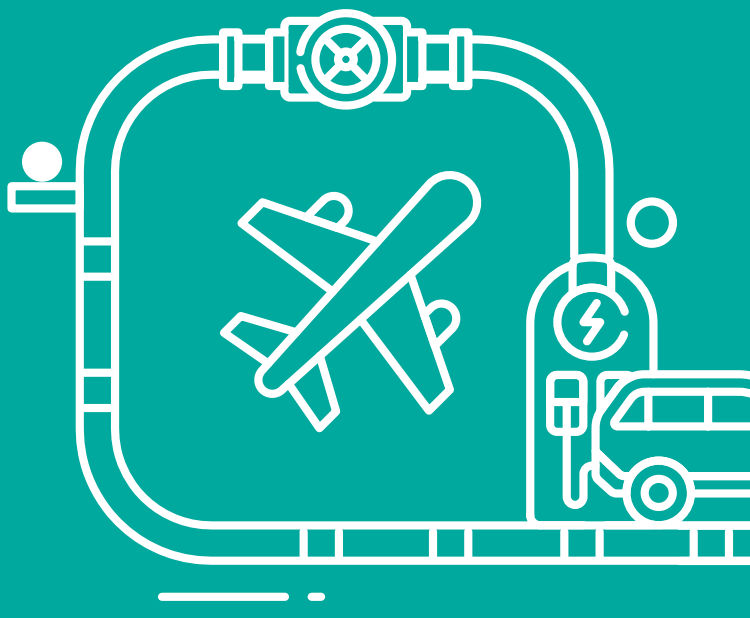
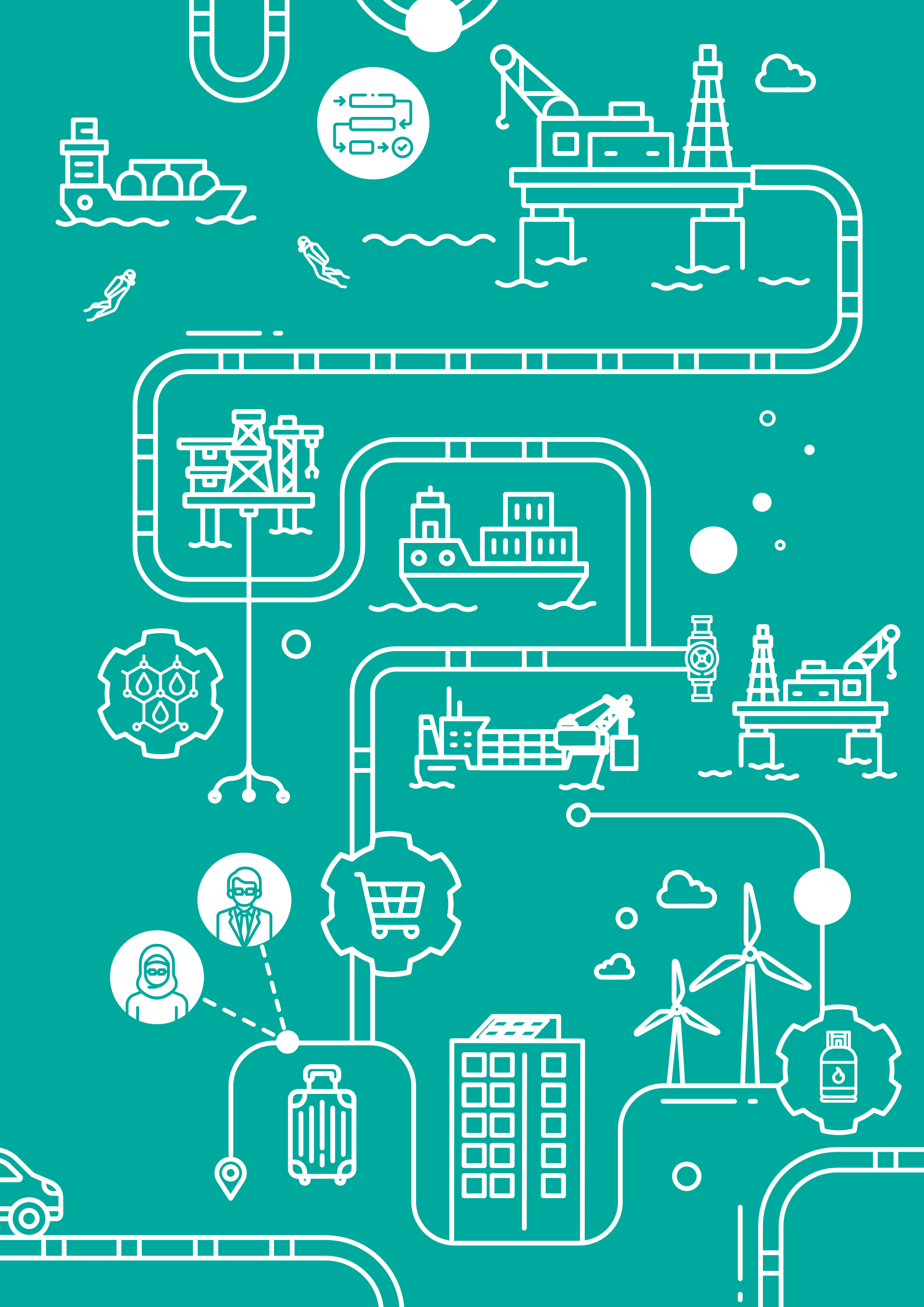
when purpose meets vision

Activity Outlook





Methodology

Scope of Coverage

This section provides the activity outlook for core categories, serving as leading indicators to many other supporting services. The interdependencies create multiplier effects across the value chain.

For Upstream-related information, this report covers the activity outlook for Malaysia. This includes activities from the 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.

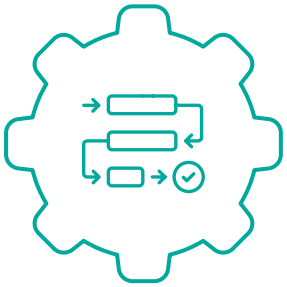
For Downstream and Gas-related information, this report covers the activity outlook for the PETRONAS Group of Companies in Malaysia only.

Time Horizon

The report provides information on activities within a three-year period, from 2024 to 2026. In the effort to provide more accurate information to the industry, where applicable, the approach taken is to provide information based on actual or planned contract award date. Using Offshore Fabrication as an example, the reported date is based on the actual or planned award date of Engineering, Procurement, Construction, Installation and Commissioning (EPCIC) package instead of the first steel-cut date. Another example is plant turnaround that begins in December 2024 and ends in January 2025 is only accounted for once, i.e., in 2024.

General Narrative on the Overall Activity Outlook

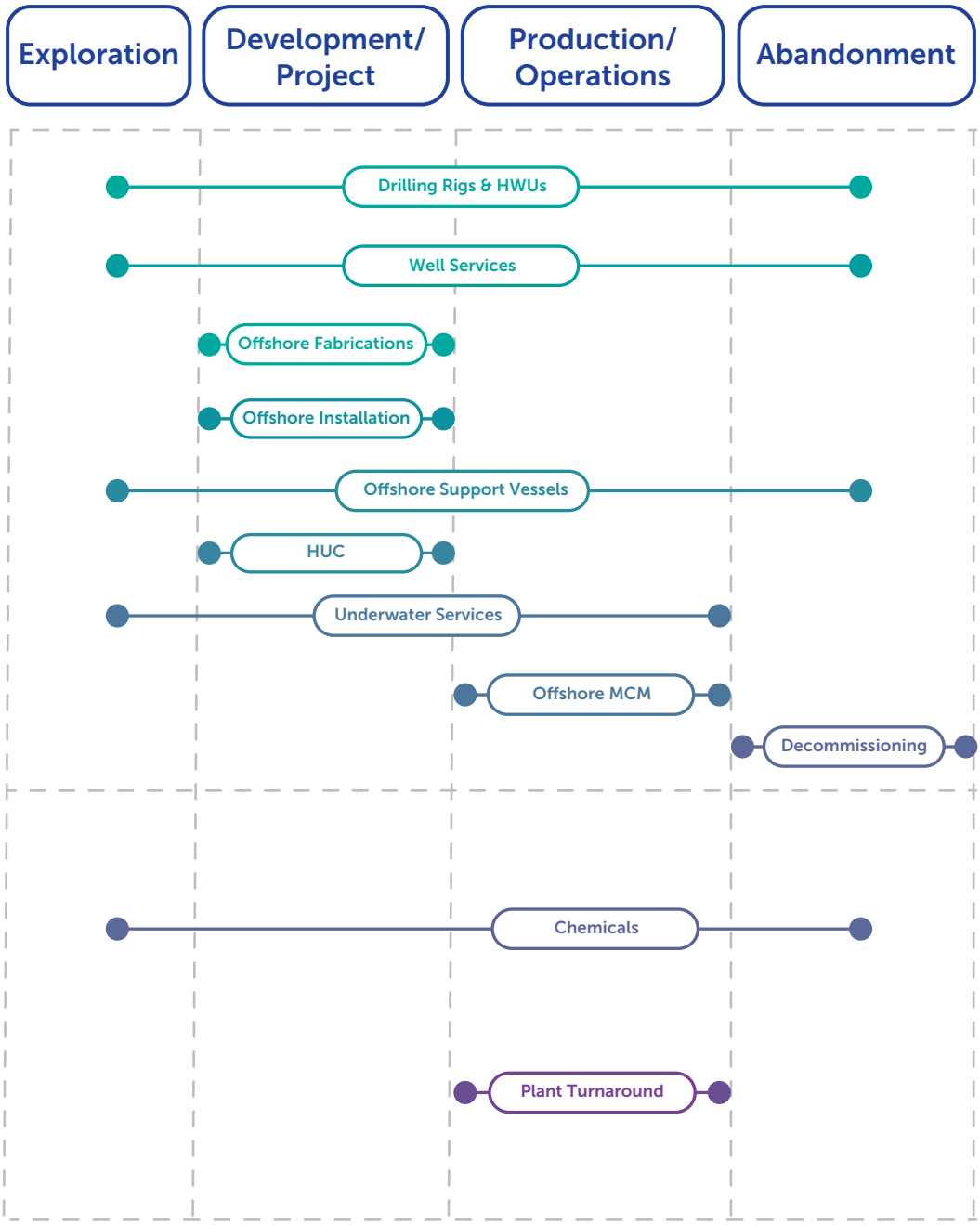
Steady outlook is expected for the next three years covering drilling rigs, fixed structures, installation and projects. An increase in activity is expected for Plant Turnaround to cater for requirement in Pengerang.



Quick Reference for 2024

Upstream business is a fully integrated business that encompasses Exploration, Development, Production and Abandonment, covering a broad portfolio of resources and play types.

Downstream business enhances the value of petroleum resources through the refining, marketing and trading of crude oil and petroleum products, as well as manufacturing and marketing of petrochemicals, specialty chemicals and derivatives.



A - Subsurface

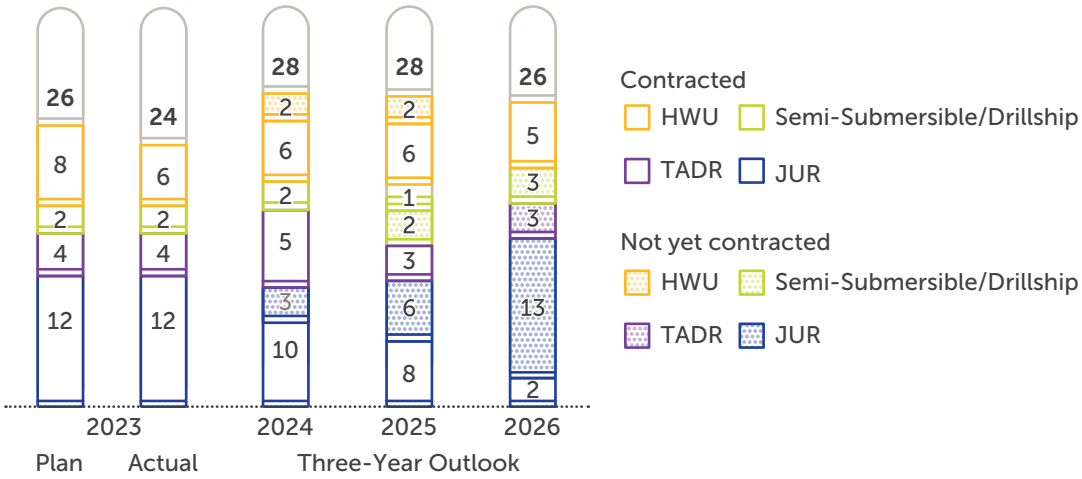
Drilling Rigs and Hydraulic Workover Units

Activity Outlook is provided for all types of rigs operating in Malaysia i.e. Jack-up Rigs (JURs), Tender Assisted Drilling Rigs (TADRs), Semi-Submersible Rigs and Drillships.

The Hydraulic Workover Units (HWUs) are utilised to perform workover for recompletion and plugged abandonment work and could function as an alternative to the rigs mentioned above.

	 JUR	 TADR	 Semi-submersible	 Drillship	 HWU
Activity Phase	• Exploration • Development • Abandonment	• Development	• Exploration	• Exploration	• Production • Abandonment
Application	The most common type of offshore rig due to its flexibility. Typically used for drilling in shallow water.	Typically used in deeper water with space/load/ approachability limitations e.g. deepwater spars, tension leg platform (TLP), etc.	The most stable type of rig, typically used for drilling in deepwater and/or harsh environment.	Typically used for drilling in deepwater/ ultra deepwater. Can also be used for well maintenance, completion and capping works.	Typically used for workover operations e.g. recompletion, well repair and well Plug & Abandonment (P&A).
Associated Services	Supporting vessels, Oil Country Tubular Goods (OCTG), third party drilling services e.g. drilling fluids, Directional Drilling (DD)/Measurement While Drilling (MWD)/ Logging While Drilling (LWD), wellheads, drill bits, cementing, fishing, slickline etc.			OCTG and third party drilling services.	Supporting vessels, production logging, slickline, wellhead, fishing cementing, etc.

Number of Rigs



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

- Utilisation for all drilling rigs for 2023 was as planned, except for HWU where lower utilisation was contributed by optimisation in performing planned workover and P&A activities.
- The outlook for 2024 to 2026 is based on full year utilisation. Actual numbers may vary based on campaign duration and/or optimisation, project deferment, cancellation, etc.

A - Subsurface

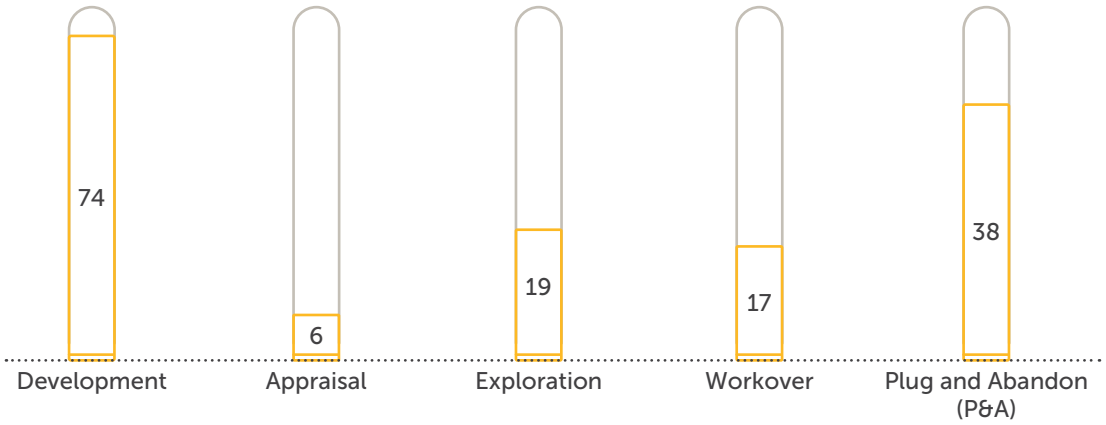
Well Services

Different services are required for different drilling activities, as tabulated below:

Well Services	Exploration Drilling	Development Drilling	Appraisal	Workover/ Intervention
Cementing	✓	✓	✓	✓
Completion	◉	◉	✓	✓
DD/MWD/LWD	✓	✓	✓	✗
Drilling Bits	✓	✓	✓	✓
Drilling Fluids	✓	✓	✓	✓
E-Line	✓	✓	✓	✗
Fishing	✓	✓	✓	✓
Mudlogging	✓	✓	✓	✗
Slickline	◉	◉	✓	✓
Tubular Handling	✓	✓	✓	✓
Well Testing	✓	✓	◉	✗
Wellhead & Tree	✓	✓	✓	✓

✓ = Yes / Required ✗ = Not Required ◉ = Optional

Number of Wells in 2024



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

- In 2024, a total of 99 wells are planned to be drilled under the development, appraisal and exploration drilling programme.
- Significant increase is expected for P&A activities in 2024 to honour the commitment made by the regulator.

B - Engineering, Construction and Projects

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

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

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

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

For the purpose of this report, the timeline for each project is segregated into four stages, i.e. (i) Engineering and (ii) Fabrication (iii) Installation and (iv) Hook-up and Commissioning. There may be an overlap of activities between the four stages, as depicted by the gradient. Also provided are indicators for facility type.

Legend for Project Activities:

Legend for Facility Type:

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

B - Engineering, Construction and Projects

Offshore Fabrication

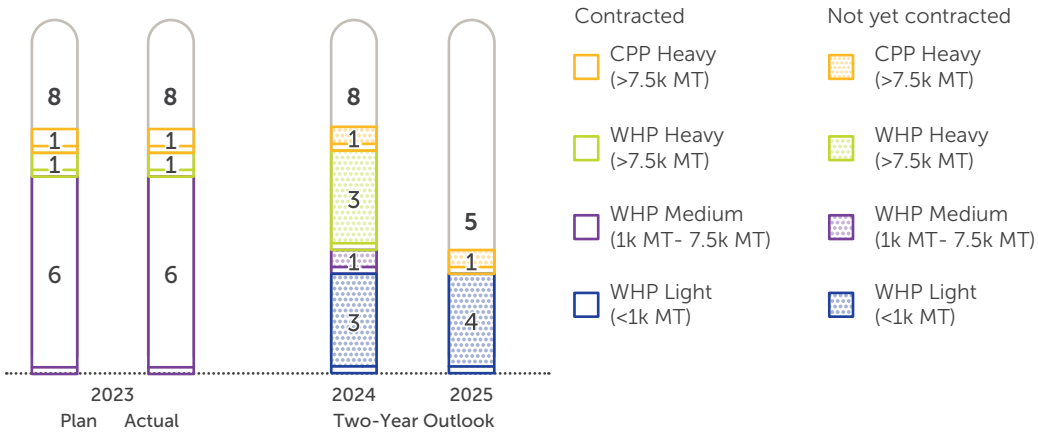
Offshore fabrication outlook is provided for fixed and floating structures, with actual or planned contract award date as the indicator of commencement of fabrication activity.

Fixed Structures: Wellhead Platform/Central Processing Platform

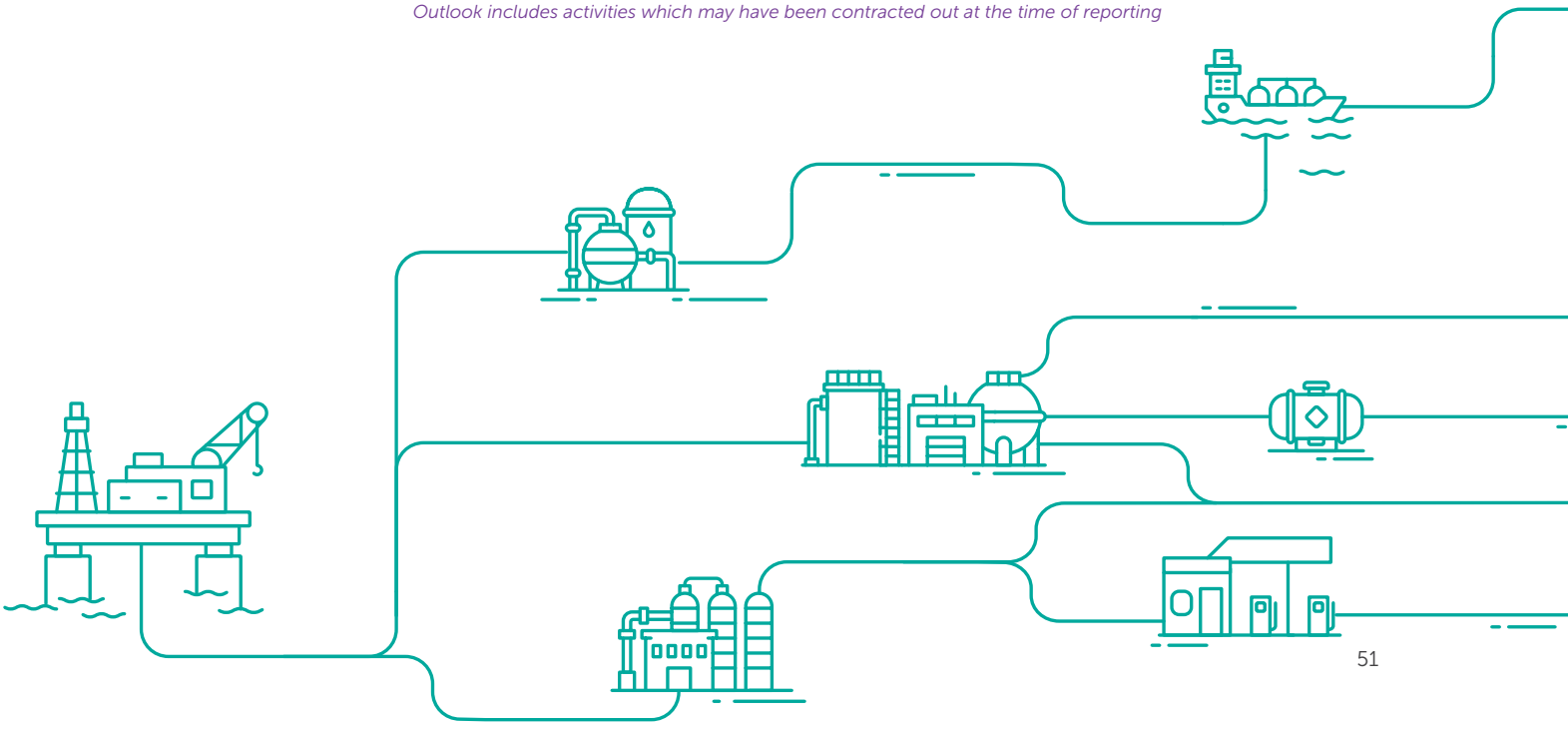
Wellhead Platform (WHP) Application:
Used to house wellheads and machinery to extract oil and gas from the seabed and serve as a platform for drilling activities. Typically, it is designed to include an integral deck, utility system, wellhead system, helideck and drilling facilities.

Central Processing Platform (CPP) Application:
Used to receive and process the extracted hydrocarbon before sending to shore or evacuation through tankers. CPP typically acts as the central hub for the entire field complex.

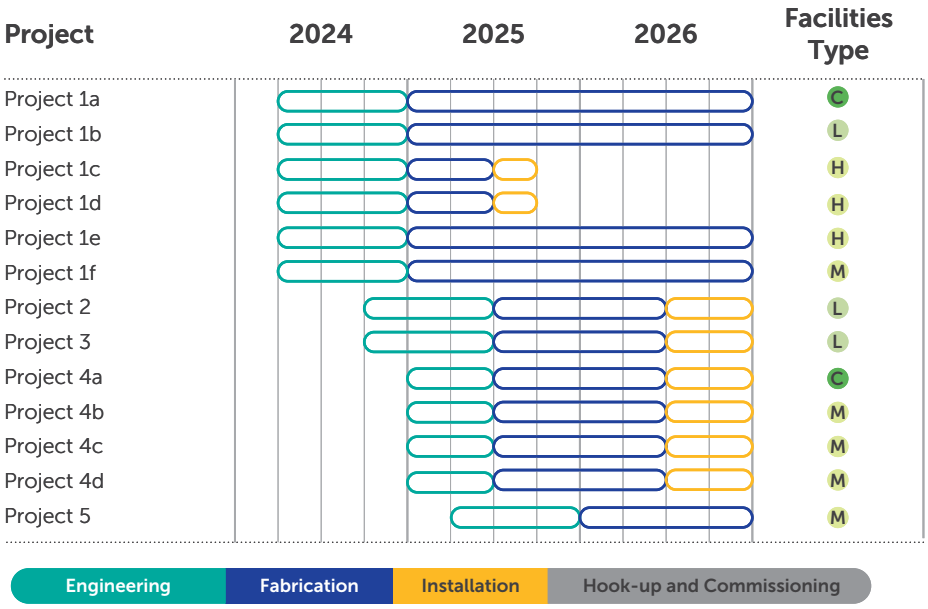
Number of Fixed Structures Fabrication



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



B - Engineering, Construction and Projects



- All requirements for the next two years have not been contracted yet.

Did You Know?

There are five offshore fabrication yards in Malaysia contracted under the Fabrication Frame Agreement (FA) with a combined annual capacity of 280,000 MT. These yards are located in Klang, Lumut, Pasir Gudang and two in Kuching.

Floating Structures: Floaters

Floaters refer to non-fixed structures involved in processing and/or the storage of hydrocarbons, i.e. Floating Production Storage and Offloading (FPSO), Floating Storage and Offloading (FSO) and Mobile Offshore Production Units (MOPU).

Application:
Used as relocatable production facilities, generally to evacuate hydrocarbons from marginal or isolated oil and gas fields without connectivity to export facilities (pipeline or tie-back) in the vicinity.

Associated Services:
Engineering, structural steel/bulk material, equipment supplies (e.g. mechanical, electrical, instrument, station-keeping, etc.), fabrication yards, shipyards, transportation and installation, hook-up and commissioning, Marine Warranty Surveyor and Operations and Maintenance (O&M).

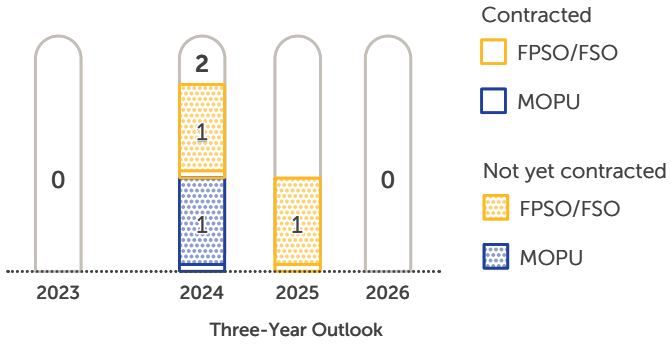
FPSO
Floating Production, Storage and Offloading
Vessel used for the processing of hydrocarbons and oil storage facility before being offloaded onto a tanker for transportation to shore.

FSO
Floating Storage and Offloading
A simplified FPSO without the processing capability for oil and/or gas.

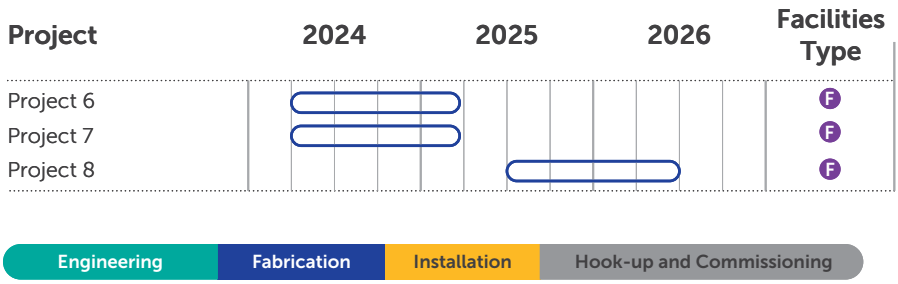
MOPU
Mobile Offshore Production Unit
Portable structure in offshore well production, referring to portable wellhead platform, self-elevating production (including water injection) facilities.

B - Engineering, Construction and Projects

Number of Floating Structures Fabrication



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



- All requirements for the next two years have not been contracted.
- ESG and robust economics are the key industry priorities of various stakeholders in maintaining the license to operate in pursuing new floater projects.
- Technology advancements for lower-carbon solutions are continuously being harnessed within the floaters fraternity in supporting NZCE 2050 aspirations.
- Operators are constantly looking for new ways to contract capable players and improve the bankability of their contracts to meet the growing demand for local floaters and keep up with market trends.
- The local floaters market offers great opportunities for new entrants to expand their services and offerings in medium-sized projects, which are less competitive than the mega projects elsewhere.

B - Engineering, Construction and Projects

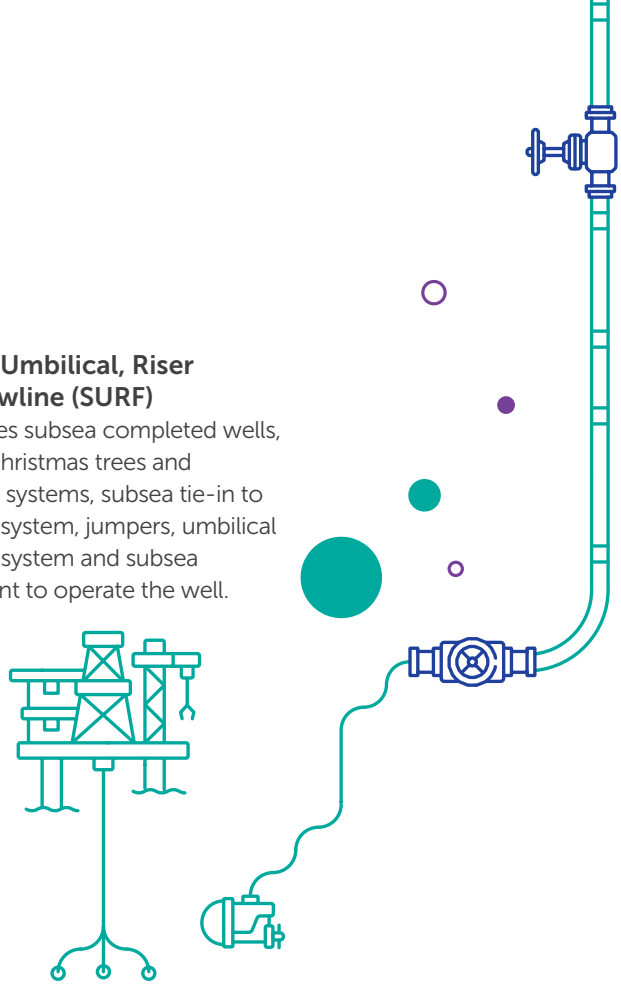
Subsea Structures

Subsea structures are facilities located on the sea floor, as opposed to on the surface. Petroleum is extracted from the sea floor and then "tied-back" to an existing production platform using Subsea Umbilical, Riser and Flowline (SURF) facilities.

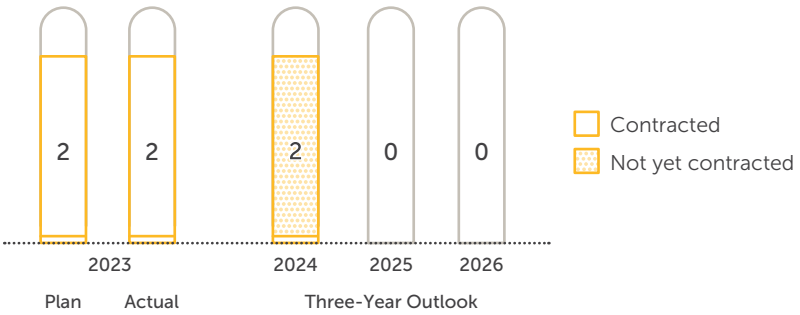
Application:
Used to provide safe and efficient interconnection from the topside platforms and vessels to the wellheads and pumps on the sea floor, and vice versa for reliable oil and gas extraction from subsea wells.

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

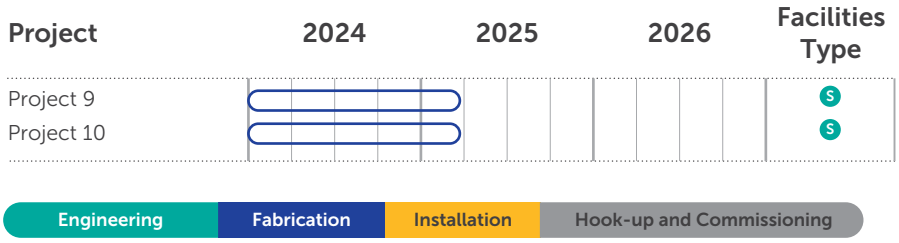
SURF
Subsea Umbilical, Riser and Flowline (SURF)
Comprises subsea completed wells, subsea Christmas trees and wellhead systems, subsea tie-in to flow line system, jumpers, umbilical and riser system and subsea equipment to operate the well.



Number of Floating Structures Fabrication



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



- All requirements for 2024 have not been contracted.

Did You Know?

Malaysia serves as the manufacturing hub for three out of five prominent global subsea equipment suppliers.

B - Engineering, Construction and Projects

Offshore Installation

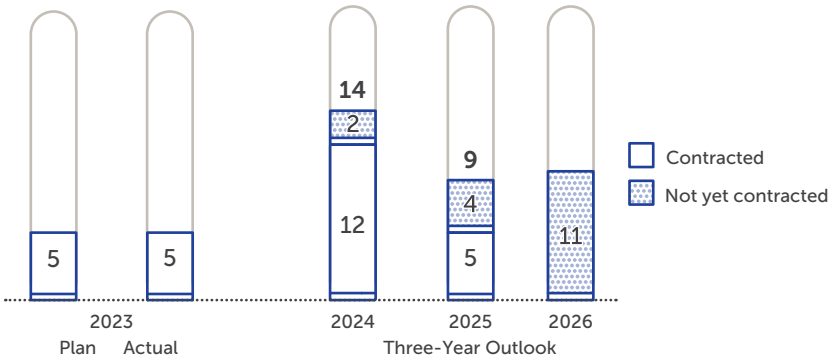
Offshore installation outlook for each project is provided by the type of installation barge required for the facility installation, i.e. heavy lift, floatover or pipelaying barge.

Structural Installation – Heavy Lift

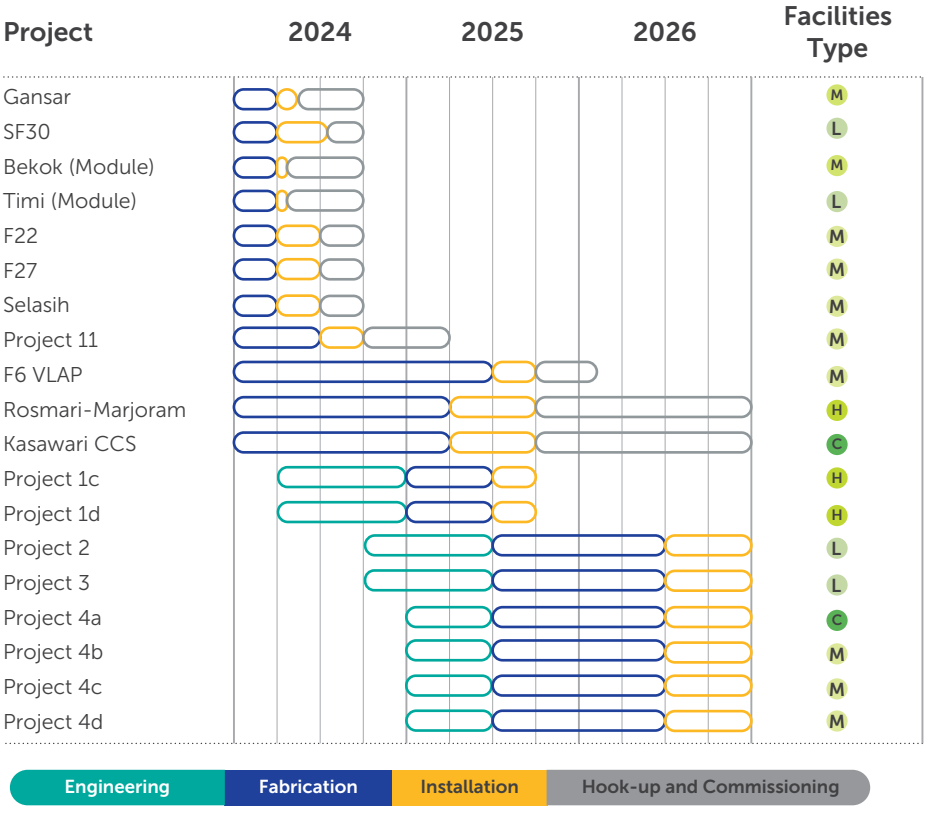
Application:
Used for installation of jackets (for WHPs and CPPs) and topsides (for WHPs).

Associated Services:
Supporting vessels, diving and remotely operated vehicles (ROVs), welding and non-destructive testing (NDT).

Number of Lifts Using Heavy Lifts Barges



Outlook may be read together with the outlook for offshore fabrication based on respective project phases



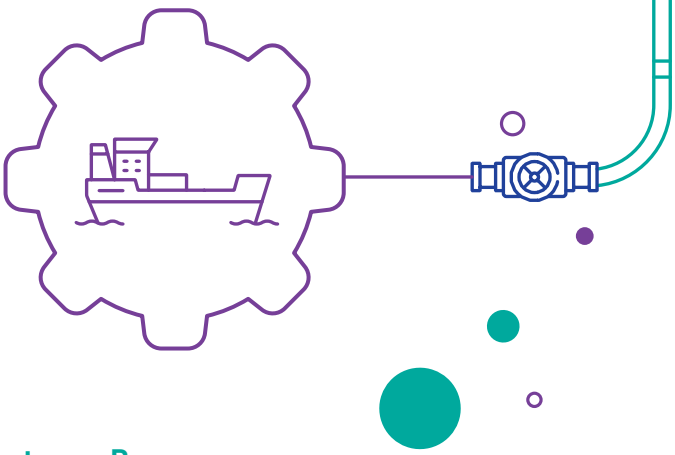
- Outlook number is measured in terms of number of lifts, counted separately for each jacket and topside, and excludes heavy lift barges utilisation for facilities decommissioning.
- Positive demand in the oil and gas and wind sector is expected to drive heavy lift utilisation growth in 2023-2030, posing challenges in security of supply.

B - Engineering, Construction and Projects

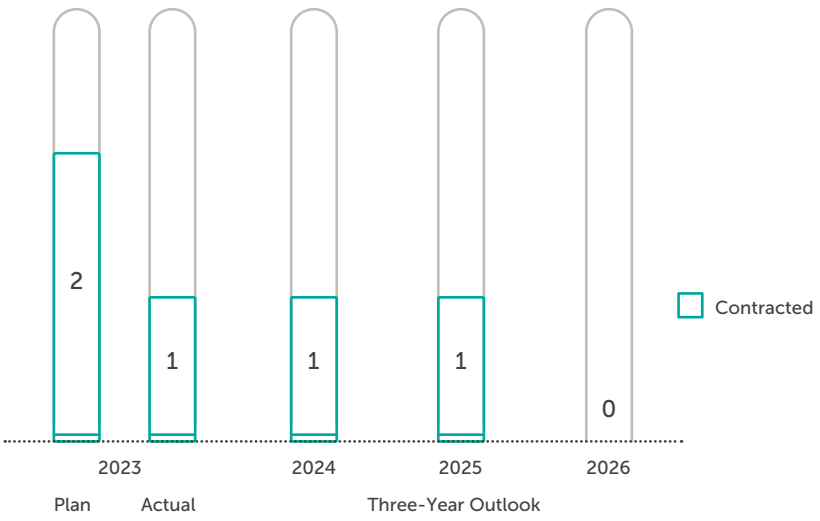
Structural Installation – Floatover

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

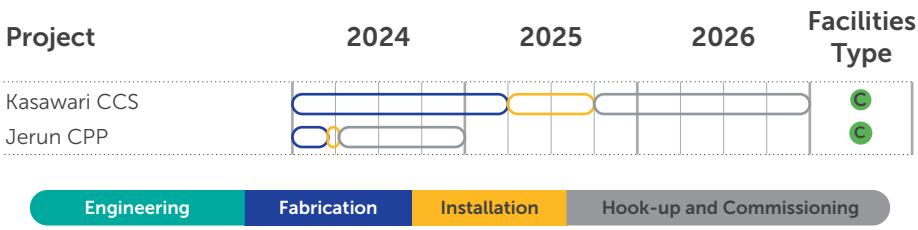
Associated Services:
Supporting vessels, diving and ROVs, welding and NDTs.



Number of Structural Installations Using Floatover Barges



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



- For 2023, one CPP was deferred to 2024 due to rationalisation of execution plan.
- All requirements for the next two years have been contracted.

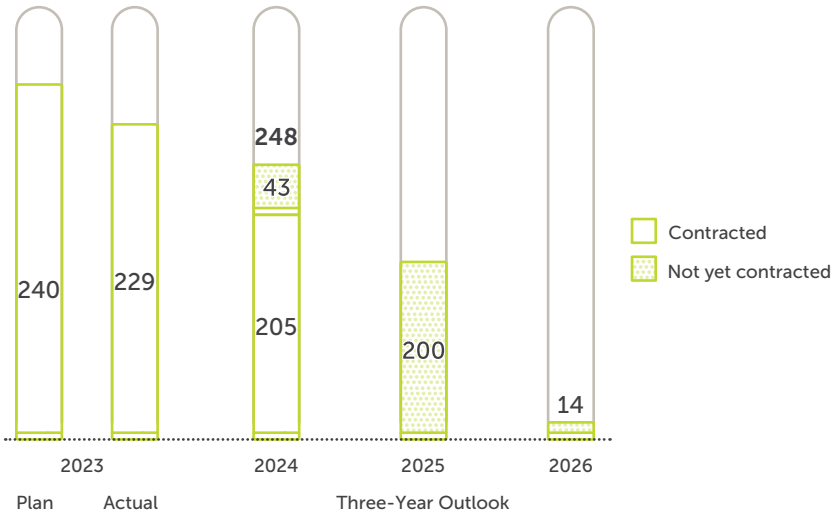
B - Engineering, Construction and Projects

Pipeline Installation – Pipelay

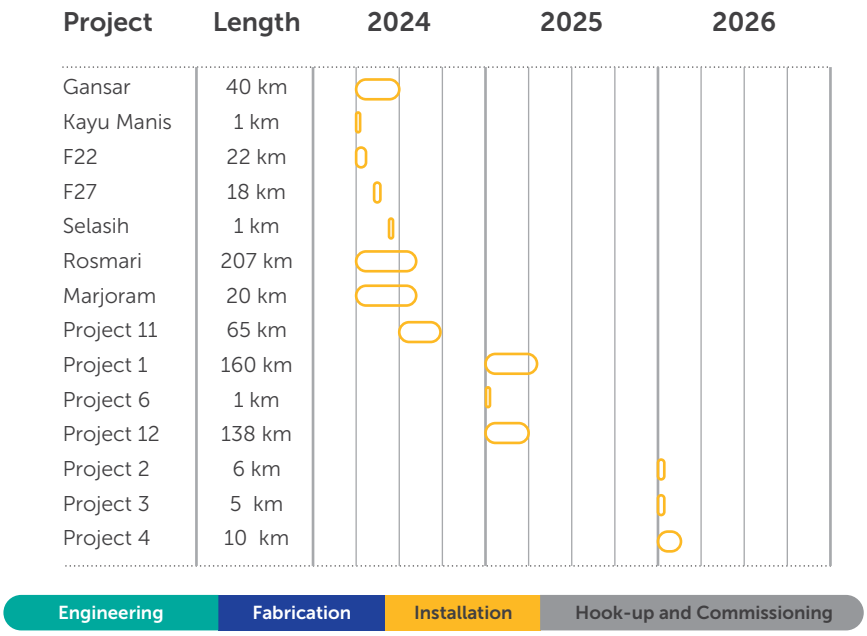
Application:
Used to install rigid linepipes (e.g. carbon steel, corrosion resistant alloy (CRA), etc. for offshore projects.

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

Number of Installation Days



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



- This outlook excludes requirements for pipeline replacement.

Did You Know?

There are currently five heavy-lift installation vessels and two pipelay installation vessels operating under the Malaysian flag as at November 2023.

B - Engineering, Construction and Projects

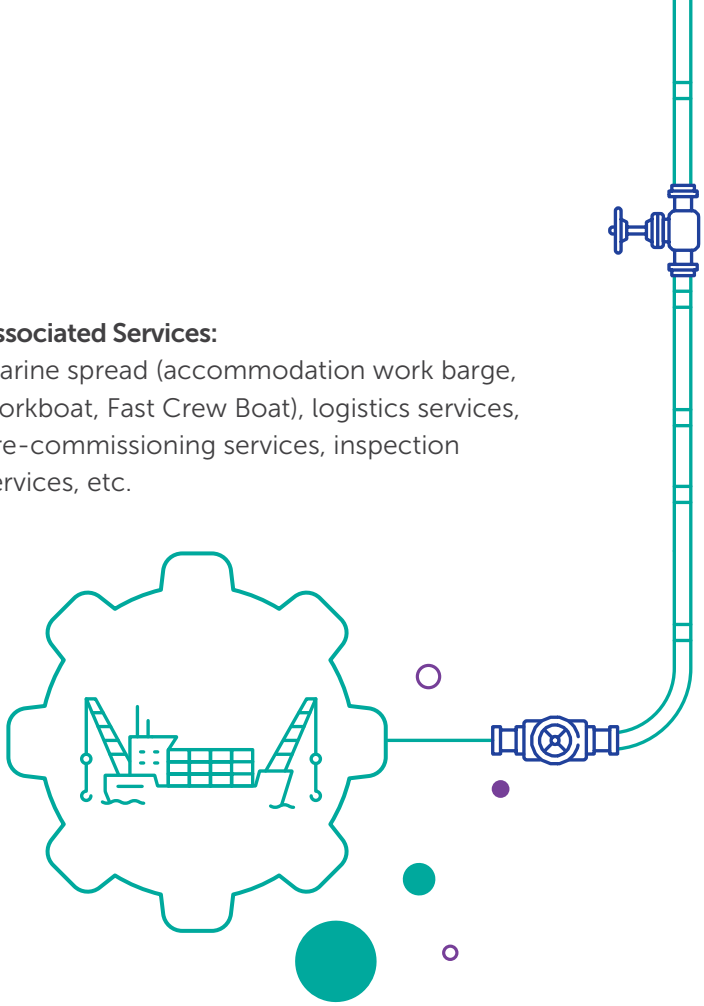
Hook-up and Commissioning

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 man-hour units as the activities are labour intensive.

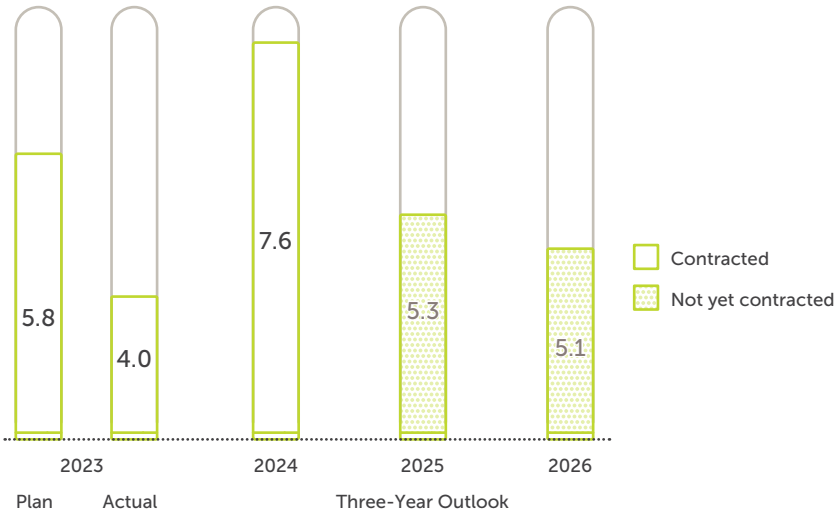
Activity Phase:
Development and Production.

Application:
Greenfield HUC involves works on newly installed platforms during the development stage. Brownfield HUC involves works on existing offshore facilities and equipment; including rejuvenation/redevelopment, general topside modification, infill drilling activity etc.

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



Number of Man-Hours (Millions)



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

- All requirements for 2024 have been contracted.
- Approximately 1.8 million man-hours planned for 2023 is expected to be carried over to 2024.
- HUC activity is expected to remain steady for year 2025 and 2026.

B - Engineering, Construction and Projects

Decommissioning

Decommissioning in the oil and gas industry represents the end of the facilities productive life of facilities, the process which comprises the removal and possible remediation of assets' installation whilst avoiding environmental impact.

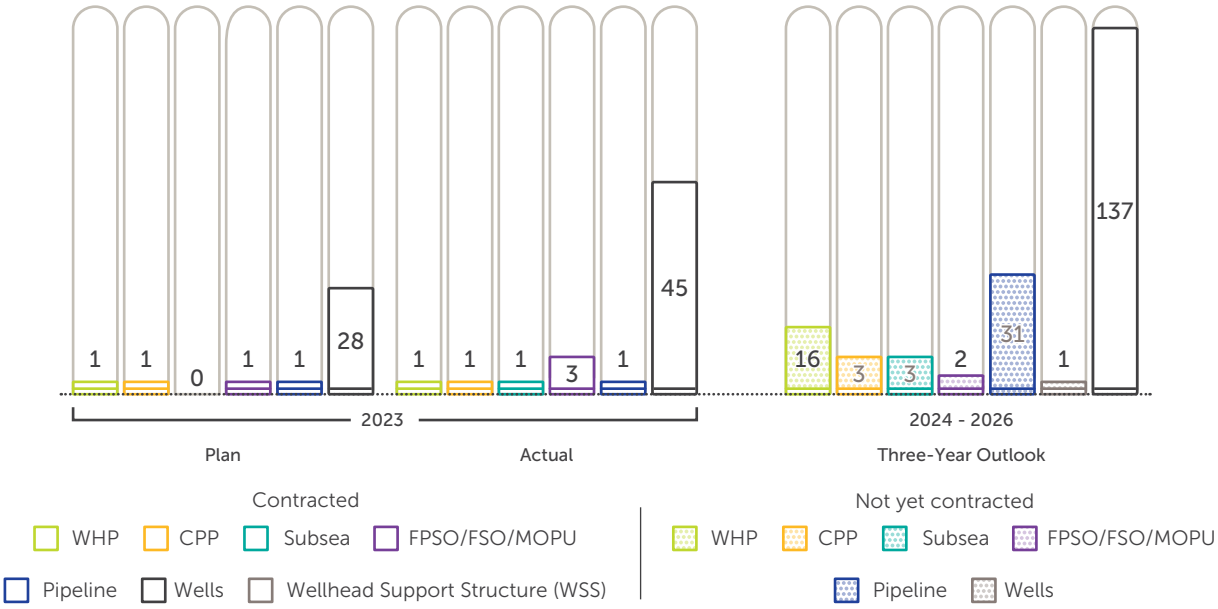
Activity Phase:
Abandonment.

Application:
Decommissioning comprises two activities:

- Well Abandonment: preparation of the well to be closed permanently.
- Upstream Facilities Decommissioning: removal and proper remediation (e.g. disposal, reefing, reuse) of the disused facilities.

Associated Services:
Drilling rigs and HWU, offshore support vessels, lifting vessels, third-party drilling services, engineering services, yard facility, transport, cutting services, conductor removal, pipeline flushing, etc.

Decommissioning of Facilities and Wells



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

- All 2024-2026 requirements for facilities decommissioning have not been contracted. For Wells P&A, the contracted requirement is subject to final technical assessment based on rig availability at the time.
- PETRONAS is looking into innovative facilities decommissioning solutions focusing on technologies, re-use/re-purpose options, integrated approaches as well as identifying potential alternative removal methods to ensure cost compression, covering the above outlook with flexibility of execution plan. Thus, participation and collaboration are encouraged from all parties.

Did You Know?

Malaysia is home to a certified decommissioning yard in Klang, specialising in the removal of hazardous and non-hazardous waste and the remediation of assets ensuring safe and environmentally responsible disposal of offshore structures.

C - General Facilities Maintenance

Offshore Maintenance, Construction and Modification

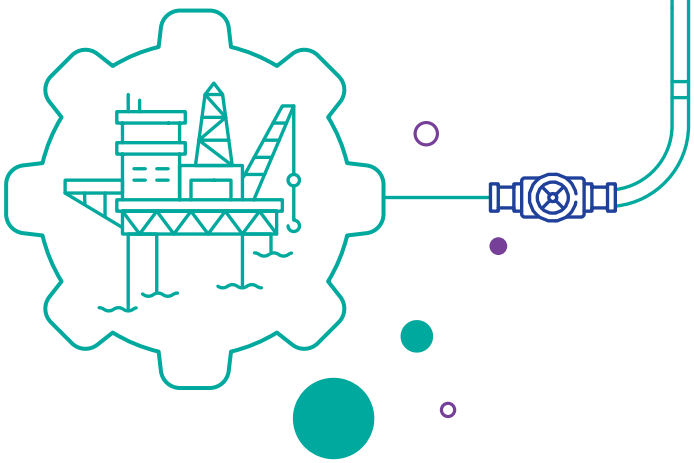
Offshore Maintenance, Construction and Modification (MCM) covers activities related to the repair and maintenance of existing topside facilities.

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

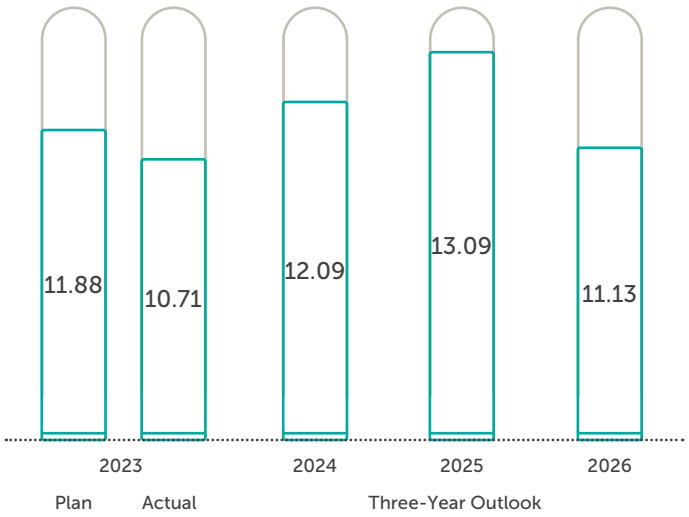
Activity Phase:
Production.

Application:
MCM involves two types of activities:
i. Scheduled Maintenance: Planned activities.
ii. Corrective Maintenance: Unplanned activities arising from unforeseen circumstances.

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



Number of Man-hours (Millions)



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

- All requirements for 2024 have been contracted. Nevertheless, there are opportunities for Associated Services under the main contractors.

C - General Facilities Maintenance

Underwater Services

Underwater Services covers inspection, maintenance and repair activities performed for underwater structures such as platform jacket inspection, offshore pipeline inspection, debris survey and removal.

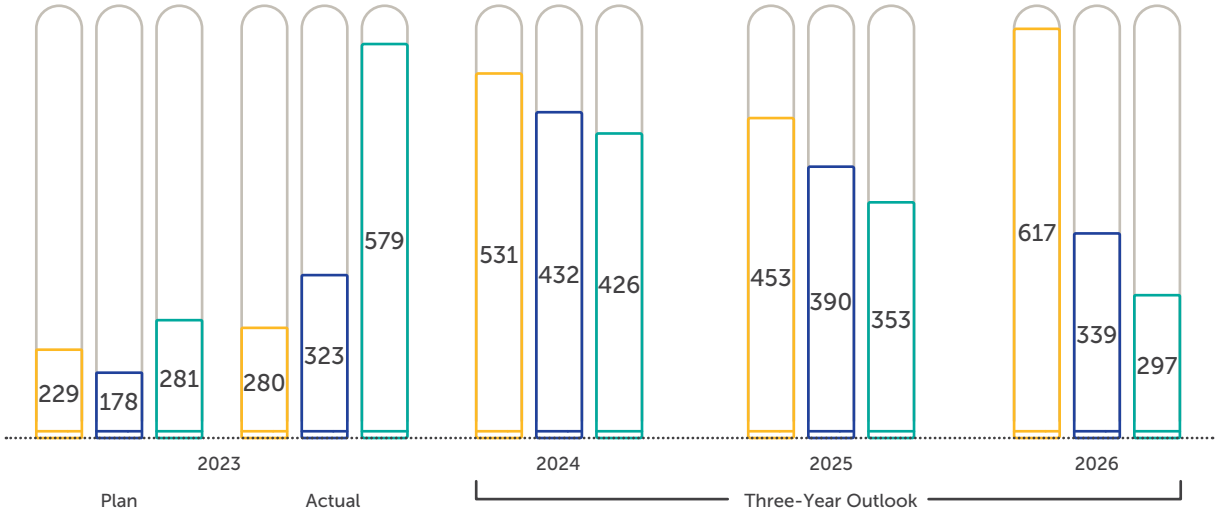
For the purpose of resources planning and optimisation, the outlook is represented by number of days for underwater activities execution.

Activity Phase:
Development and Production.

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

Associated Services:
Diving and support vessel, Saturation Diving system, Remotely Operated Vehicles (ROV) and Project Management Team (PMT), etc.

Number of Days



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

DPII DSV - ROV & Air Diving System

DPII DSV - Built-in Saturation Diving System

DPII DSV - ROV & Intervention

- The actual execution for 2023 has increased due to elevated activity levels. Demand is projected to remain strong in 2024 onwards.
- Approximately six to eight Diving Support Vessels (DSV) are required for the next three years.
- Outlook is based on forecasted number of days for execution of underwater activities utilising Diving Support Vessels (DSV) where the estimated volume for each vessel specification may vary depending on specific scope requirement by PACs.

Did You Know?

There are five active Dynamic Positioning Diving Support Vessels (DPDSV) in Malaysia as at November 2023.

C - General Facilities Maintenance

Plant Turnaround

Plant Turnaround is planned periodic shutdown of a process plant or process unit to carry out work (including but not limited to) for equipment maintenance, inspection, repairs, replacement, catalyst change out, etc. of the plants to ensure integrity and to achieve safe, reliable operation until the next planned shutdown.

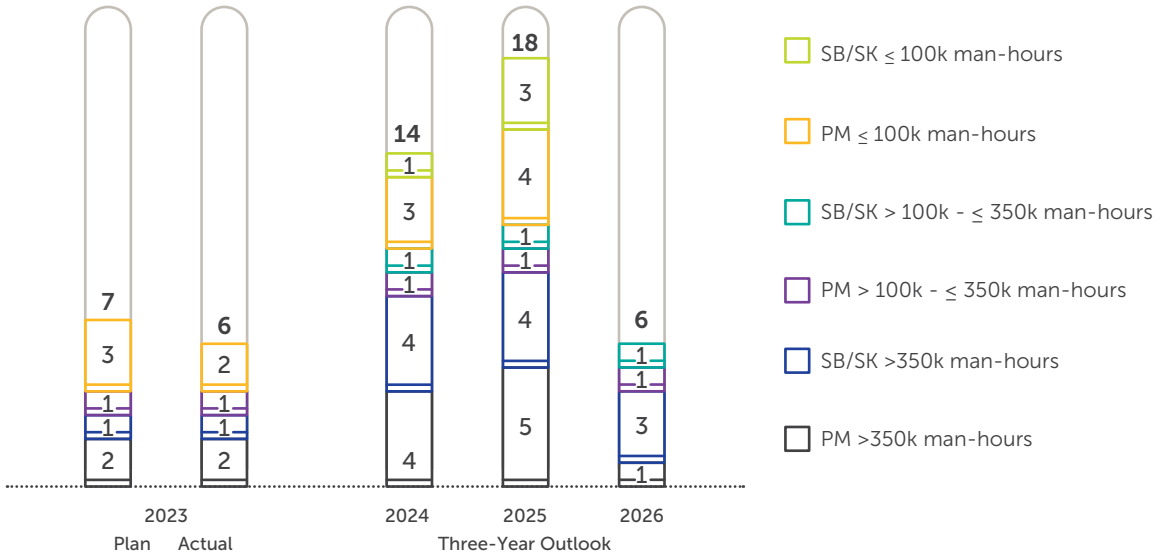
Turnaround comprises main mechanical work, which constitutes the bulk of total activities (~60 percent). Other activities are discipline-specific; e.g., electrical, instrument, inspection and rotating equipment maintenance. Turnaround is labour intensive; hence activity outlook is stated in man-hour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

Activity Phase:
Operations.

Application:
Turnaround is scheduled periodically in which the entire facility is taken off stream for an extended period to conduct maintenance and inspection activities to ensure the asset's reliability.

Associated Services:
Equipment services (e.g., mechanical, electrical, instruments, etc.), inspection services, manpower and equipment supply/rental.

Number of Turnarounds



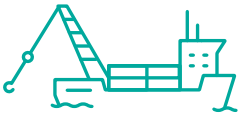
Outlook includes activities which may have been contracted out at the time of reporting

- 2023 execution was slightly lower due to schedule deferment.
- Positive outlook is expected for the next three years, especially for the years 2024 and 2025. Significant increase in number of turnarounds contributed by requirement at Peninsular Malaysia (East Coast), Pengerang and Sarawak.
- While a majority of the main mechanical package has been contracted out, there are opportunities for involvement in scopes such as catalyst change-outs, equipment supply, support services and others.
- PETRONAS is embarking on a Self Regulation (SR) initiative which is expected to reduce the number of turnaround post SR certified while shifting focus to maintenance.

D - Logistics

The Logistics category covers land transportation, supply base, warehouse, aviation and Offshore Support Vessel (OSV).

Offshore Support Vessel (OSV)

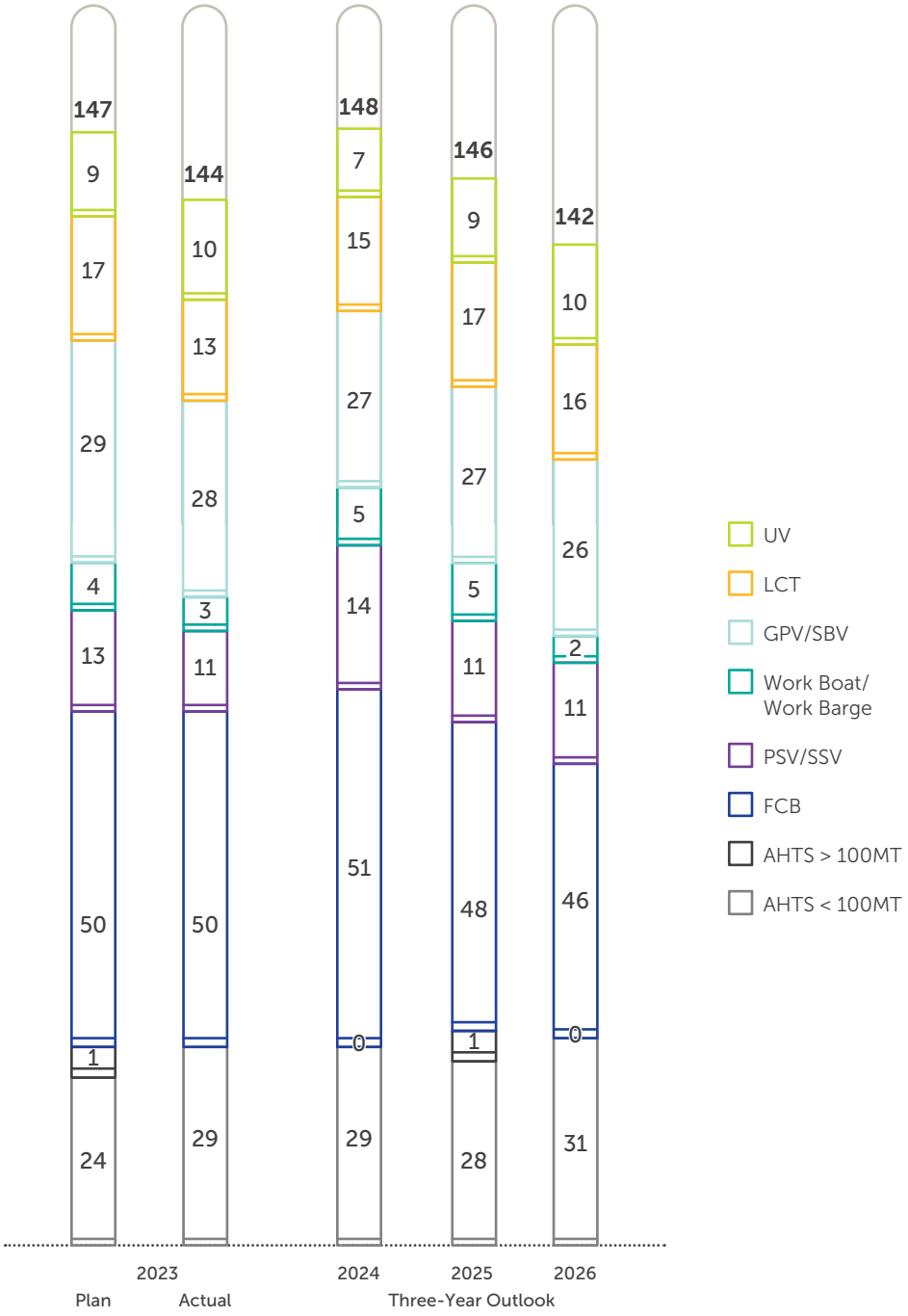
	Anchor Handling Tug Supply (AHTS)	Platform Supply Vessel (PSV)/ Straight Supply Vessel (SSV)	Fast Crew Boat (FCB)
Type of Vessel			
Activity Phase	• Exploration • Development	• Production • Abandonment	• Development • Production • Abandonment
Application	Used to assist in anchor handling operation, towing and transport supplies to and from offshore platforms/drilling rigs	Transport equipment and supplies to offshore platforms/drilling rigs	High speed vessel for the transportation of crew to offshore facilities and inter rigs
Associated Services	Vessel inspection services, bunkering services, port services and tank cleaning services.		

	Workboat/ Work Barge	General Purpose Vessel (GPV)/ Standby Vessel (SBV)	Utility Vessel (UV)	Landing Craft Tank (LCT)
Type of Vessel				
Activity Phase	• Development • Production • Abandonment	• Development • Production		• Production
Application	Accommodation for personnel.	Standby, support, rescue and emergency duties.		Transport equipment and supplies to offshore platforms/drilling rigs.
Associated Services	Vessel inspection services, bunkering services, port services and tank cleaning services.			

For the purpose of activity outlook, the numbers represent OSVs requirements for Production Operations, Drilling and Projects (Wells).

D - Logistics

Number of Vessels Supporting Production Operations and Production Project Related:

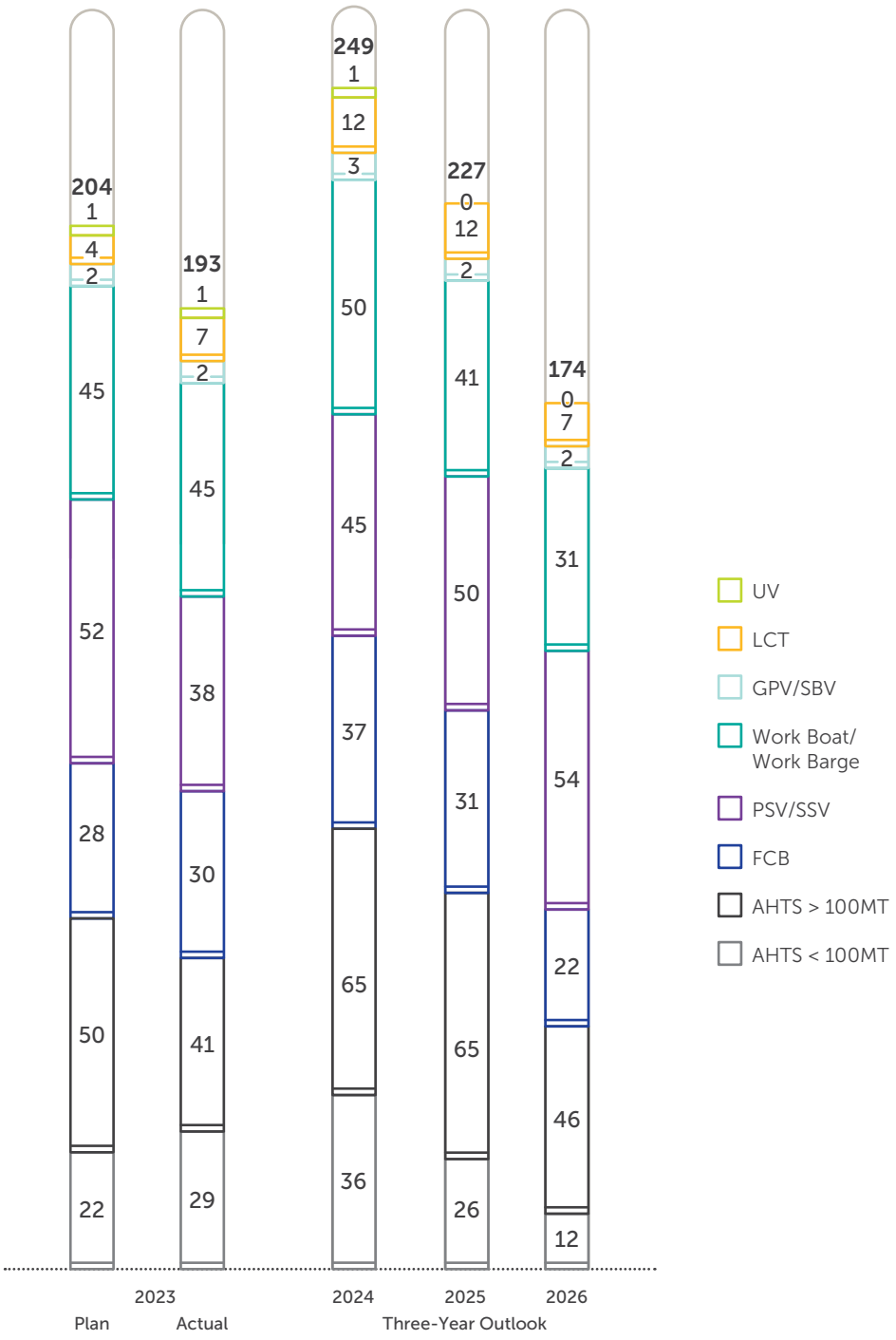


Outlook includes activities which may have been contracted out at the time of reporting

- 2023 utilisation remain as per plan, and demand is projected to remain steady in 2024.
- Outlook for the next three years depicts slightly decreasing demand for vessels supporting production operations from year-to-year due to possible revision in production operations philosophy i.e. unmanned platform.
- OSV owners embarking on fleet renewal should consider fuel efficient technologies including diesel electric with battery (hybrid) vessels to reduce total operational cost for charterers.
- Project Safina Phase Two, which aims to build new offshore support vessels replacing ageing vessels, is expected to commence its contracting exercise in Q3 2024.

D - Logistics

Number of Vessels Supporting Drilling and Projects (Wells)



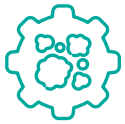
Outlook includes activities which may have been contracted out at the time of reporting

- In 2023, the actual numbers were lower due to a vessel optimisation exercise implemented across multiple projects.
- Outlook for the next three years depicts stable year-to year demand for vessel supporting projects and drilling activities.
- Shortage of Malaysian-Flagged OSV to support Drilling and Projects is expected to continue in the near future.
- This outlook excludes the requirements of vessels for HUC, MCM and Underwater Services activities, EPCC and EPCIC which will be sourced separately.

E - Chemicals

Chemicals are consumed in both upstream and downstream businesses, mainly during maintenance and operation activities.

Commodity Chemicals



Gases

Laboratory Chemicals

Process Chemicals

Chemical Services

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

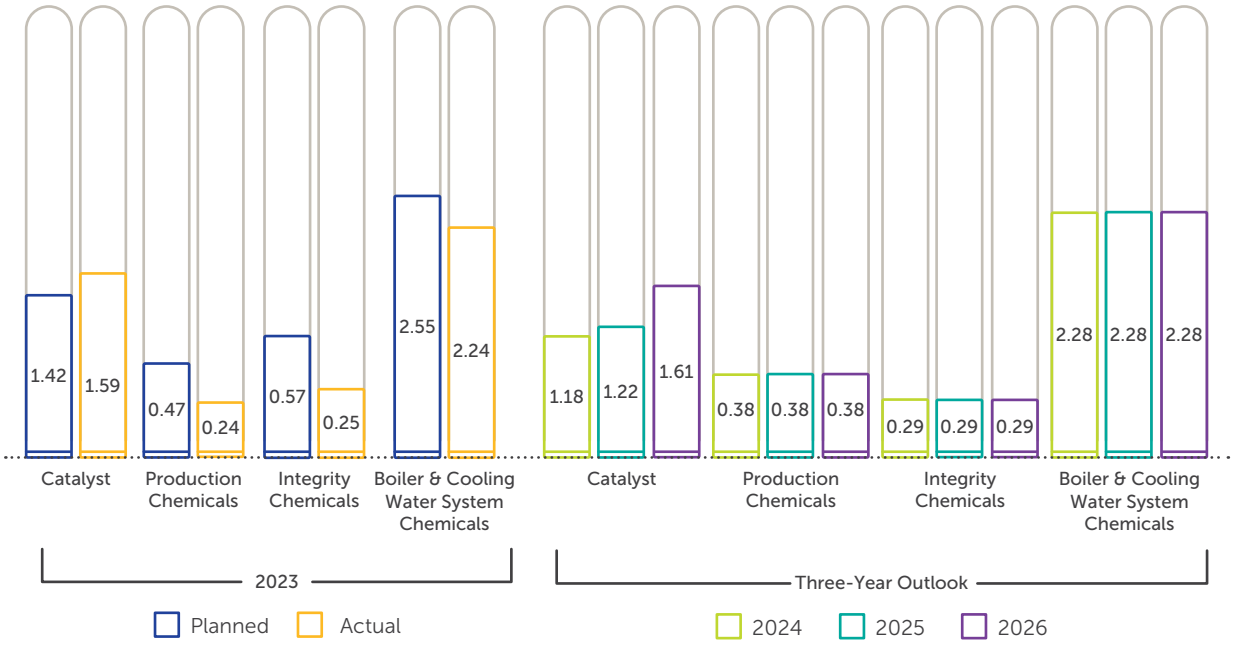
	Process Chemicals	Commodity Chemicals	Chemical Services
Description	Chemicals that are specialised and used to accelerate plant processes, maximise asset reliability and/or improve productivity.	Chemicals that are standardised and commonly used in process and operations.	Provision of manpower, materials, consumables, equipment and facilities necessary for providing chemical services.
Examples	• Additives • Boiler & Cooling Water System chemicals • Catalyst • Corrosion Inhibitors and Biocides • Sulfiding Agent • Production chemicals	• Amines • Base oil • Chloralkali • Glycols • Lubricants • Resins • Solvents	• Catalyst and internal media change out. • Precious metal recovery from spent catalyst. • Other chemical services.

Outlook

- Key elements for chemical prices are raw materials and logistics costs.
- Key drivers for PETRONAS chemicals demand are dependent on ageing assets, turnaround and shutdown (TASD), new projects, new plants onstream, longevity and lifespan of the chemicals, etc.
- Base oil, catalyst, corrosion inhibitors and biocides, glycols, oils and lubricants and production chemicals are the major contributors of chemicals spend.
- Chemicals consumption may not be extensive however it is essential to collaborate with others for chemicals technology advancement, not limited only to product delivery but also in products management, sustainability etc.
- Chemicals and/or chemical services that extend assets longevity, optimise and/or improve reliability and productivity are advantageous.
- More companies are managing sustainability to improve processes, pursue growth and add value to their companies instead of focusing on reputation only. Research shows that companies aligned with sustainability have higher valuation – thus a holistic approach to ESG is not an option in the long run.

E - Chemicals

Number of Chemicals' Purchase Ratio



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

Note: Chemicals' Purchase Ratio is based on the forecasted purchase in comparison to actual purchased in base year 2022.

- All requirements for 2024-2026 have been contracted.
- **Boilers and Cooling Water System:** Continuous requirement for purchases and services related to boiling and cooling water system across PETRONAS Operating Units (OPUs) in ensuring asset integrity/reliability. Consumption of chemicals for water treatment is dependent on the condition of the water quality in boiler and cooling towers.
- **Catalyst:** Continuous requirement for purchases and services related to catalyst and internal media across OPUs in view of multiple change-out or top-up requirements for year 2024 to 2026.
- **Integrity Chemicals (Corrosion Inhibitors and Biocide):** Continuous requirement in ensuring asset integrity/reliability especially of the pipeline, equipment and piping from corrosion/leak as well as additional demand for cooling water system to remove heat from process or equipment.
- **Production Chemicals:** Outlook will depend on projection of crude oil production and alignment towards lower-carbon future and current geopolitical crises that affect the supply and demand.
- PETRONAS is embarking on the use of the e-Chemical Management System (eCHEMS), a PETRONAS HSE Enterprise Digital System on chemical management.