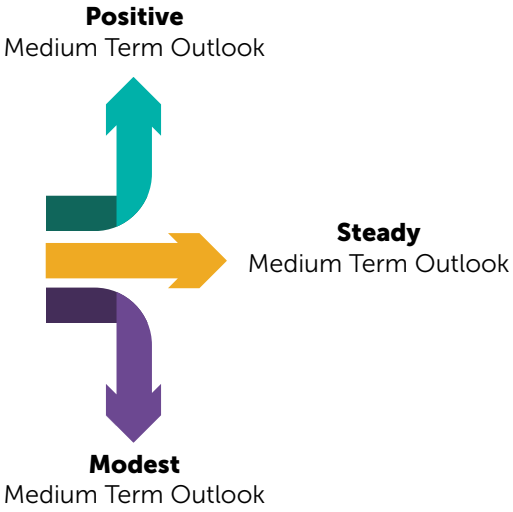
For Upstream related information, this report covers the activity outlook for Malaysia. This includes activities from PETRONAS Group of Companies and other Petroleum Arrangement Contractors (PACs). Activities governed under the Malaysia-Thailand Joint Development Area (MTJDA) are excluded from this report.

For Downstream and Gas & New Energy related information, this report covers the activity outlook for PETRONAS Group of Companies in Malaysia only.

Time Horizon

This report provides information on activities within a three-year period, from 2020 to 2022. Information is accounted for when a specific activity begins and not by contract award date. Using Offshore Fabrication as an example, we report the date of the first steel-cut instead of the date of Engineering, Procurement, Construction, Installation and Commissioning (EPCIC) contract award. Another example is plant turnaround that begins in December 2020 and ends in January 2021 is only accounted for once, i.e. in 2020.

Directional narratives are provided for the medium-term i.e. post-2022, to support outlook analysis using the following signposts:



Actual vs Plan for 2019

Actual numbers are based on data as at October 2019.

Base & High Case Scenarios for 2020 – 2022

Outlook numbers for most categories are provided via a lower and upper band:
Base Case – Activities with high probability of occurrence; high project maturity and certainty of requirement.
High Case – Activities with lower probability of occurrence; lower project maturity and certainty of requirement.

Quick Reference for 2020

Subsurface

Drilling Rigs & HWUs

- ~ 16 Jackups
- ~ 3 TADRs
- ~ 3 Semi-submersibles/Drillships
- ~ 4 HWUs

Engineering, Construction & Project

Offshore Fabrications

- 10 – 13 WHPs & 1 CPP
- 2 Floaters
- 1-2 SURF

Supply of Linepipes

- 94 – 137 km Carbon Steel
- ~ 7 km Flexible Pipes

Offshore Installations

- ~ 3 lifts for Heavylift
- ~ 79 km of Pipeline Installation

Hook-up and Commissioning (HUC)

- ~ 4.6 Million manhours

Decommissioning

- ~ 7 Subsea Tree
- ~ 30 Wells

General Facilities & Maintenance

Maintenance, Construction and Modification (MCM)

- ~ 18.9 million manhours for MCM

Plant Turnaround

- 2 with >350k manhours
- 4 with <= 350k manhours
- 3 with <= 100k manhours

Underwater Services

-DP2 Support Vessels

- 2 – 4,300m^2
- 5 – 9,500m^2
- 3 – 5,700m^2

Logistics

Marine Vessel

- ~ 149 Anchor Handling Tug Supply (AHTS)
- ~ 56 Platform Supply Vessel (PSV)/ Straight Supply Vessel (SSV)
- ~ 70 Fast Crew Boat
- ~ 58 Workboat/Work Barge
- ~ 19 General Purpose Vessel (GPV)/ Standby Vessel (SBV)
- ~ 30 Landing Craft Tank (LCT)
- ~ 8 Utility Vessel (UV)

Others

Equipment & Material

Chemicals

Indirect

Activity Phase (Upstream, Downstream, Gas & New Energy):

Exploration | Production/Operation | Development/Project | Abandonment

A Subsurface

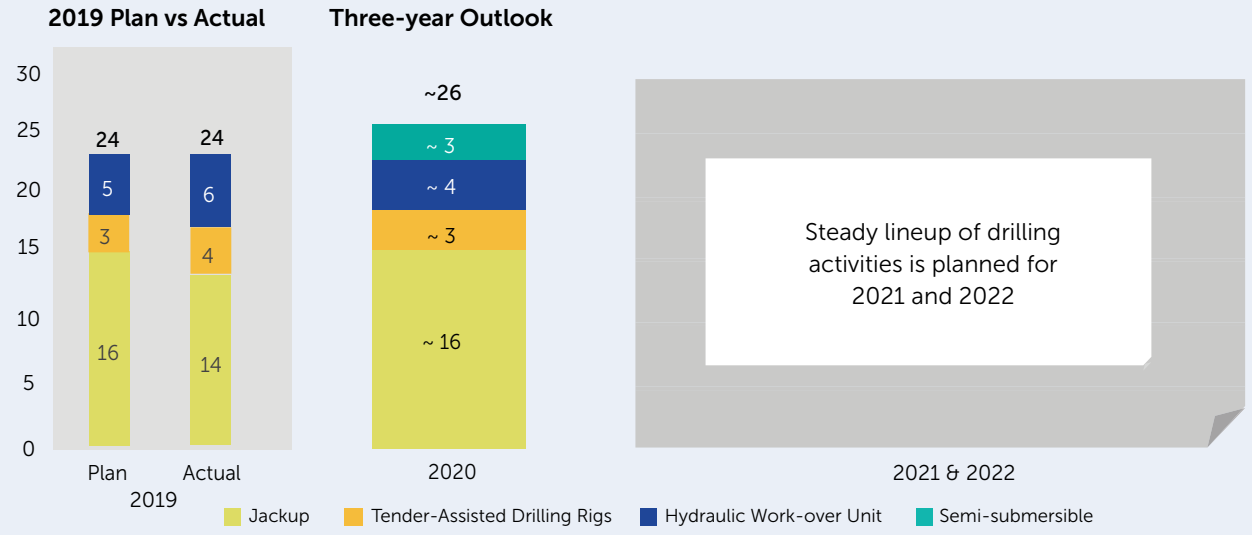
Drilling Rigs and Hydraulic Workover Units (HWUs)

Drilling Rigs refer to the machines used to drill a wellbore. Activity outlook will be provided for all types of rigs operating in Malaysia, i.e. Jackup Rigs (JURs), Tender-Assisted Drilling Rigs (TADRs), Semi-submersible Rigs, and Drillship.

Workover refers to any well intervention process that helps to remediate the wells using an invasive technique and Hydraulic Workover Unit (HWU) which is used to perform these operations.

Type of Rigs	Jackup	TADR	Semi-submersible	Drillship	HWU
Activity Phase	• Exploration • Development • Abandonment	• Development	• Exploration • Development • Abandonment	• Exploration • Development	• Production • Abandonment
Application	The most common type of offshore rig due to its flexibility. Typically used for drilling in shallow waters.	Typically used for areas with higher water depth and space/load/ approachability limitations, e.g. deepwater spars, TLPs, etc.	The most stable type of rig, typically used for drilling in shallow or deep waters and/or harsh environments, depending on the technical capability of the rig.	Typically used for drilling in deep/ultra deep waters. Can also be used for well maintenance, completion and capping works.	Typically used for workover operations e.g. well casings and casing levels repair, sand cleanout, etc.
Associated Services	Supporting vessels, OCTG, third party drilling services e.g. drilling fluids, DD/MWD/LWD, wellheads, drill bits, cementing, fishing, slickline etc.			OCTG and third party drilling services.	Supporting vessels, slickline, cementing, etc.

Number of Rigs:



- Total rig utilisation for 2019 reflects the planned number, with different composition for optimisation.
- For 2020 to 2022, semi-submersible and drillship are included. Activity levelling across the year will be implemented to avoid bunching during the peak summer months from around July to September to allow for optimum utilisation of resources and cost.

Medium Term Outlook – Post 2022

- Steady outlook of drilling activities is expected through PETRONAS' effort of optimising its resource requirement.

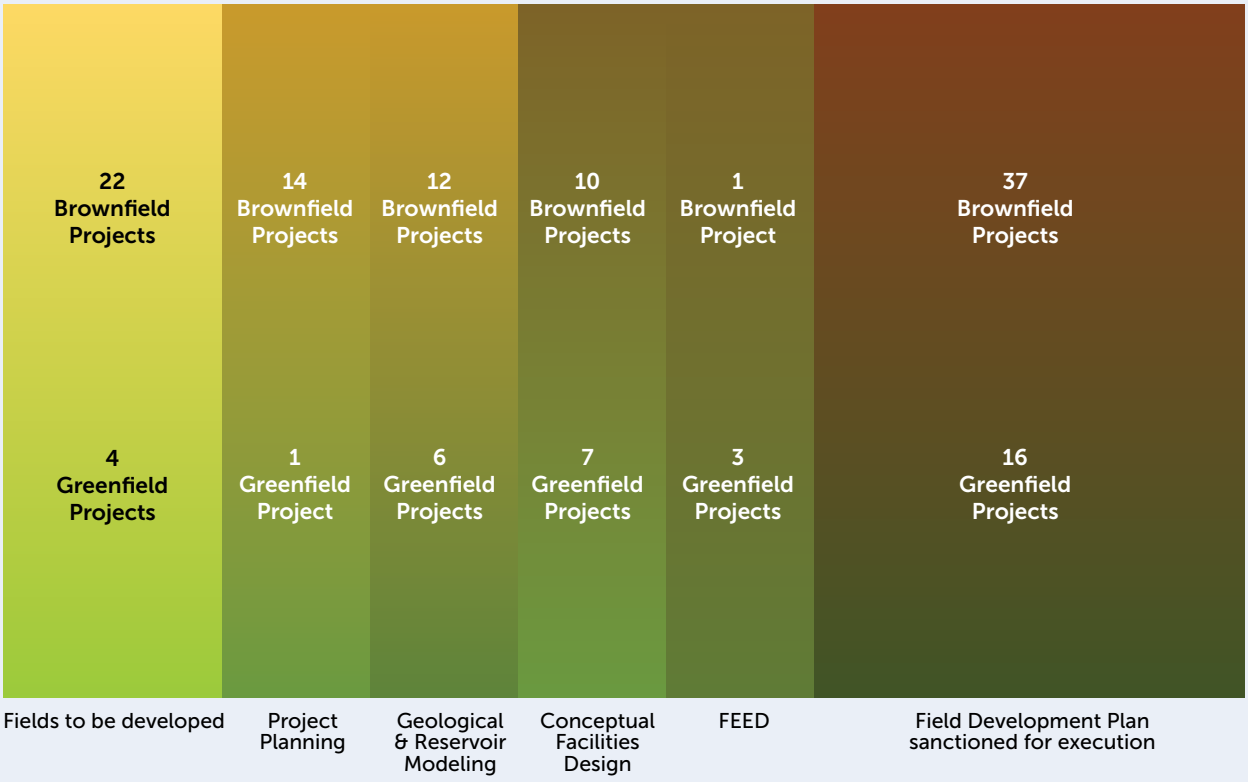
B Engineering, Construction & Projects

The outlook for **Engineering, Construction & Projects** is best represented by activities related to development projects. i.e. offshore fabrication, supply of linepipes, offshore installation, hook-up and decommissioning.

Typical upstream project development comprises Engineering, Procurement, Construction, Installation, Hook-up and Commissioning (EPCIC) stages.

The following portfolio of projects showcases abundant investment opportunities in Malaysian waters over the longer horizon. Large pool of projects are continuously and rigorously reviewed to materialise a steady pipeline of feasible and economically viable projects for production sustainability.

Portfolio of projects relative to project maturity



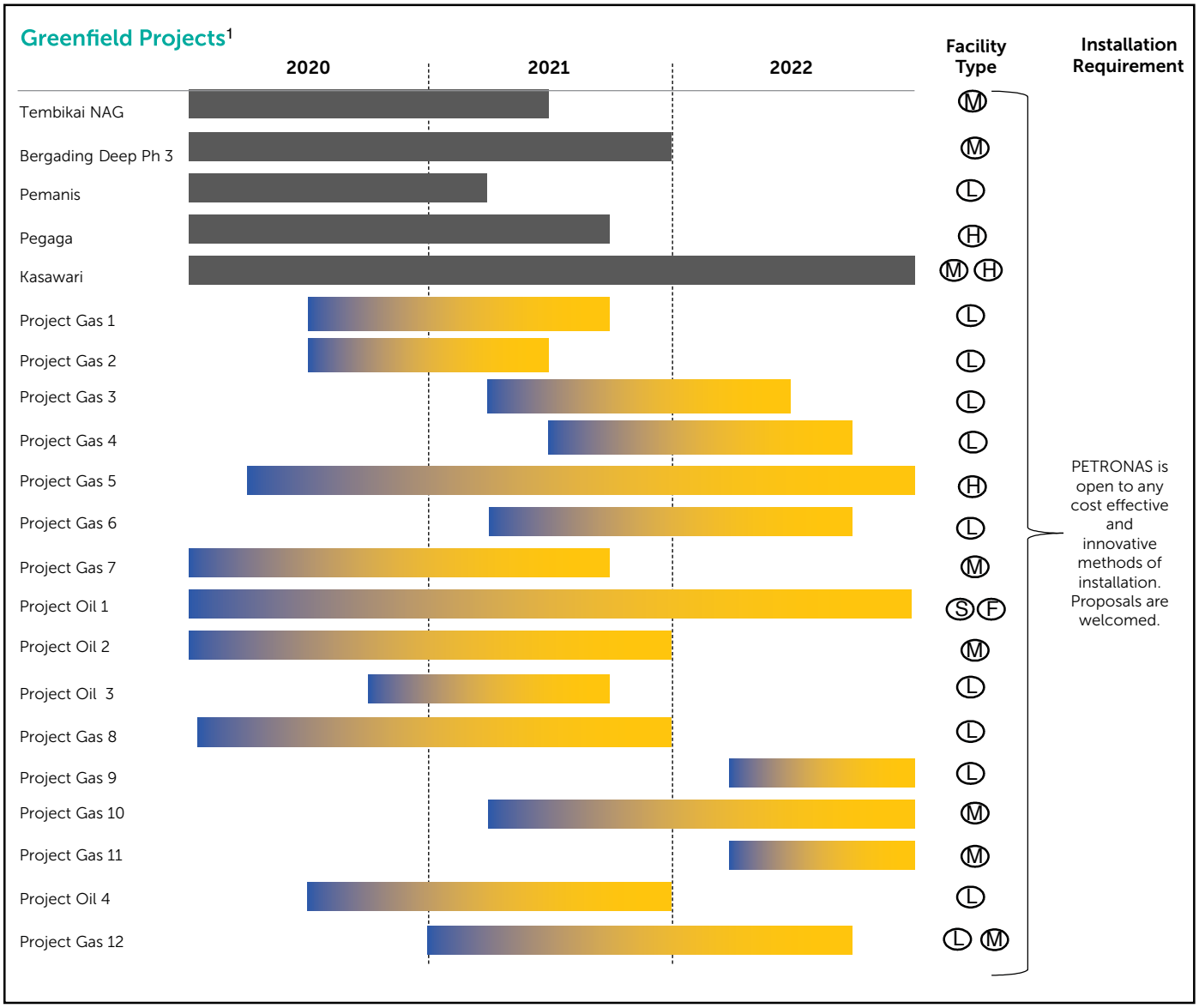
Number of projects are as at November 2019, and inclusive of infill drilling projects.

The fields to be developed include marginal fields, late life assets, fields with high contaminants, high complexity reservoirs and distant fields that offer opportunities for investors to make the projects viable through innovative, disruptive, and cost-effective solutions. This is a niche play that can create a marketspace of profitable and sustainable business.

B Engineering, Construction & Projects

For the purpose of this report, the timeline for each project is segregated into two stages; i.e. (i) Engineering and (ii) Procurement, Construction, Installation, Hook-up and Commissioning. There may be overlapping of activities between the two stages, as depicted by the gradient. Also provided are indicators for facility types and installation requirements.

The list below depicts upstream **Greenfield Projects**:



[1] At the time of reporting, approximately 75 per cent of projects are still under review.

Engineering

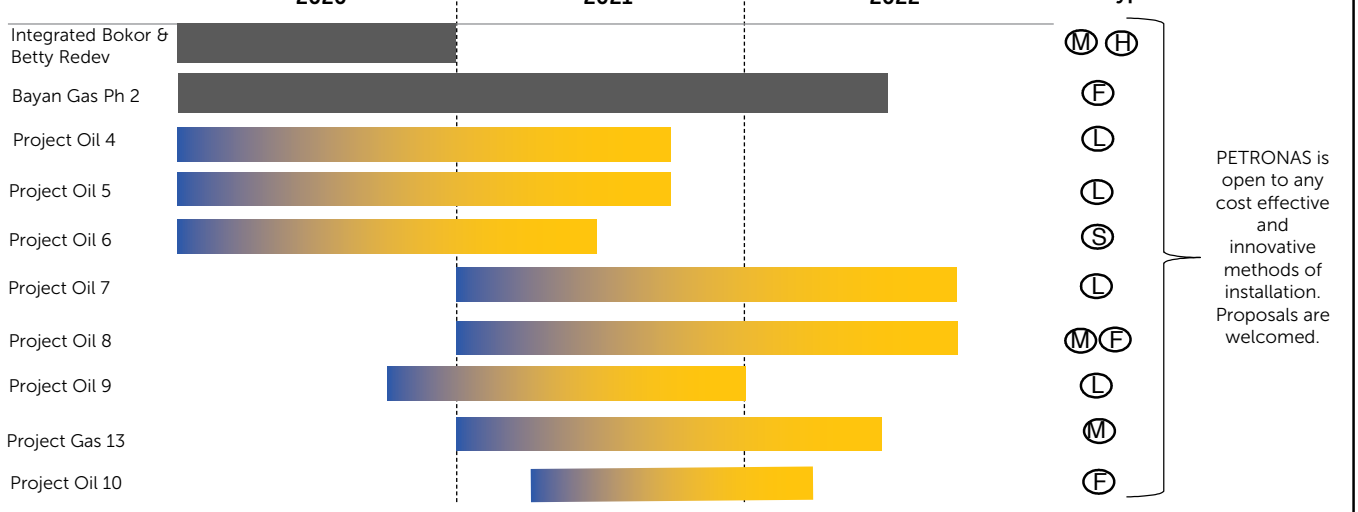
Fabrication, Installation, and Hook-up and Commissioning

In execution

B Engineering, Construction & Projects

For the purpose of this report, **brownfield projects** are segregated by:
Brownfield Projects (with new structural installation)
Brownfield Projects (without new structural installation)

Brownfield Projects[2] (with new structural installation)



[2] At the time of reporting, high number of projects are still under review.

Legend for Facilities Type:

Fixed structure	(L) Lightweight	– total tonnage 1,000 tonnes	(H) Heavy Weight	– total tonnage > 7,500 tonnes
	(M) Medium Weight	– total tonnage 7,500 tonnes		
Floating structure	(F) Floaters – Floating Production Storage & Offloading (FPSO) / Floating Storage & Offloading (FSO) / Mobile Operating Production Unit (MOPU)			
Subsea structure	(S) Subsea – Subsea Production System & Subsea Umbilical Riser Facilities (SURF)			

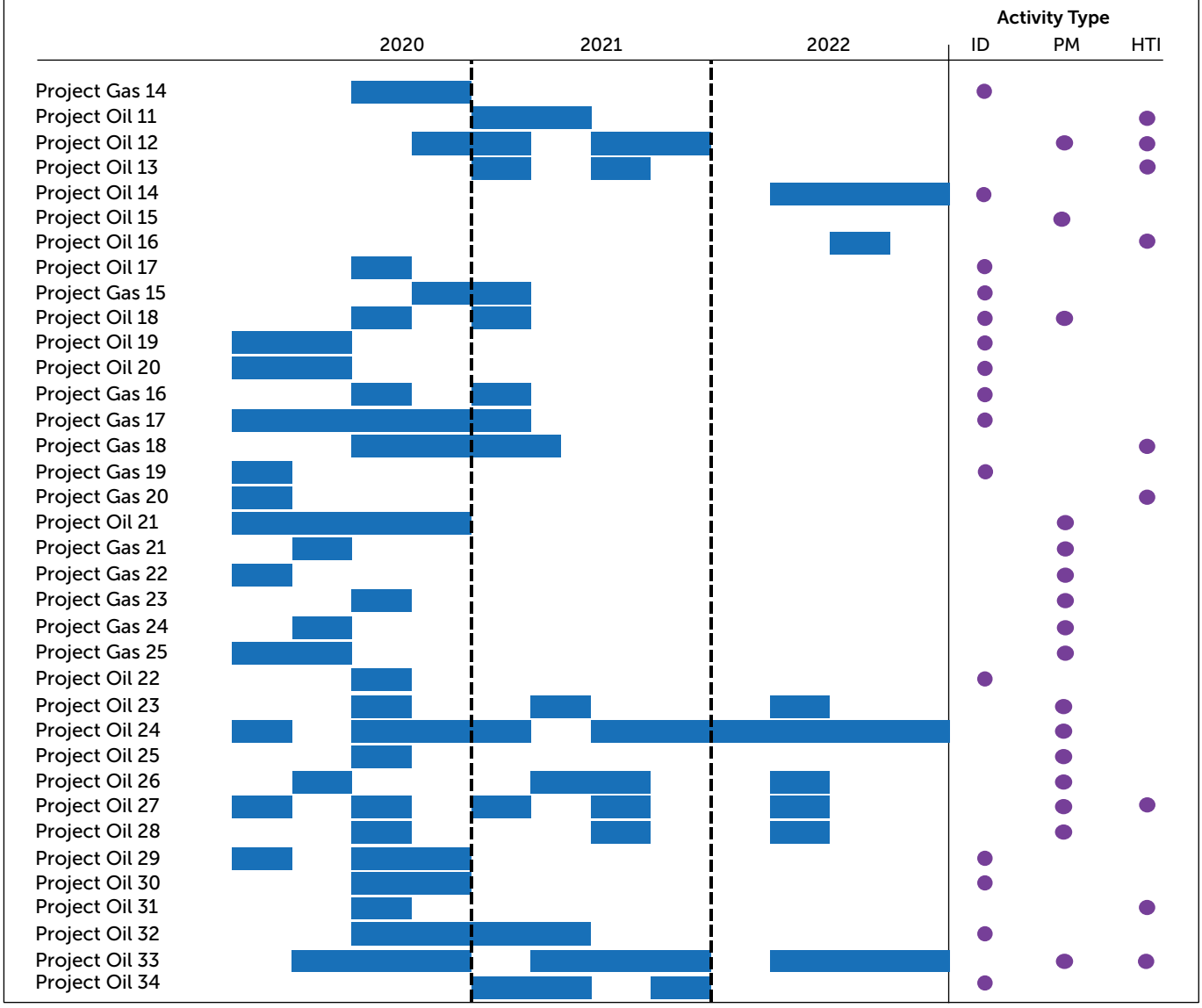
- Engineering
- Fabrication, Installation, and Hook-up and Commissioning
- In execution

B Engineering, Construction & Projects

For brownfield projects (without new structural installation), the activity type is indicated as below:

Infill Drilling	Drilling of new wells in an existing field within the original well patterns to accelerate production.
Platform Modification	Modifying existing structure to enable rig move-in (for infill drilling) or to serve new/ additional operational objectives. May involve minor fabrication works.
Host Tie-in	Connecting two or more structures to complete the chain of production facilities, allowing production to commence.

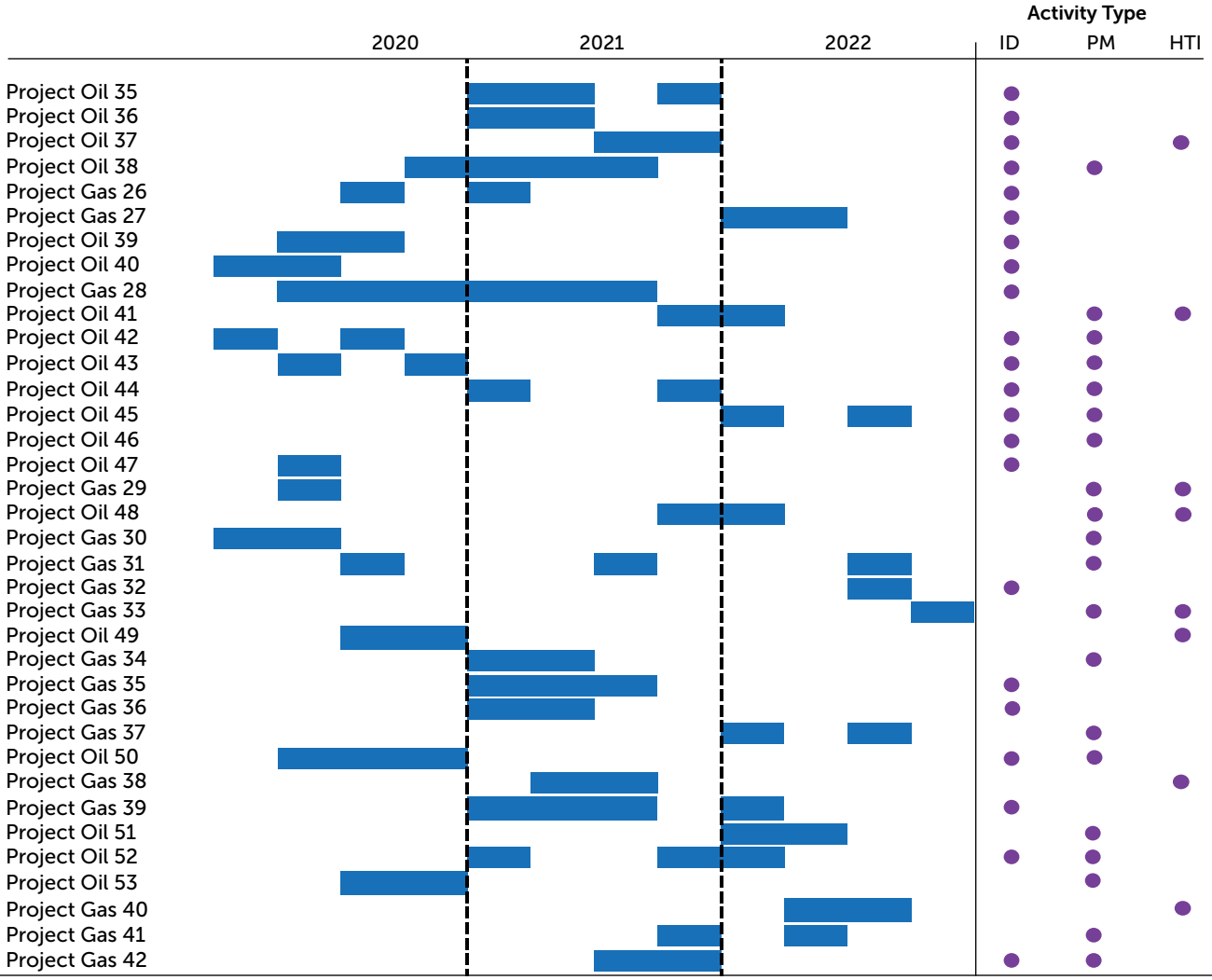
Brownfield Projects (without new structural installation)



Legend:

ID: Infill Drilling **PM:** Platform Modification **HTI:** Host Tie-in

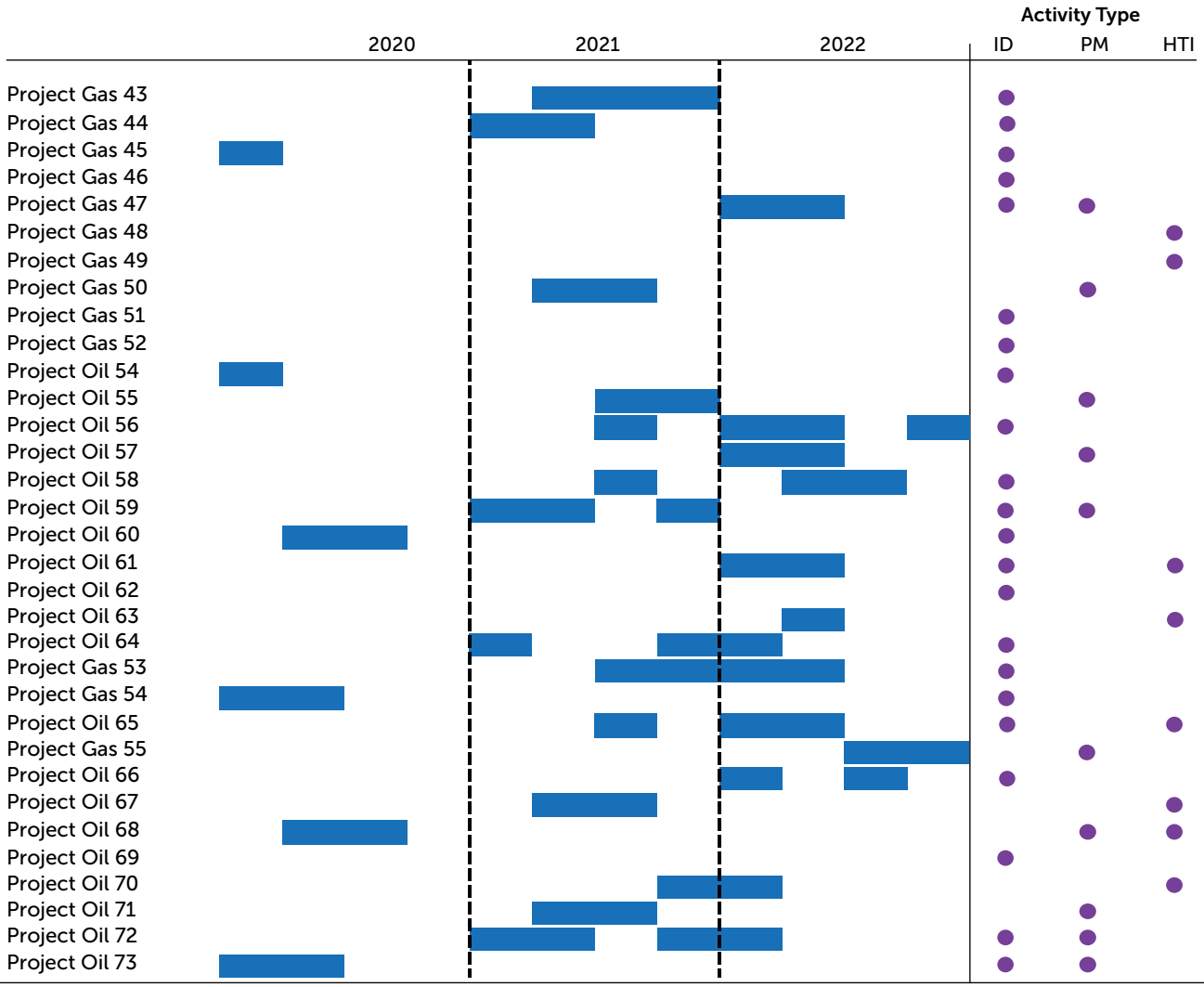
Brownfield Projects (without new structural installation)



Legend:

ID: Infill Drilling **PM:** Platform Modification **HTI:** Host Tie-in

Brownfield Projects (without new structural installation)



Legend:

ID: Infill Drilling **PM:** Platform Modification **HTI:** Host Tie-in

B Engineering, Construction & Projects

Offshore Fabrication

Offshore fabrication outlook is provided for fixed and floating structures, with first steel-cut as the indicator for commencement of fabrication activity.

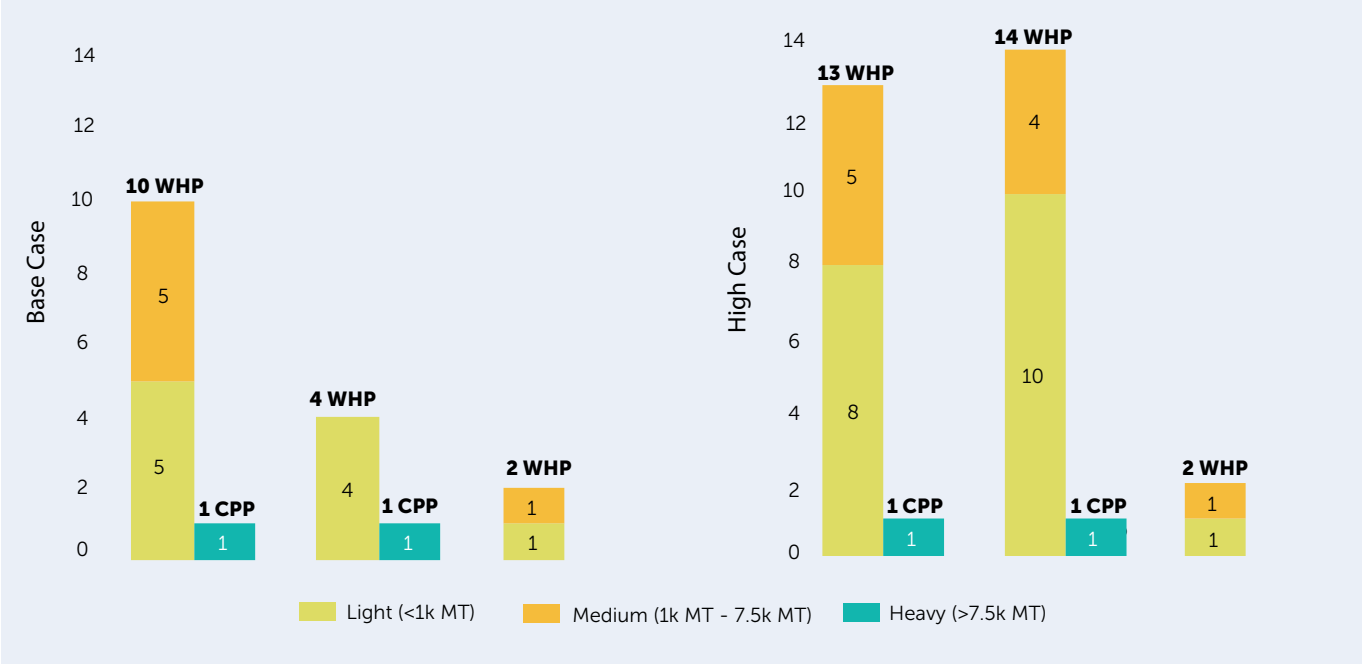
Fixed Structures: Wellhead Platform (WHP) and Central Processing Platform (CPP)

Application (WHP): To house wellheads and equipment that extract oil and gas from the seabed and serve as a platform for drilling activities. Typically, it is linked to other fixed or floating structures for oil and gas processing.

Application (CPP): To house wellheads and equipment that extract and process oil and gas from WHPs and piped to point of export. CPP typically acts as the central hub for the entire field complex.

Associated Services: Engineering, structural steel, bulk materials e.g. piping, cables, etc., equipment supplies e.g. mechanical, electrical, instruments, etc.

Number of Fixed Structures Fabrication: Three-year Outlook



Outlook includes activities which may have been contracted out at the time of reporting.

- In 2019, three projects have started its first steel-cut vs six projects as initially forecasted due to revised development concept and revised facility design driven by opportunities to achieve cost efficiency.
- In 2021, most projects are at pre-concept selection stage, which are still subjected to projects' economic feasibility. Therefore, there is a disparity in the high and base case.
- Steady outlook is expected in 2022. With stable movement of oil prices, more new development projects which are currently in planning, will mature, resulting in the possibility of more than the projected two WHP fabrication.

B Engineering, Construction & Projects

Floating Structures: Floaters

For the purpose of this report, floaters refer to non-fixed structures involved in processing and/or storage of hydrocarbons i.e. Floating Production Storage and Offloading (FPSO), Floating Storage and Offloading (FSO) and Mobile Offshore Production Units (MOPUs).

Application: Relocatable production facilities, generally to enable monetisation of marginal fields or isolated oil and gas fields without existing export facilities e.g. pipeline in the vicinity.

Associated Services: Engineering, structural steel, equipment supplies, e.g. mechanical, electrical, instruments, etc., shipyards.

FPSO

Floating Production, Storage & Offloading
Vessel used for the processing of hydrocarbons, as well as for storage of crude oil before export via tanker lifting.

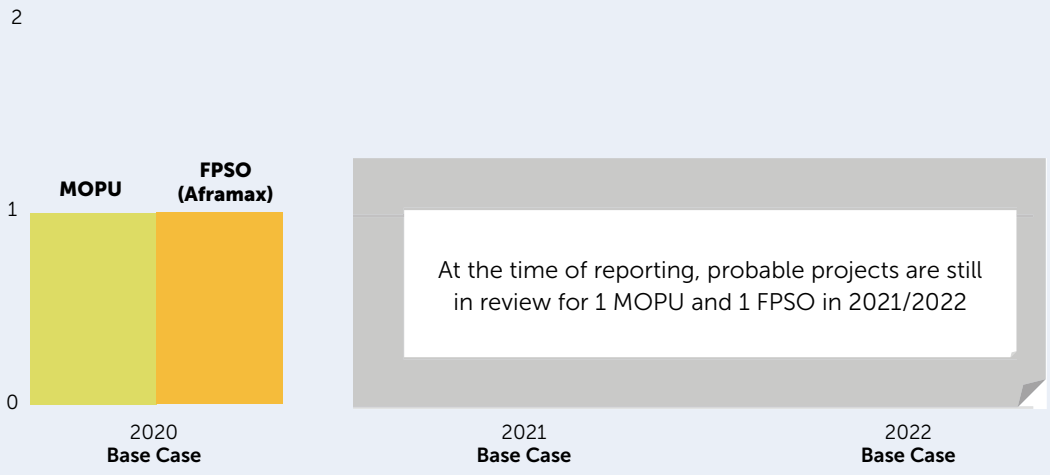
FSO

Floating Storage & Offloading
A simplified FPSO without the capability for oil or gas processing.

MOPU

Mobile Offshore Production Unit
Portable structure that can be reused in offshore well production. In this report, MOPU refers to the portable wellhead platform.

Number of Floating Structures: Three-year Outlook



Medium Term Outlook – Post 2022

- Steady outlook is expected for light to medium weight WHPs as well as floaters, in line with emerging number of marginal field development in Malaysia. PETRONAS is exploring the Design 1, Build Many (D1BM) concept towards higher efficiency in schedule and cost management.
- Modest outlook can be expected for heavier structures, as cost competitiveness drives development projects to opt for tie-ins to existing nearby facilities.

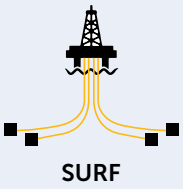
B Engineering, Construction & Projects

Subsea Structures

Subsea structures are facilities located on the sea floor, as opposed to on the surface. The hydrocarbon is extracted at the sea floor, and then 'tied-back' to an already existing production platform using Subsea Umbilical, Riser & Flowline (SURF) facilities.

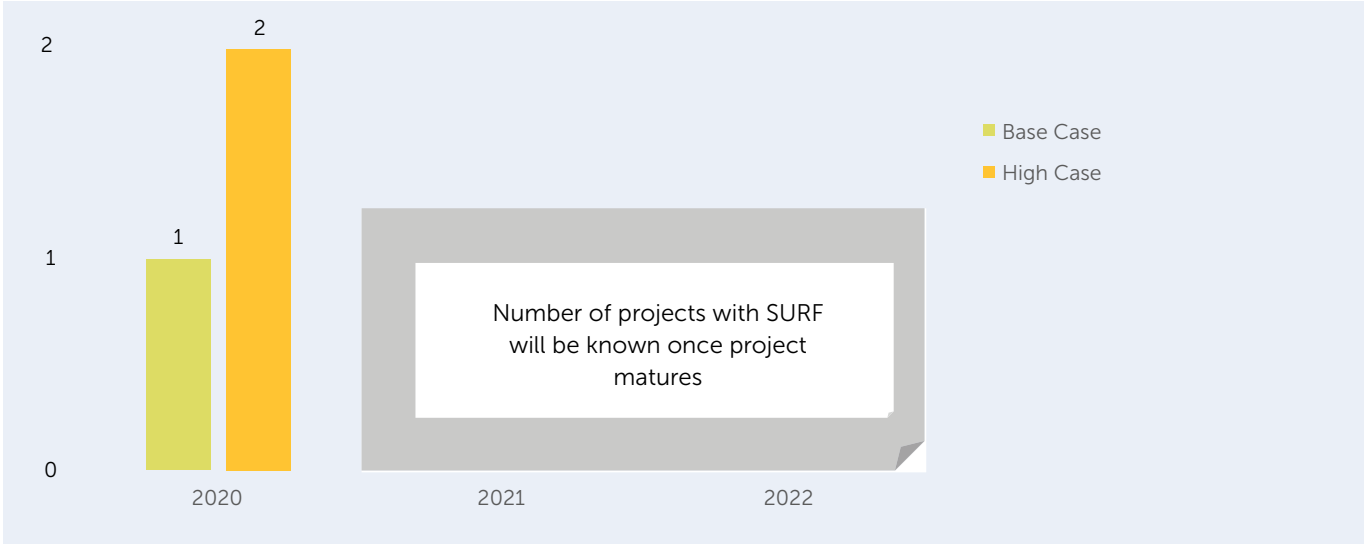
Application: To provide safe and efficient interconnection from the topside platforms and vessels to the wellheads and pumps on the sea floor, and vice versa for a reliable oil and gas extraction from subsea wells.

Associated Services: Engineering, equipment supplies e.g. mechanical, electrical, instruments, etc., installation.



Subsea Umbilical, Riser & Flowline (SURF) comprises subsea completed wells, subsea Christmas trees and wellhead systems, subsea tie-in to flowline system, jumpers, umbilical and riser system, and subsea equipment to operate the well.

Number of Projects for SURFs: Three-year Outlook



- Outlook is provided by the number of projects with SURF installation.
- SURF has been deployed to several fields in Malaysia, namely Rotan, Buluh, Kikeh, Siakap North Petai and Gumusut-Kakap.
- For 2021 to 2022, the number of SURF projection will be known as projects mature.

Did You Know?

Subsea tie-backs are becoming popular in the development of new oil and gas reserves. With larger oil and gas discoveries becoming less common, the focus is now shifted towards previously untapped, less economically viable discoveries.

B Engineering, Construction & Projects

Supply of Linepipes

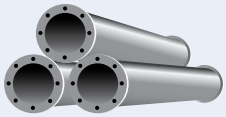
Linepipes and flexible pipes are used to transport oil or gas between two or more facilities. In this report, pipeline requirement is indicated by its type i.e. fixed pipeline, flexible pipeline, or both.

In this report, outlook is provided in relation to upstream development projects' requirements.

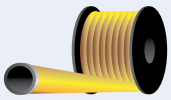
Application (Linepipes): Generally used for longer distances, typically from platforms to onshore plants.

Application (Flexible Pipes): Generally for shorter distances, typically for floating production systems with high-pressure production risers, export risers, chemical/water/injection lines, and gas lift lines.

Associated Services: Engineering, pre-commissioning services, logistics, coating services (only for linepipes).

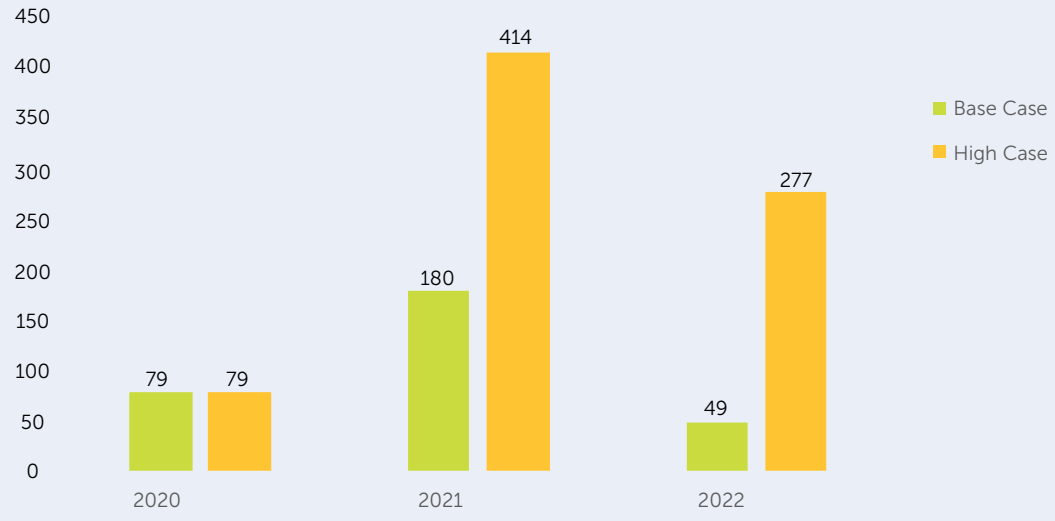


Linepipes
Rigid pipelines, generally made of carbon steel material or corrosion-resistant alloy.



Flexible Pipes
Flexible pipes are strong and adaptable pipelines that are high-pressure resistant, bendable, adjustable, and retrievable.

Length of linepipes for installation using pipelay barges (km): Three-year Outlook



- In 2019, 72.6km linepipes and 8.6km flexible pipes were fabricated or procured for upstream projects, which were well within plan.
- The numbers indicate requirement of Carbon Steel (CS) linepipes only.
- In addition, requirements for Corrosion Resistant Alloy (CRA) linepipes are around 7km in 2020 and around 5km in 2021.

Medium Term Outlook – Post 2022

- Steady outlook for linepipes is expected as more development projects opt for tie-ins to existing WHP/processing facility.

B Engineering, Construction & Projects

Offshore Installation

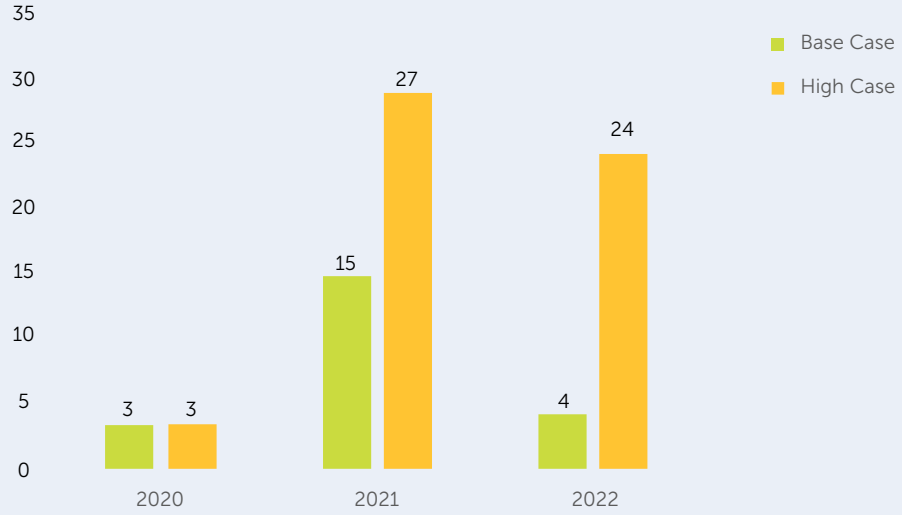
Offshore installation outlook for each project is provided by the type of installation barge required for the facilities installation, i.e. heavylift, floatover or pipelaying barge.

Structural Installation – Heavylift

Application: Used for installation of jackets (for WHPs and CPPs) and topsides (for WHPs).

Associated Services: Supporting vessels, diving and Remote-Operated Vechicles (ROVs), welding, and Non-Destructive Testings (NDTs).

Number of lifts using heavylift barges: Three-year Outlook



Outlook includes activities which may have been contracted out at the time of reporting.

- In 2019, eight structural installation campaigns were completed as planned.
- Outlook number is measured in terms of number of lifts, counted separately for each jacket and topside.
- Higher outlook in 2021 to cater for current projects that are in planning and expected to be sanctioned in 2020.
- Lower base outlook in 2022 as half of the facilities due for installation are floating facilities.
- This outlook may be read together with the outlook for offshore fabrication.

Medium Term Outlook – Post 2022

- Steady outlook can be expected for heavylift barges, in line with a stable number of development projects requiring lightweight and medium-weight WHPs.

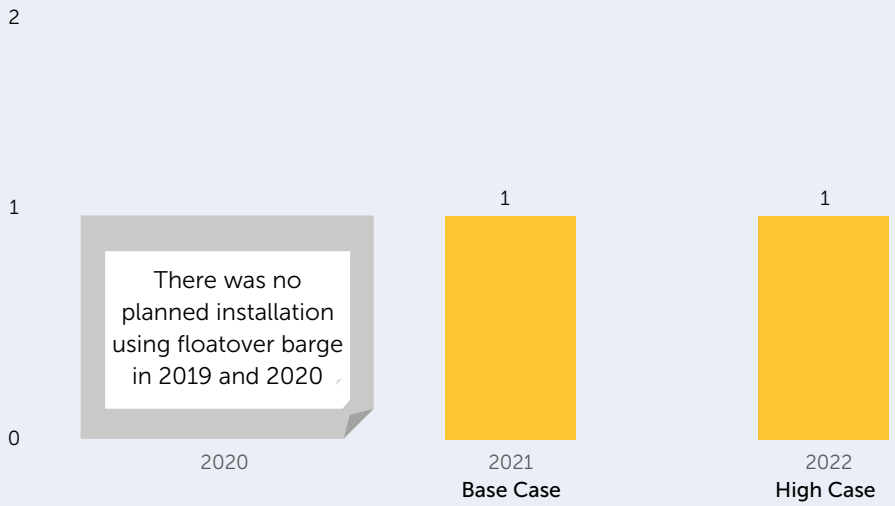
B Engineering, Construction & Projects

Structural Installation – Floatover

Application: Used for installation of heavier or integrated topsides (for CPPs).

Associated Services: Supporting vessels, diving and ROVs, welding and NDTs.

Number of structural installation using floatover barges: Three-year Outlook



Outlook includes activities which may have been contracted out at the time of reporting.

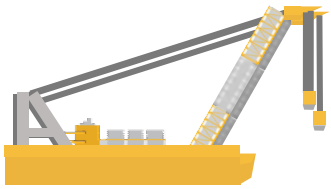
- There was no planned installation using floatover barge in 2019 and 2020.
- Outlook number is measured in terms of number of lifts for heavy structures.
- Typically, floatover barge requirement is bundled under the EPCIC scope.

Medium Term Outlook – Post 2022

- Modest outlook can be expected for floatover barges with a lower number of projects that require CPP.

B Engineering, Construction & Projects

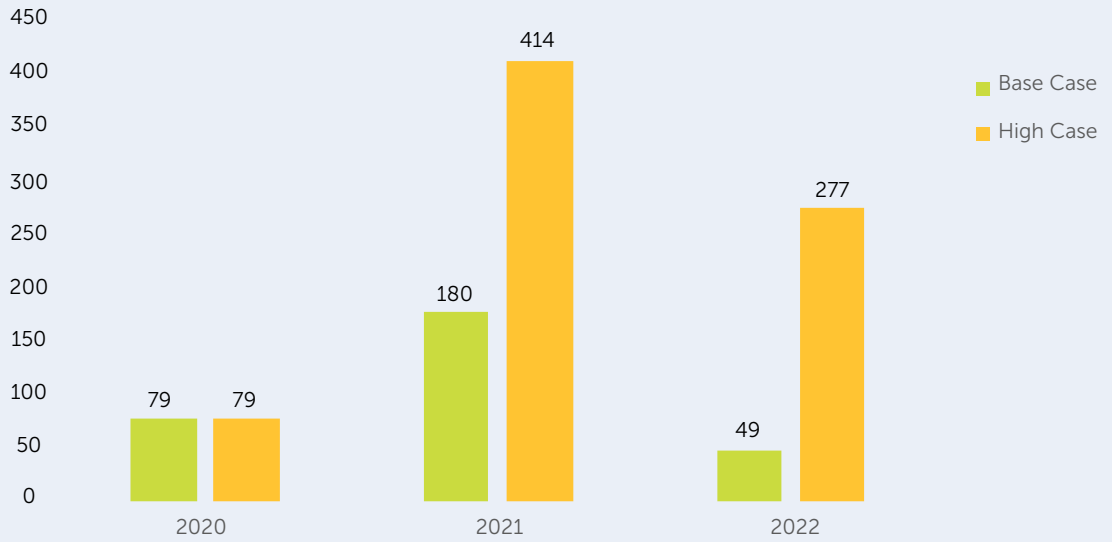
Pipeline Installation – Pipelay



Application: Used to install rigid linepipes e.g. carbon steel, CRA, etc., for offshore projects.

Associated Services: Supporting vessels, diving and ROVs, fill joint coating services, welding, and NDTs.

Length of pipeline for installation using pipelay barges (km): Three-year Outlook



Outlook includes activities which may have been contracted out at the time of reporting.

- Outlook number is measured in terms of length (in km) of the pipelines to be installed in the respective years. In general, it is directly correlated to the distance of the new facilities to their nearest tie-back facilities.
- In 2019, 145km of pipeline installation was completed.
- In 2020, most projects are in fabrication stage where the pipeline will only be installed in 2021 onwards. It is projected that five projects with pipeline length of more than 40km, currently under review, will be carried out in 2021 and 2022.
- This outlook may be read together with the outlook for supply of linepipes and activities for new projects only, excluding pipeline replacements.

Medium Term Outlook – Post 2022

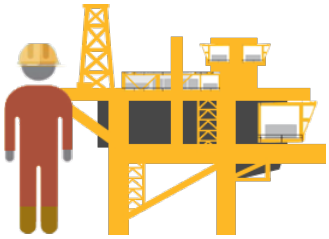
- Steady outlook can be expected for pipelay barges as more development projects opt for tie-ins to existing WHP or processing facilities.

B Engineering, Construction & Projects

Hook-up and Commissioning (HUC)

Hook-Up and Commissioning (HUC) ties in all components of the facilities including all function tests and start-up of facilities.

Outlook is stated in manhour units as the activities are labour-intensive.

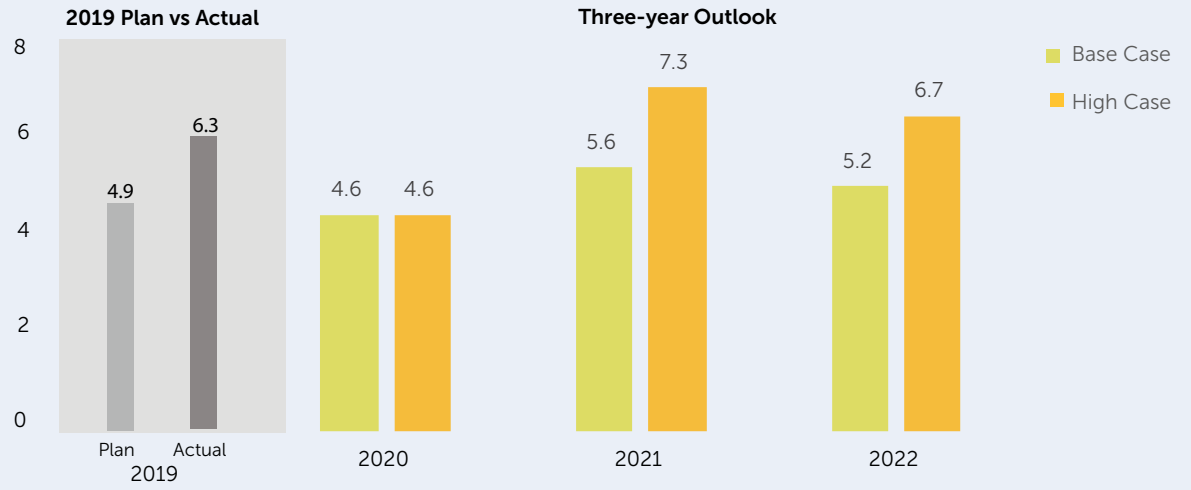


Activity Phase: Development and Production

Application: Greenfield HUC involves works on newly installed platforms during Development stage. Typically bundled as part of EPCC/EPCIC contracts. **Brownfield** HUC involves works on existing offshore facilities and equipment; including rejuvenation/ redevelopment, general topside modification, infill drilling activity, etc.

Associated Services: Marine spread (e.g. accommodation work barge, workboat, etc.), logistics services, pre-commissioning services, inspection services, etc.

Number of Manhours (Millions):



Outlook includes activities which may have been contracted out at the time of reporting.

- Higher actual figures in 2019 as compared with planned figures due to additional projects being sanctioned and executed.
- There is a disparity in the high and base case for 2021 and 2022 due to differing levels of project maturity.
- Most manhours reflected are for Brownfield HUC.

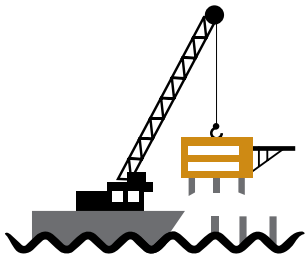
Medium Term Outlook – Post 2022

- Positive outlook is expected for Brownfield HUC activities in anticipation of a growing number of Brownfield projects.

B Engineering, Construction & Projects

Decommissioning

Decommissioning refers to an activity of restoring a previously producing site to a safe and environmentally-stable condition.



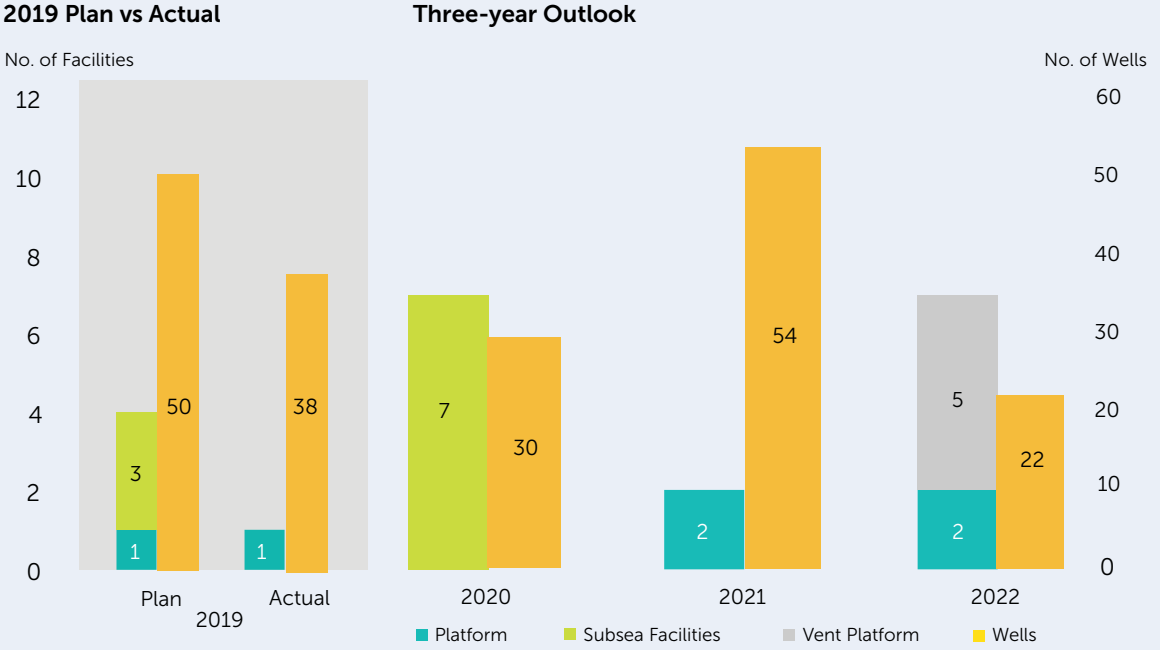
Activity Phase: Abandonment

Application: Decommissioning comprises two activities:

- Well Abandonment: prepare wells to be closed permanently.
- Upstream Facilities Decommissioning: permanently make safe the facilities e.g. WHP, CPP, Subsea Tree, etc.

Associated Services: Drilling Rigs and HWU, Offshore Support Vessels, Lifting and Third Party Drilling Services, Engineering Services, Yard Facility, Transport, Cutting Services, etc.

Decommissioning of Facilities & Wells:



Outlook includes activities which may have been contracted out at the time of reporting.

- In 2019, there were fewer wells abandoned than initially planned due to overall activity reprioritisation.
- The candidates for decommissioning have undergone technical assessment and commercial evaluation prior to the decision for decommissioning, which will be further complemented with ongoing optimisation and sequencing efforts.

Medium Term Outlook – Post 2022

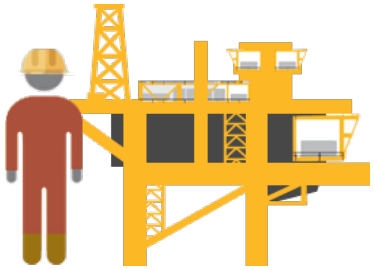
- Steady outlook can be expected for decommissioning projects as 44 per cent of facilities in Malaysian waters are operating beyond design life.

C General Facilities & Maintenance

Maintenance, Construction & Modification (MCM)

Maintenance, Construction & Modification (MCM) covers activities relating to the repair and maintenance of existing topside facilities. Typically, an MCM campaign will be executed every five to eight years to ensure production sustainability.

Outlook is stated in manhour units as the activities are labour-intensive.



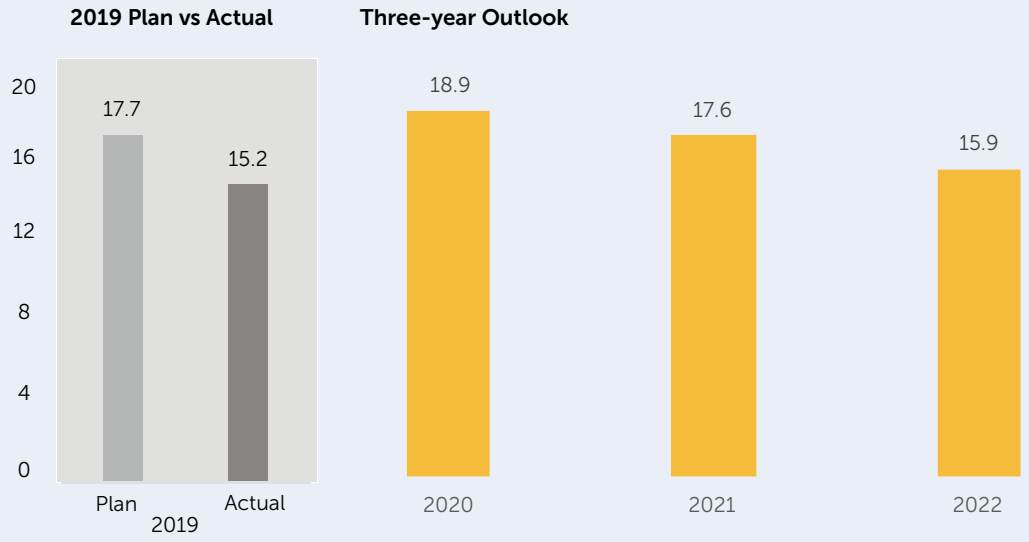
Activity Phase: Production

Application: MCM involves two types of activities for Offshore and Onshore facilities:

- Scheduled Maintenance: Planned activities.
- Corrective Maintenance: Unplanned activities arising from unforeseen circumstances.

Associated Services: Supply vessel, inspection services, blasting, painting services, etc.

Number of Manhours (Millions):



Outlook includes activities which may have been contracted out at the time of reporting.

- Actual 2019 manhours are lower due to fewer maintenance activities.
- MCM activities are expected to remain stable over the next three years.

Medium Term Outlook – Post 2022

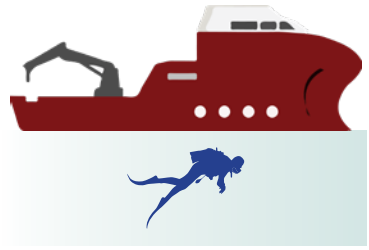
- Steady outlook can be expected for MCM activities given the cyclical nature of maintenance activities whilst scope-optimisation will continue to be a priority.

C General Facilities & Maintenance

Underwater Services

For the purpose of this report, Underwater Services category uses supply of Dynamic Positioning 2 (DP2) Support Vessel as leading indicator, excluding the supply of equipment and manpower; i.e. divers.

DP2 Support Vessel for Underwater Services

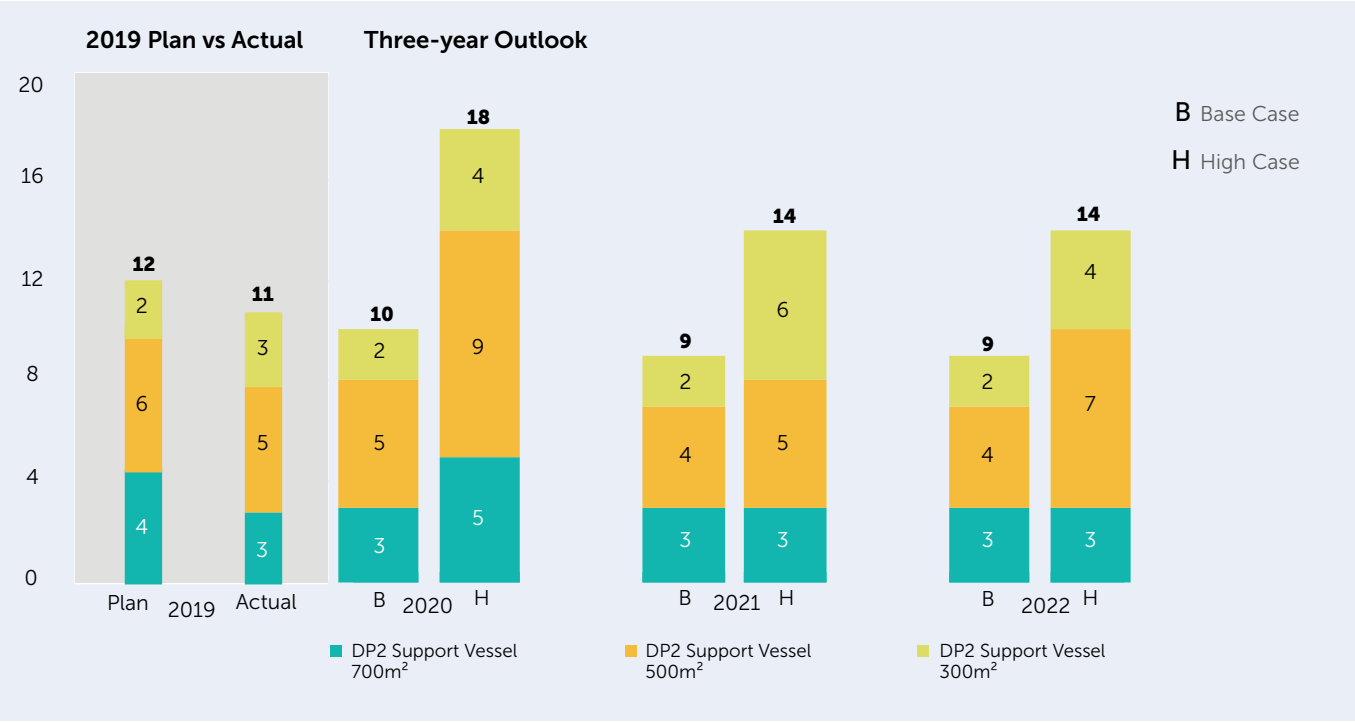


Activity Phase: Development & Production

Application: Inspection, Maintenance, and Repair (IMR) activities for continuity of services, safety and integrity of underwater facilities. (e.g. platform jackets, pipelines, subsea hardware, etc.)

Associated Services: Support vessel, ROV, manpower, equipment, etc.

Number of Vessels:



Outlook includes activities which may have been contracted out at the time of reporting.

- Outlook number is proxied by number of vessels for Underwater Services, covering both Development and Production phases and its duration may vary.
- Local vessels prioritisation will be exercised during execution.

Medium Term Outlook – Post 2022

- Steady outlook is expected for Underwater Services as activities are periodically scheduled.

C General Facilities & Maintenance

Plant Turnaround

Plant Turnaround is defined as a major engineering event during which an onshore facility is shut down for equipment inspection and overhaul, debottlenecking, revamps, and catalyst regeneration projects.

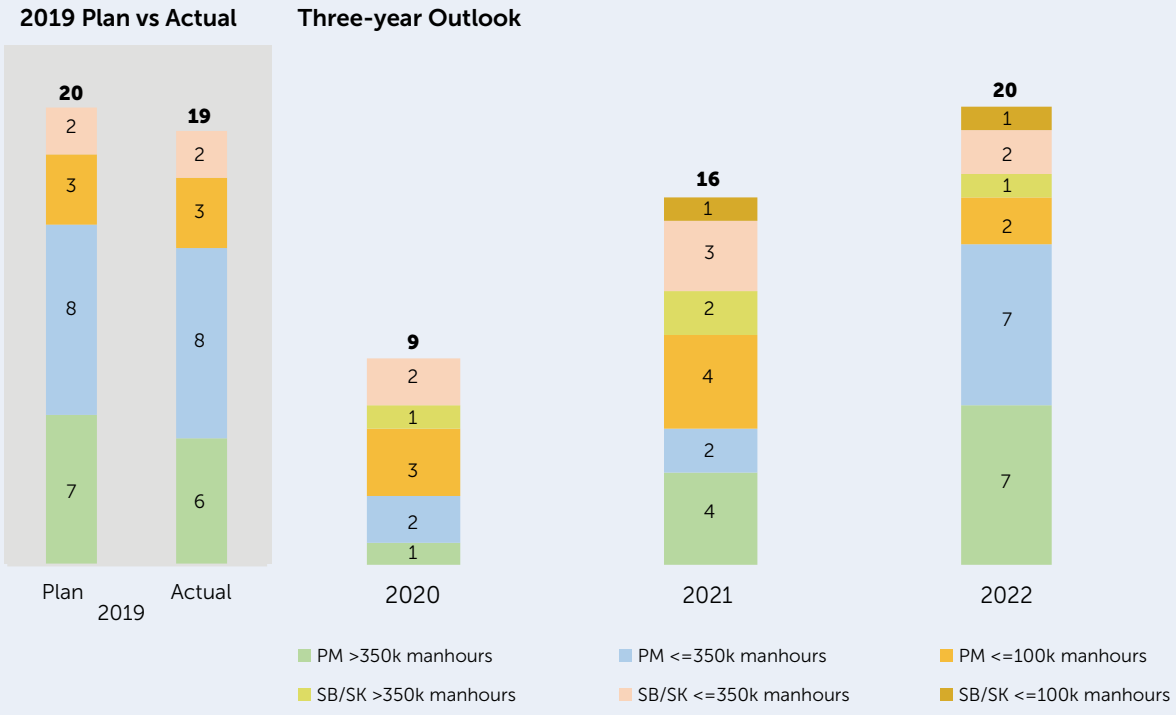
Turnaround comprises main mechanical work, which constitutes the bulk of total activities (approximately 60 per cent). Other activities are discipline-specific; e.g., electrical, instrument, inspection and rotating equipment maintenance). Turnaround is labour-intensive, hence activity outlook is stated in manhour units.

Activity Phase: Operations

Application: Turnarounds are scheduled periodically to ensure timely renewal of Certificate of Fitness (CF) by authorities and maximise plant efficiency and capacity.

Associated Services: Equipment Services (e.g. Mechanical, Electrical, Instruments, etc.), Inspection Services, and Manpower.

Number of Turnarounds:



Outlook includes activities which may have been contracted out at the time of reporting.

- For 2019, almost all Turnarounds were carried out as planned, except for GPP1 which was rescheduled to 2020. As at December 2019, approximately 8.2 million manhours have been spent on Turnaround activities at 19 facilities.

Medium Term Outlook – Post 2022

- Positive outlook can be expected. With Pengerang Integrated Complex (PIC) set to undergo Turnaround in 2023, overall activity and manhours will be significantly increased.

D Logistics

Logistics category covers Transportation, Logistics, Warehouse, Workshop and Storage and Marine Operation Services.

In this report, outlook is provided for Marine Vessels that support a wide range of activities in Exploration, Development, Production, and Abandonment phases.

Marine Vessels

This year, outlook is provided for a wider range of vessels i.e. Anchor Handling Tug Supply (AHTS), Platform Supply Vessels (PSV)/Straight Supply Vessels (SSV), Fast Crew Boat (FCB), Workboat/Work Barge, General Purpose Vessel (GPV)/Standby Vessel (SBV), Landing Craft Tank (LCT) and Utility Vessel (UV).

The tables below describe the applications and associated services for each type of vessel:

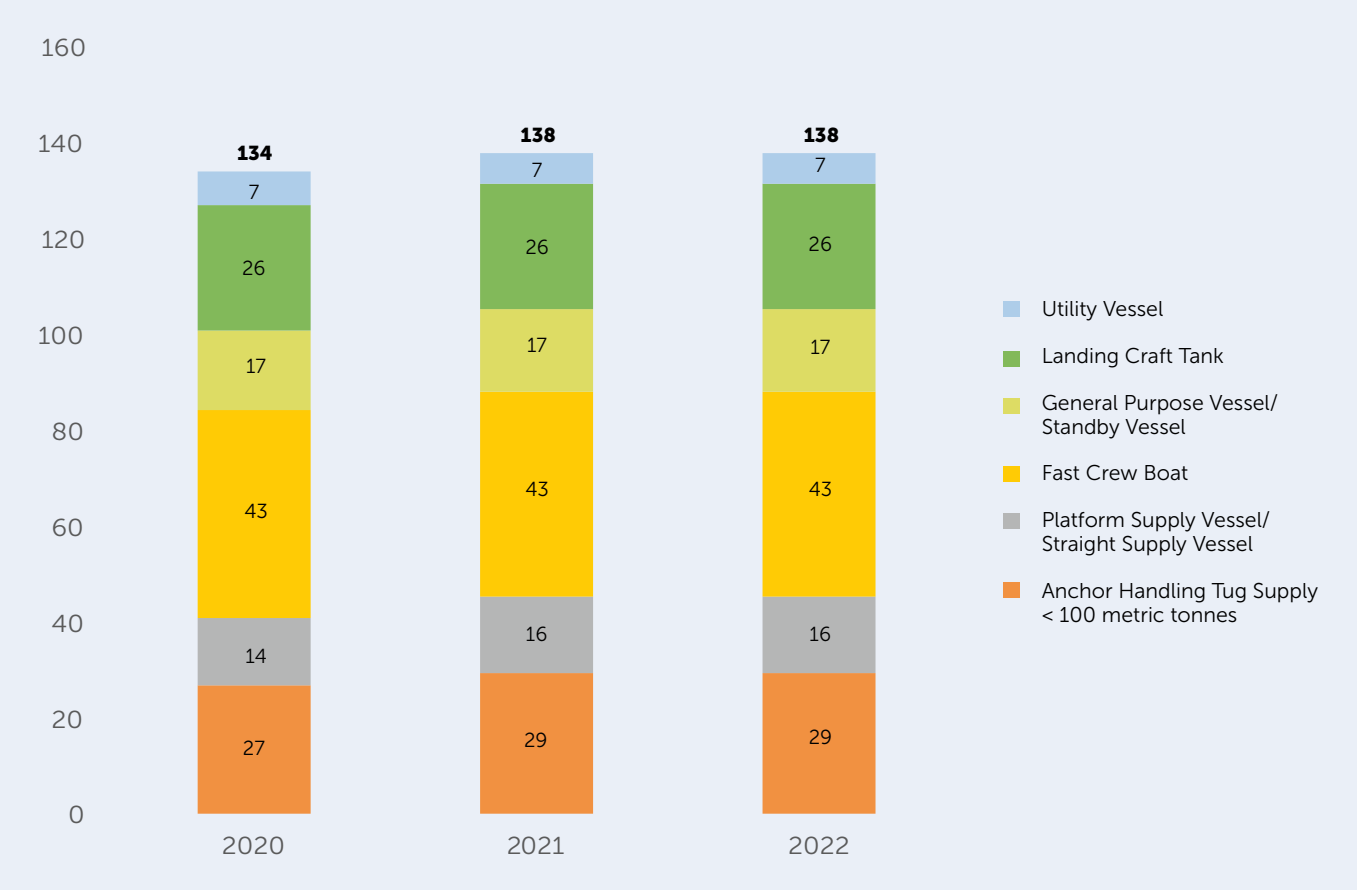
Type of Vessel	Anchor Handling Tug Supply (AHTS)	Platform Supply Vessels (PSVs) / Straight Supply Vessels (SSVs)	Fast Crew Boat (FCB)
Activity Phase	• Exploration • Development • Production • Abandonment		• Development • Production • Abandonment
Application	Typically used to transport supplies to and from offshore platforms/drilling rigs	Transport equipment & supplies to offshore platforms/ drilling rigs	High speed vessel for the transportation of crew to offshore facilities
Associated Services	Vessel inspection services, bunkering services, port services		

Type of Vessel	Workboat/ Workbarge	General Purpose Vessel (GPV)/ Standby Vessel (SBV)	Utility Vessel (UV)
Activity Phase	• Development • Production • Abandonment	• Development • Production	
Application	Accommodation for personnel	• Transport general material and personnel from/to offshore facilities • Standby, rescue and emergency duties	Transport general material and personnel and standby support for drilling/production operations
Associated Services	Vessel inspection services, bunkering services, port services		

D Logistics

To better illustrate overall requirement for marine vessels, the outlook is being segregated into two main activities i.e. **Production Operations** and **Drilling & Projects**.

Number of vessels supporting production operations: Three-year Outlook



Outlook includes activities which may have been contracted out at the time of reporting.

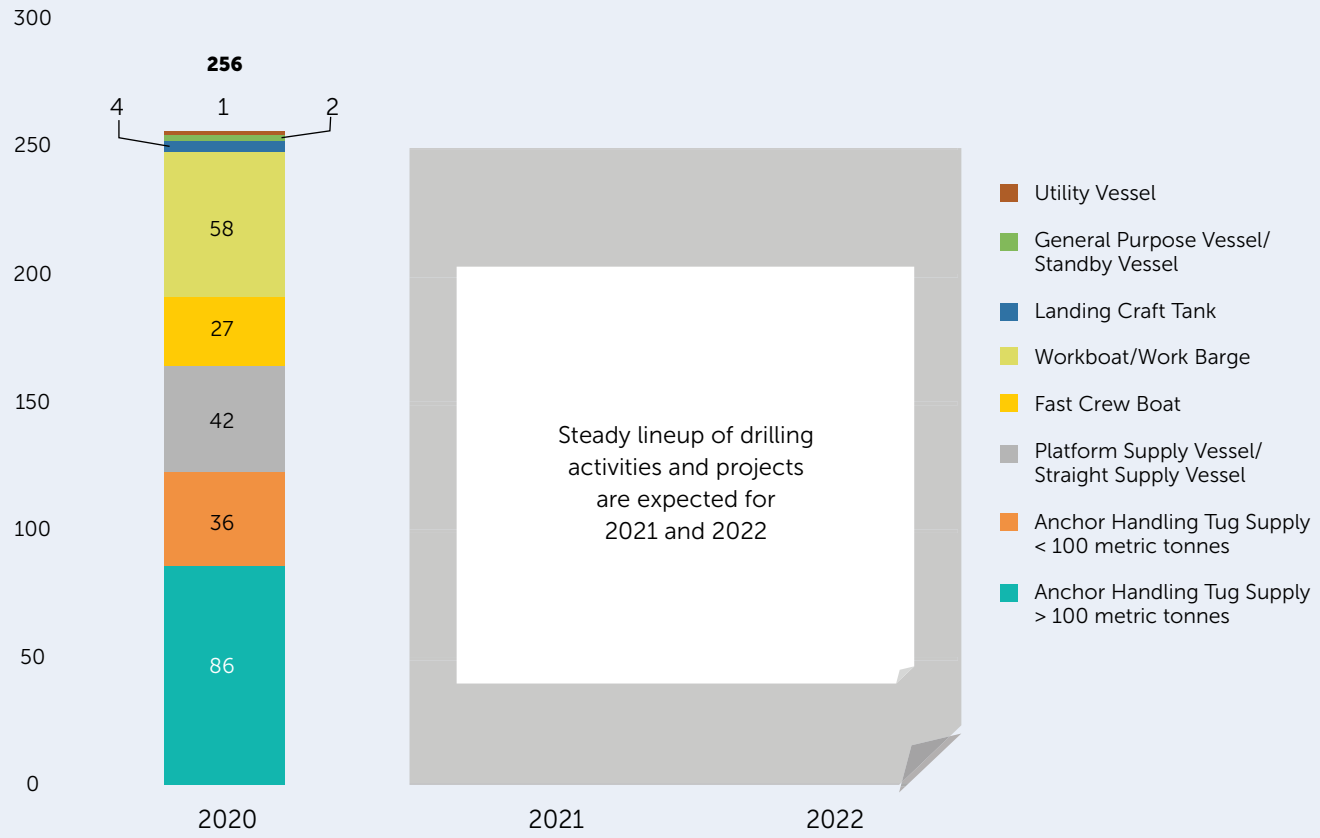
- Requirement of vessels for Production activities is being catered through contract 'Offshore Support Vessels for PACs' Production Operations' with locally-funded Local Owner-Operators.

Medium Term Outlook – Post 2022

- Steady outlook is expected for marine vessels due to the consistent activity of production operations throughout Malaysian waters.

D Logistics

Number of vessels supporting drilling and projects: Three-year Outlook



Outlook includes activities which may have been contracted out at the time of reporting.

- A Frame Agreement has been established to support Drilling and Development/Production projects' requirements.
- The steady lineup of activities and portfolios of projects coming on stream in the future depicts a healthy outlook.
- Local players and financiers to re-assess appetite for investment opportunities and sustainability of support from local ecosystem.

Medium Term Outlook – Post 2022

- Steady outlook can be expected for marine vessels under these activities through PETRONAS' effort of optimising its resource requirement.

E Equipment & Material

The **Equipment and Material (E&M)** category covers a broad range of equipment and materials for mechanical rotating and static, electrical, instrumentation, Oil Country Tubular Goods (OCTG), linepipes, structural steels, piping equipment and civil & structure.

For the purpose of this report, the **primary categories** under E&M and their main composition are as follows:

	Turbomachinery & rotating	**Instrumentation**	**Electrical**
Main composition	• Gas turbine • Pump • Compressor • Engine • Steam turbine • Air compressor	• Instrument & test equipment • Certification services • Custody metering • Field instrument	• Transformer • Switchgear • Power supply • Motor • Electrical accessories & consumable
Outlook	The outlook for major equipment is proxied to the number of upstream **greenfield projects** whilst the supply of spares and equipment maintenance is related to the number of brownfield projects (refer to Engineering, Construction & Projects Activity Outlook).		

F Chemicals

Chemicals are **primarily utilised in Downstream and Gas plants** accounting for 80 per cent of total chemical spend in a year. Utilisation in upstream is predominantly during the development and production stage.

For the purpose of this report, the **primary categories** under Chemicals and their main composition are as follows:

	Process	**Commodity**	**Chemical Services**
Main composition	Catalyst, production chemicals, corrosion inhibitors & biocides, boiler water chemical, sulfiding agent, and additives.	Base oil, lubricants, glycols, amines, surfactants, resins, chloralkali, and solvents.	Catalyst and internal media change out.
Utilisation	• Chemicals that are used to accelerate plant processes, maximise asset reliability and improve productivity. • Chemicals that are commonly used in process and operations. • Periodical service during turnaround and when there is change out requirement.		

G Indirect

The **Indirect** category covers diverse products and services including Human Resources, Health Safety Security & Environment (HSSE), Marketing & Advertising, Digital & ICT, as well as Office, Administrative & Professional Services.

The key approach for sourcing of Indirect category is through **integrated consolidated contracts** across corporate and business units.

In the near future, indirect purchases will be sourced via catalogue buying capability through the online procurement platform.

For the purpose of this report, only the **primary categories** are highlighted.

	Human Resources Services	**Office, Administration & Professional Services**	**Digital & ICT Services**
Main composition	• Manpower supply • Capability development	• Business travel management • General consultancy services • Catering	• Application software • ICT consultancy • Telecommunications • ICT equipment & hardware

Contracts Outlook

Contracts Outlook 2020-2022

This year, PETRONAS is sharing contracts covering a broader spectrum of jobs with sizeable values for large players as well as small and medium enterprises (SMEs). As many of these contracts are due for re-tendering in the period of 2020-2022, this would be an opportune time for players to strategise on resources, new technology offerings, and strategic partnerships.

The procurement approach for the following contracts may change to fit PETRONAS' overall strategy.

The contracts comprise the following:

Pan-Malaysia contracts: Joint contracts between Petroleum Arrangement Contractors (PACs) in Malaysia for similar scopes of services and material.

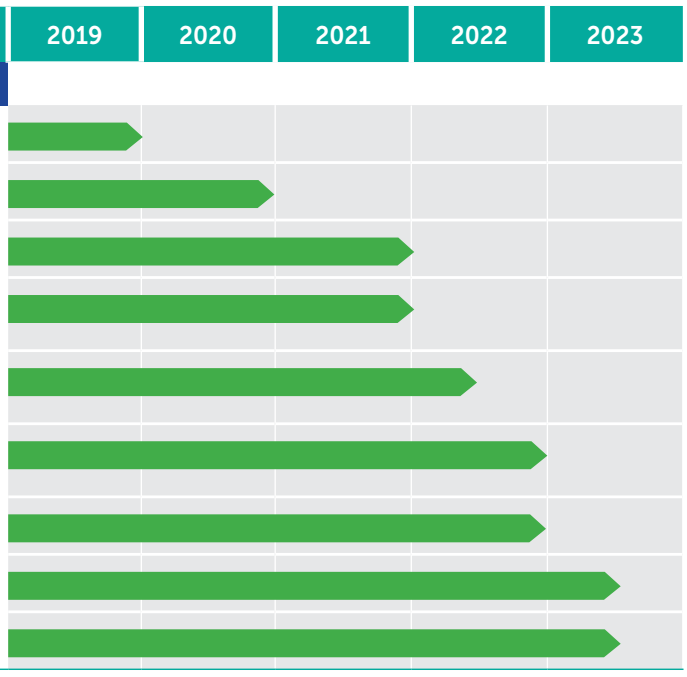
Integrated Downstream contracts: Joint contracts between PETRONAS Downstream Operating Units (OPUs) for similar scopes of services and material.

Integrated Upstream & Downstream contracts: Joint contracts between PETRONAS Operating Units (OPUs) for similar scopes of services and material in upstream and downstream.

Upstream & Downstream Individual contracts

A Subsurface

No.	Contract	Start
Pan-Malaysia		
1	Electric Wireline Logging (EWL)	**2016**
2	Class G Cement	**2017**
3	Slickline	**2018**
4	Tubular Handling, Conductor Installation and Slot Recovery	**2018**
5	Well Testing & Tubing Conveyed Perforations (TCP)	**2017**
6	Drill Bits (Rock/PDC) and Hole Enlargement Tools	**2017**
7	Mudlogging	**2017**
8	Cementing & Downhole Tools	**2018**
9	Drilling Fluids	**2018**



Notes:

- In contract
- This list includes contracts for Gas & New Energy.
- The list excludes original equipment manufacturer (OEM)-supplied item contracts.
- Chemical contracts are currently managed by respective OPUs. Future strategy could include consolidation, where applicable.

No.	Contract	Start	2019	2020	2021	2022	2023
Upstream Individual							
10	Well Leak Repair	**2017**					
11	Directional Drilling (DD)/Measurement While Drilling (MWD) Logging While Drilling (LWD)	**2016**					
12	Site Investigation Services	**2017**					
13	Downhole Tractoring Equipment & Services	**2017**					
14	Fluid Sample Analysis Services	**2017**					
15	Fishing Equipment and Services	**2018**					
16	Surveying, Navigation and Positioning Services	**2017**					
17	Wellhead Maintenance Services	**2017**					
18	Surface Controlled Subsurface Safety Valve System (SCSSV) Installation, Maintenance & Services	**2018**					
19	Advanced Surveillance Acquisition and Interpretation Services	**2018**					
20	Annulus Wash & Cementing Assurance	**2017**					
21	Geological Samples and Laboratory Core Analysis Services	**2018**					
22	Surface Wellhead Equipment & Services	**2018**					
23	Well Downhole Leak Detection Services (Ultrasound)	**2018**					
24	Sand Control & Stimulation Equipment & Services	**2018**					
25	Drilling Rig Integrity and Inspection	**2018**					
26	Geophysical, Geomatics, HSE and Technical Auditor Consultancy Services	**2018**					
27	Gas Lift Valves (GLV) & Insert Strings Equipment, Accessories and Services	**2019**					
28	Surface Sand Management	**2019**					
29	Real Time Metocean Observation System and Services	**2019**					

Notes:

- In contract
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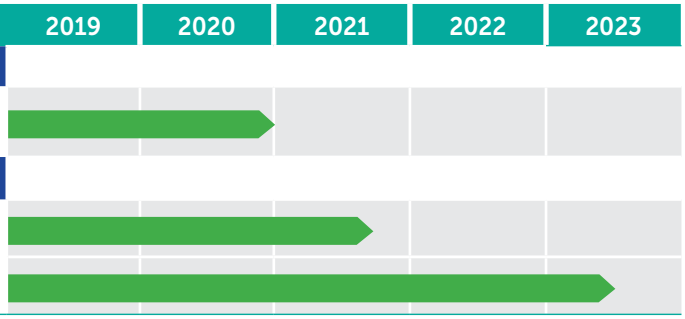
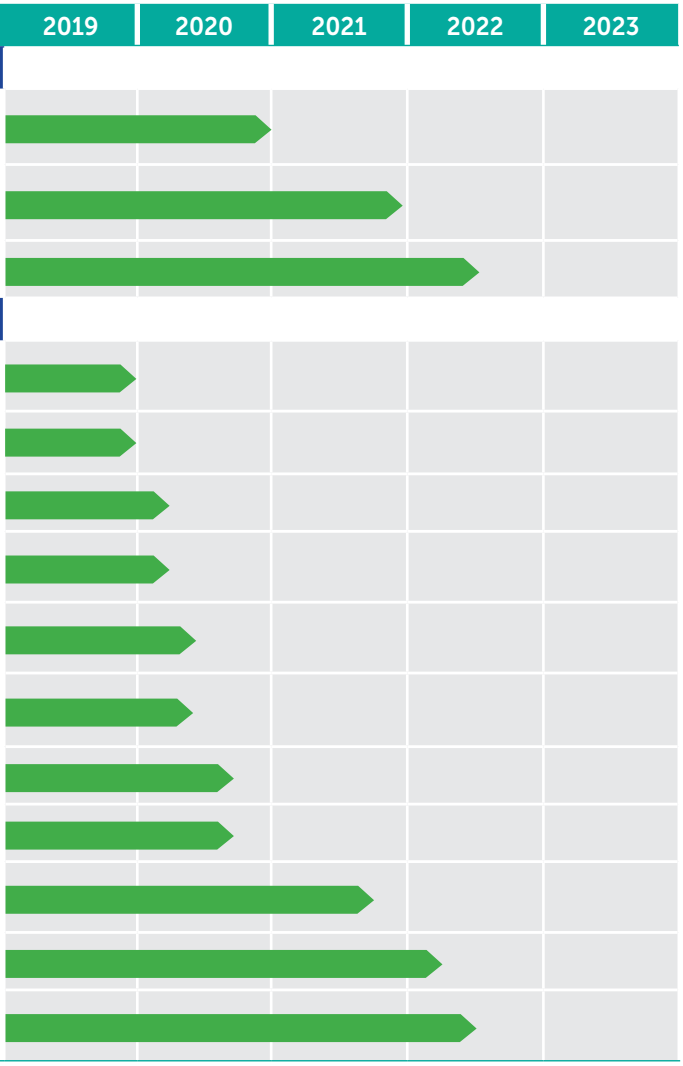
B Engineering, Construction & Project (EC&P)

No.	Contract	Start
Pan-Malaysia		
1	Transportation and Installation of Offshore Facilities	**2016**
Integrated Upstream & Downstream		
2	Engineering Services (Minor)	**2018**
3	Engineering Services (Major)	**2019**



C Equipment & Materials (E&M)

No.	Contract	Start
Integrated Upstream & Downstream		
1	Heating, Ventilation, Air Conditioning (HVAC) Maintenance Services (Onshore & Offshore)	**2017**
2	Maintenance of High Voltage (HV)/Low Voltage (LV) Motor and Alternator	**2018**
3	Supply of Pressure Safety/Relief Valve	**2019**
Upstream Individual		
4	Maintenance Services for Turbomachinery Equipment	**2018**
5	Glass Reinforced Epoxy (GRE) Lining and Wrap	**2016**
6	Valve Maintenance Services	**2017**
7	Offshore Portable Hydraulic Floor Crane Unit and Services	**2017**
8	Service and Maintenance of Heater Bundle and Control Panel	**2018**
9	Lifting Equipment Operation Maintenance Services	**2017**
10	Onshore Pipeline Maintenance Services	**2018**
11	General Instrument Maintenance and Services	**2014**
12	Machining Services for Oil Country Tubular Goods (OCTG)	**2019**
13	Pressure Relief Device Maintenance Services	**2019**
14	Reciprocating Engine & Compressor Maintenance	**2019**



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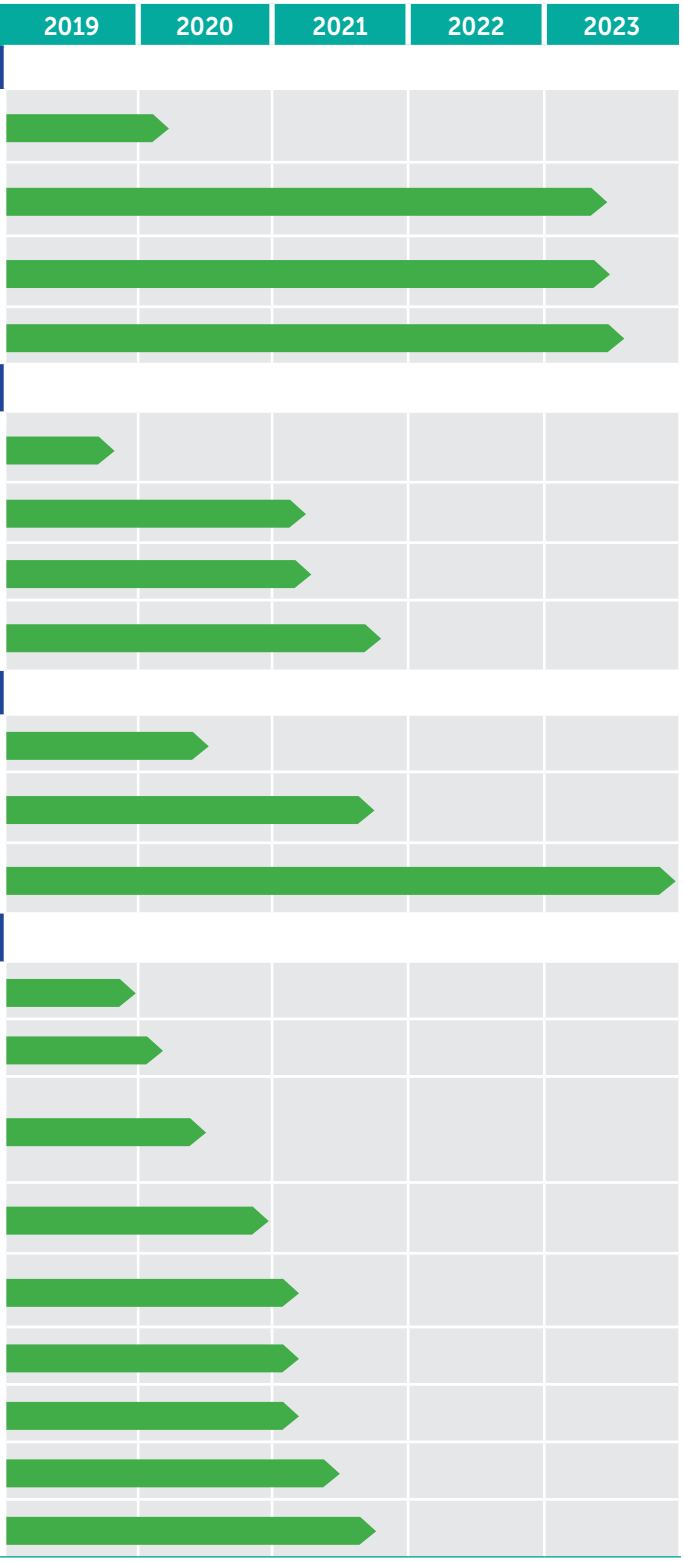
D General Facilities & Maintenance (GFM)

No.	Contract	Start
Pan-Malaysia		
1	Idle Wells Reactivation and Production Enhancement Solutioning	2018
2	Inspection and Corrosion Monitoring Services (ICMS)	2018
3	Maintenance, Construction & Modification (MCM) - Offshore & Onshore	2018
4	Underwater Services	2018
Integrated Upstream & Downstream		
5	Atmospheric Storage Tank Cleaning and Maintenance Services	2016
6	Intelligent Pigging for In-Line Inspection	2018
7	Online Leak Sealing Services	2018
8	Maintenance, Supply and Installation of Batteries	2018
Integrated Downstream		
9	Civil Maintenance Work	2017
10	Supply & Installation of Composite Overwrap Repair System	2018
11	Integrated Turnaround Main Mechanical & Maintenance Mechanical Static (TA4MS)	2019
Upstream Individual		
12	Reactive Charges Perforation	2013
13	Pressurised Welding Habitat	2018
14	Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) Monitoring and Contaminated Material Cleaning	2018
15	Production Optimisation with CO_2 Tracer Pumping Services	2018
16	Integrated Operation (IO) System Implementation & Services	2014
17	Overall Pipeline Commissioning & Services	2018
18	Splash Zone Structural Repair & Maintenance	2019
19	Offshore Marine Vessel & Rig Tank Cleaning	2018
20	Blasting & Painting Services	2018



Notes:

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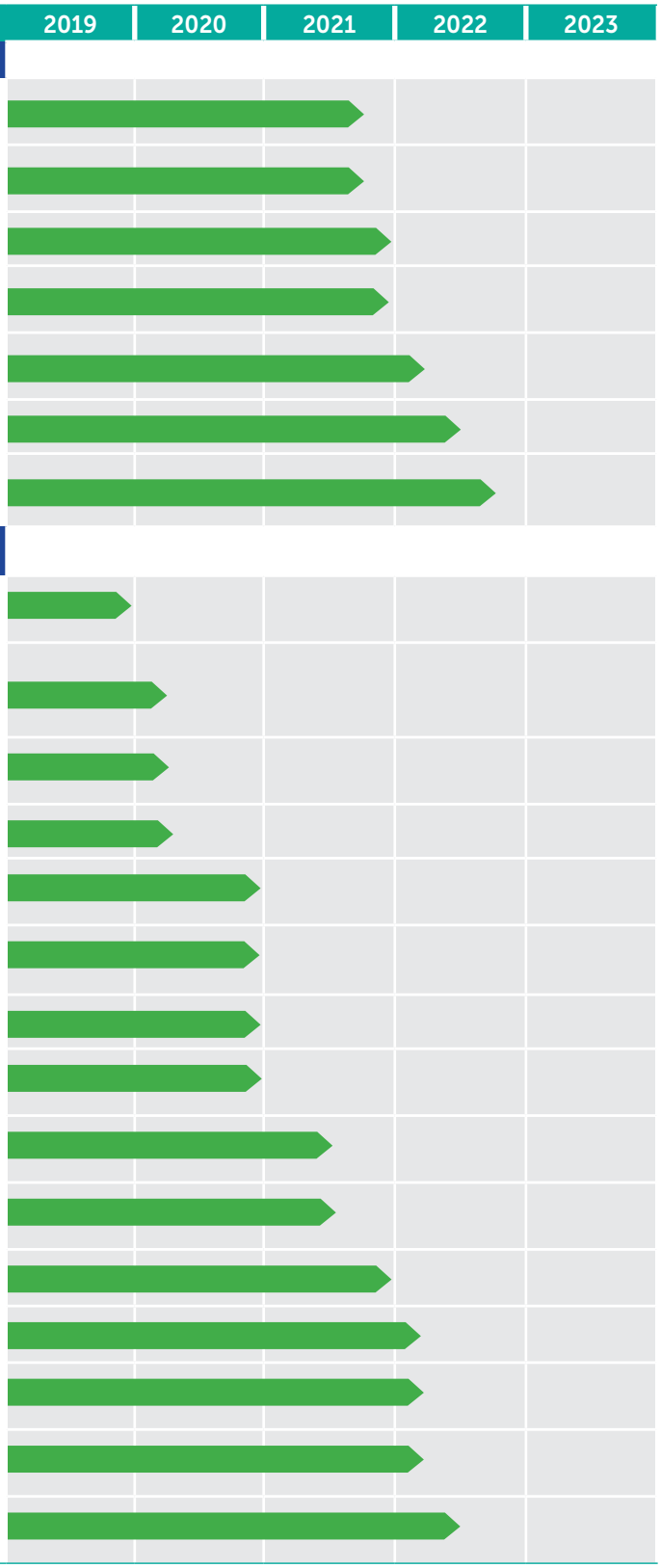
- Chemical contracts are currently managed by respective OPUs. Future strategy could include consolidation, where applicable.

No.	Contract	Start
Upstream Individual		
21	Riser Corrosion Prevention System & Maintenance	2018
22	Overall Pig Trap System Commissioning & Services	2018
23	Operational Pigging Services	2018
24	Onshore Maintenance, Construction & Modification (MCM)	2018
25	Integrity and Fitness for Service (FFS) Assessment of Pipelines	2019
26	Pipeline Isolation Services	2019
27	Maintenance, Construction & Modification (MCM) - Offshore	2017
Downstream Individual		
28	Maintenance of Process and Non-Process Facilities	2017
29	Overall Commissioning & Maintenance of Underground Strorage Tank and Monitoring Test Well for PETRONAS Stations	2018
30	Electrical Turnaround Inspection & Maintenance Services	2015
31	Sundry Equipment Maintenance Works	2018
32	Marine Operation & Maintenance (O&M) Services	2015
33	Terminal Operations and Maintenance Services	2018
34	Repainting of LPG Cylinders	2018
35	Overall Commissioning & Maintenance for Chillers & Freezers	2019
36	Maintenance Services of Aviation Vehicles at Aviation Fuel Terminals	2016
37	Tubular Inspection Services for Heat Exchangers	2018
38	Scaffolding Services	2018
39	Civil Works Maintenance	2019
40	Fabricate and Reconditioning of LPG Cylinder and Supply of LPG Compact Valves	2019
41	Requalification and Shot-Blast Repainting of LPG Cylinder	2019
42	Main Cryogenic Heat Exchanger (MCHE) Repair	2019



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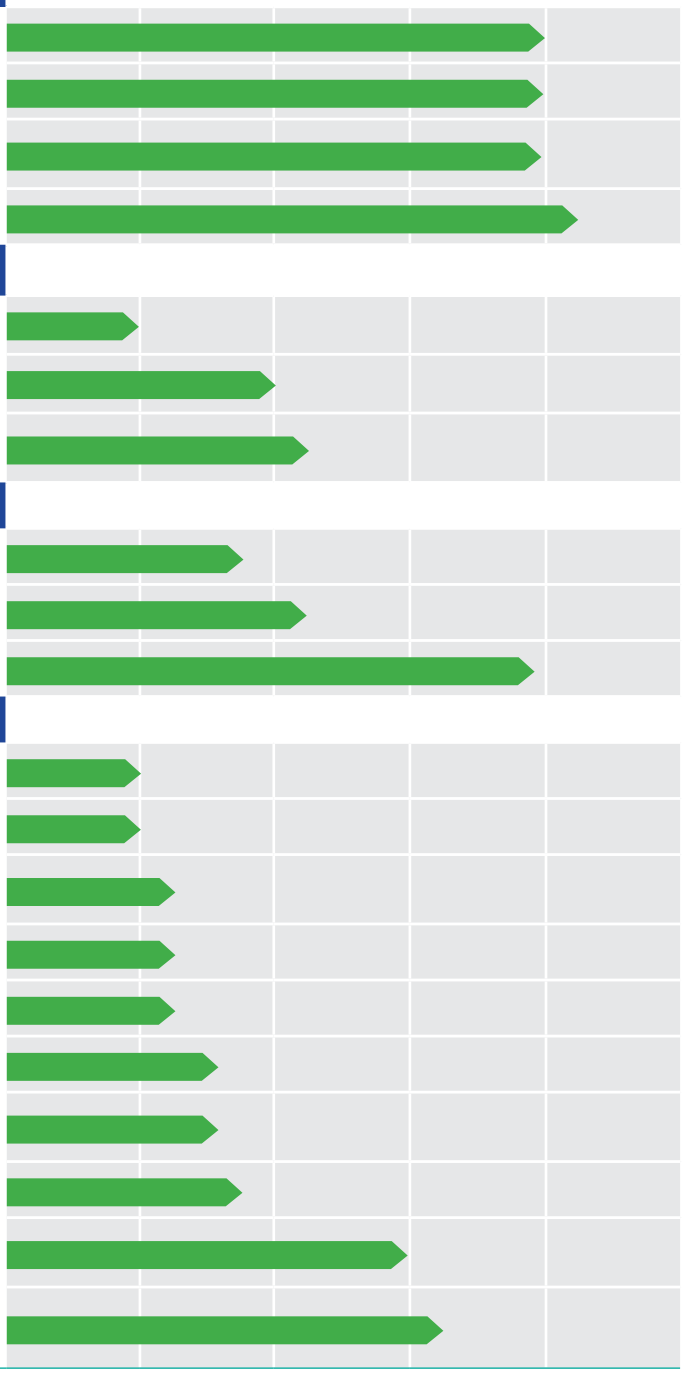
- Chemical contracts are currently managed by respective OPUs. Future strategy could include consolidation, where applicable.

E Chemicals

No.	Contract	Start
Pan-Malaysia		
1	Chloralkali Chemicals	**2018**
2	Sulphuric Acid Chemicals	**2018**
3	Water Treatment Solution Programme for Boiler and Cooling Water System	**2017**
4	Base Oil	**2018**
Integrated Downstream		
5	Supply and Delivery of Wash Oil Solvesso 150	**2018**
6	Supply & Delivery of Activated Carbon	**2018**
7	Supply of Specialty Chemicals: Dimetyhl Disulfide (DMDS) and Ethyl Mercaptan (EM)	**2018**
Upstream Individual		
8	Laboratory Services and Personnel	**2017**
9	Supply of Integrity Chemical	**2016**
10	Supply of Production Chemicals	**2017**
Downstream Individual		
11	Supply of Sonolube CL-1000 EU (2%BHT)	**2017**
12	Process Chemical Treatment Programme	**2018**
13	Supply of Film and Blow Moulding Grade Catalyst	**2018**
14	Supply of Process/Specialty Chemicals	**2018**
15	Supply of Diisopropanolamine (DIPA)	**2017**
16	Supply of Refinery Fuel Additives	**2018**
17	Supply of EOEG Carbonate Solution Activator (Catacarb 922)	**2018**
18	Supply of 1 MT Agrenas Bags	**2017**
19	Supply of Chemicals Anti-Foulant (DA2339) & Surface Modifier (DA2318)	**2018**
20	Supply of New Empty High Density Polyethylene (HDPE) Drums	**2019**



Notes:

- In contract
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F Indirect

No.	Contract	Start	2019	2020	2021	2022	2023
Integrated Upstream & Downstream							
1	Travel Management Company	2015					
2	Global Mobility Services	2015					
3	Flame Resistant Coverall and Headscarf	2019					
4	Manpower Supply Services	2019					
Upstream Individual							
5	General Labour Services for Offshore Operation - Region 1	2017					
6	Offshore Catering - Region 2	2018					
7	Offshore Catering - Region 1	2018					
8	Offshore Catering - Region 3	2019					
9	General Labour Services for Offshore Operation - Region 2	2018					
10	Data Store Operational Services	2018					
11	Material Disposal Services	2019					
Downstream Individual							
12	Above-the-Line (ATL) Creative Advertising Services	2018					
13	Out-of-Home (OOH) Advertising Services	2018					
14	Below-the-Line (BTL) Creative Advertising Services	2019					
15	PETRONAS Merchandise Vendor	2018					
16	Bottling Services of LPG Cylinders	2018					
17	Supply of New Empty Steel Drum	2019					

G Logistics

No.	Contract	Start	2019	2020	2021	2022	2023
Pan-Malaysia							
1	Offshore Support Vessels for PACs' Production Operations	2018					
2	Offshore Support Vessel (OSV) Services for PACs' Drilling Project Activities	2019					
Integrated Downstream Contract							
3	Intra-Plant Transportation And Related Services	2017					

Notes:

- In contract
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- Chemical contracts are currently managed by respective OPUs. Future strategy could include consolidation, where applicable.

List of Abbreviations

Abbreviations used in the report

UNIT	ABBREVIATION	USED FOR
A	AHTS	Anchor Handling Tug Supply
B	B2B	Business-to-Business
C	CPP	Central Processing Platform
	CRA	Corrosion Resistant Alloy
	CS	Carbon Steel
	CF	Certificate of Fitness
D	DD/MWD/LWD	Directional Drilling/Measurement-While-Drilling/Logging-While-Drilling
	DP	Dynamic Positioning
	DRO	Discovered Resource Opportunities
E	EPCC	Engineering, Procurement, Construction & Commissioning
	EPCIC	Engineering, Procurement, Construction, Installation & Commissioning
F	FCB	Fast Crew Boat
	FPSO	Floating Production Storage & Offloading
	FSO	Floating Storage & Offloading
	FSU	Floating Storage Unit
	FTG	Full Tensile Gravity
G	GPV	General Purpose Vessel
	GDP	Gross Domestic Product
H	HSSE	Health, Safety, Security, and Environment
	HUC	Hook-up & Commissioning
	HTI	Host Tie-In
	HR	Human Resource
I	ID	Infill Drilling
	IMR	Inspection, Maintenance, and Repair
	ICT	Information & Communications Technology
	IEA	International Energy Agency
	IMF	International Monetary Fund
	IS	International Standards
	IOGP	International Association of Oil & Gas Producers

List of Abbreviations

Abbreviations used in the report (Con't)

UNIT	ABBREVIATION	DEFINITION
J	JUR	Jack-up Rig
L	LCT[1]	Landing Craft Tank
	LCT[2]	Logistics Control Tower
	LNG	Liquefied Natural Gas
M	MCM	Maintenance, Construction & Modification (MCM)
	MOPU	Mobile Offshore Production Unit
	MBR	Malaysia Bidding Round
	MTJDA	Malaysia – Thailand Joint Development Area
N	NDT	Non-Destructive Testing
O	OCTG	Oil Country Tubular Goods
	OGSE	Oil & Gas Services and Equipment
	OPEC	Organisation of the Petroleum Exporting Countries
	OECD	Organisation for Economic Co-operation and Development
P	PM	Peninsular Malaysia
	PSV	Platform Supply Vessel
	PIC	Pengerang Integrated Complex
	PAC	Petroleum Arrangement Contractors
	PFLNG	PETRONAS Floating LNG
	PTS	PETRONAS Technical Standards
R	ROV	Remotely-Operated Vehicle
S	SB	Sabah
	SK	Sarawak
	SSV	Straight Supply Vessel
	SBV	Standby Vessel
	SURF	Subsea Production System & Subsea Umbilical Riser Facilities
T	TADR	Tender-Assisted Drilling Rigs
	TLP	Tension-Leg Platform
U	UV	Utility Vessel
	US$	United States Dollar
W	WHP	Wellhead Platform

Glossary
Industry terms used in the report

UNIT	TERM	DESCRIPTION
A	Aframax	Mid-sized tanker with dead weight tonnage (DWT) between 80,000 – 120,000MT and oil storage capacity of approximately 600 – 750kbbls.
B	Barrel (bbl.)	A standard unit of measurement for oil production. One barrel contains 159 litres of oil.
	Barrels of Oil Equivalent (boe)	A unit of measurement to quantify collective amounts of crude oil, condensate and natural gas. Natural gas volumes are converted to barrels on the basis of energy content.
	Brent Price	The benchmark crude oil price in Europe, as traded on the International Petroleum Exchange in London. Brent crude refers to a particular grade of crude oil, which is slightly heavier than WTI crude. See WTI price.
	Brownfield	Field that has been previously developed and has reached its peak oil/gas production level.
	Brownfield Development Project	Projects to improve oil and/or gas recovery from an existing producing field, inclusive of infill drilling, Improved Oil Recovery (IOR) and Enhanced Oil Recovery (EOR) projects.
D	Deepwater	Projects in water depths exceeding 450ft. Unique methods are required to produce the oil and gas from ocean bed at such depths.
	Development	Activities following discovery that are necessary to begin production and transportation of crude oil and natural gas.
	Downstream	All segments of the value chain that add value to the crude oil and natural gas produced, for example, oil refining, gas processing, gas liquefaction, gas distribution, petrochemical manufacturing, marketing of petroleum and petrochemical products, storage and transportation.
E	Enhanced Oil Recovery (EOR)	Any method(s) applied to productive reservoirs in order to increase production rates and to improve the overall recovery factor.
	Exploration	The search for crude oil and/or natural gas by geological and topographical studies, geophysical and seismic surveys, and drilling of wells.
F	Feedstock	Raw material used in manufacturing a product, e.g. crude oil is a feedstock in a refining process to produce gasoline.
	Field	A geographical area overlying a hydrocarbon reservoir.
G	Greenfield	A field that has proven oil/gas reserves but has never been developed.
	Greenfield Development Project	A project to start the production of oil and/or gas from new, undeveloped reserves.
L	Liquefied Natural Gas (LNG)	Natural gas that is liquefied under extremely cold temperature of about -162 degrees Celsius to facilitate storage or transportation in specially designed vessels.

Glossary

Industry terms used in the report (Con't)

UNIT	TERM	DESCRIPTION
N	Naphtha	Usually an intermediate product between gasoline and benzene, naphtha is colourless and volatile petroleum distillate used as a solvent or fuel.
P	Petrochemicals	Organic and inorganic compounds and mixtures derived from petroleum, used principally to manufacture chemicals, plastics and resins, synthetic fibres, detergents, adhesives, and synthetic motor oils.
	Pan Malaysia Contract	A contract that combines the requirement of more than one PAC to achieve Economies of Scale (EOS).
	Panamax	Smaller-sized tanker with Dead Weight Tonnage (DWT) between 65,000 – 80,000MT and oil storage capacity of approximately 350kbbls.
R	Refining	A purification process for natural resources which includes hydrocarbons, using distillation, cooling and/or compression.
	Regasification	Process of converting LNG back to natural gas at atmospheric temperature.
	Resources	The total estimated quantities of petroleum at a specific date to be contained in, or that have been produced from known accumulations of hydrocarbon.
S	Sour Crude/Gas	Sour crude oil is crude oil containing a high amount of the impurity sulfur. Sour gas is natural gas or any other gas containing significant amounts of hydrogen sulfide H_2S.
	Steam Cracker	Steam cracker plants are facilities in which a feedstock is thermally cracked to produce lighter hydrocarbons.
T	Tight Oil	Also known as shale oil, tight oil is a type of oil found in impermeable shale and limestone rock deposits that are broken up by advanced drilling techniques such as horizontal drilling or hydraulic fracturing. The process is needed to produce oil in commercial quantities as shale has low matrix permeability.
U	Upstream	The segment of the value chain pertaining to finding, developing and producing crude oil and natural gas. These include oil and gas exploration, development and production operations; also known as Exploration & Production (E&P).
W	WTI Price	WTI stands for West Texas Intermediate, the benchmark crude oil price in the US, measured in US dollar per barrel, which refers to a type of high quality light crude oil.
	Wellheads	Component at the surface of an oil or gas well that provides the structural and pressure-containing interface for the drilling and production equipment.

Glossary

Units used in the report

UNIT	DEFINITION	USED FOR
bscf	Billion standard cubic feet	Volume
bce	Big cargo equivalent	Capacity
kbpd	Kilobarrels per day	Production Rate
km	Kilometre	Distance
mmscfd	Million metric standard cubic feet per day	Production Rate
mmstb	Million stock tank barrels	Volume
MTPA/mtpa	Million tonnes per annum	Capacity
mmBtu	Million British thermal unit	Heating Value
sqkm	Square kilometre	Area
tscf	Trillion standard cubic feet	Volume
tbtu	Trillion British thermal unit	Heating Value

Frequently Asked Questions (FAQs)

1

How does this report benefit the OGSE sector?

This report will improve visibility on PETRONAS' domestic activities, enabling better planning of resources and investments by vendors.

2

How will the OGSE sector be affected if the oil price recovers?

If the oil price recovers for a sustainable period, we expect a higher number of greenfield and brownfield projects to become commercially viable, provided that we keep the cost at a competitive level. Thus activities for the OGSE sector may increase accordingly.

3

What is the accuracy and reliability of the outlook data? Would this be in line with what has been previously disclosed to the public?

This data is based on the projection of activities with high and base scenarios indicating the project milestones, at the time of release. Changes are to be expected in response to market dynamics and operational requirements.

4

Does this outlook refer to tenders to be issued or contracts to be awarded?

The outlook provided is based on activities per year, not by tender issuance nor contract award. Therefore, it includes activities which may have been contracted at the time of reporting. An overview of contracts with its current duration is provided in this document. Companies may use them as an indicator for opportunities that may arise in the future.

5

Should I make my investment decisions/business planning based on this report?

The intent of this outlook is to provide a general direction for the industry and be sufficient for players to make their high-level planning. PETRONAS makes no representation on the accuracy or completeness of any information provided in this report and expressly disclaims any liability whatsoever arising from, or in reliance upon, the whole or any part of its contents. We recommend players to also make references to other sources of data and information to complement their decision-making.

6

Wellhead platforms (WHPs), central processing platforms (CPPs), and rigs information are primarily for larger players. How will smaller players benefit from the information?

The outlook in this report prioritises leading indicators for a broad spectrum of activities in the oil and gas industry, as indicated in the list of Associated Services, which may benefit smaller players.

7

Is this a once-off exercise or a regular effort?

This is the fourth edition of the report, and is part of PETRONAS' effort to increase engagement with the OGSE sector. We endeavour to provide this report on an annual basis.

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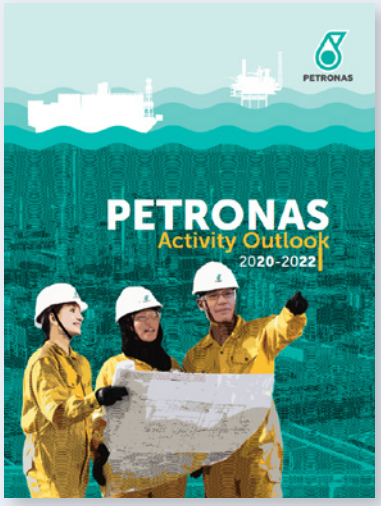
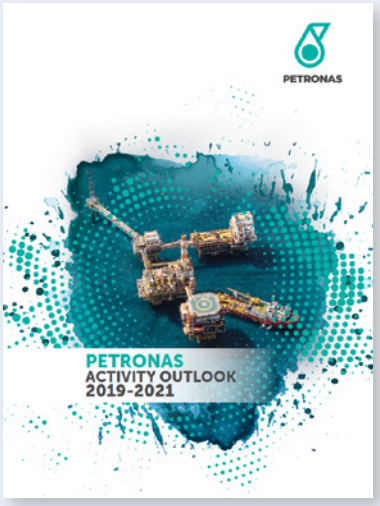


PETRONAS Activity Outlook 2020-2022



PETRONAS Activity Outlook 2019-2021

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Email us:**lrs_enquiries@petronas.com**

Malaysia Tax Incentives Compilation and Guide for Oil and Gas Services and Equipment (OGSE) Sector

Our Record-breaking Winning Formula to Move You like Never Before

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We want to hear from you. Share your feedback/enquiries with our team at **pdtcorporateprojects@petronas.com**

Thank you for showing your interest in **PETRONAS Activity Outlook 2020-2022.**