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SOLUTIONS BROCHURE

OFFSHORE ENERGY SOLUTIONS



A PROVEN NAME IN THE OFFSHORE ENERGY MARKET



Boskalis is a leading global dredging and marine expert. Since our founding in 1910, we have established a long track record of demanding projects, which have been achieved successfully through close cooperation with our clients.

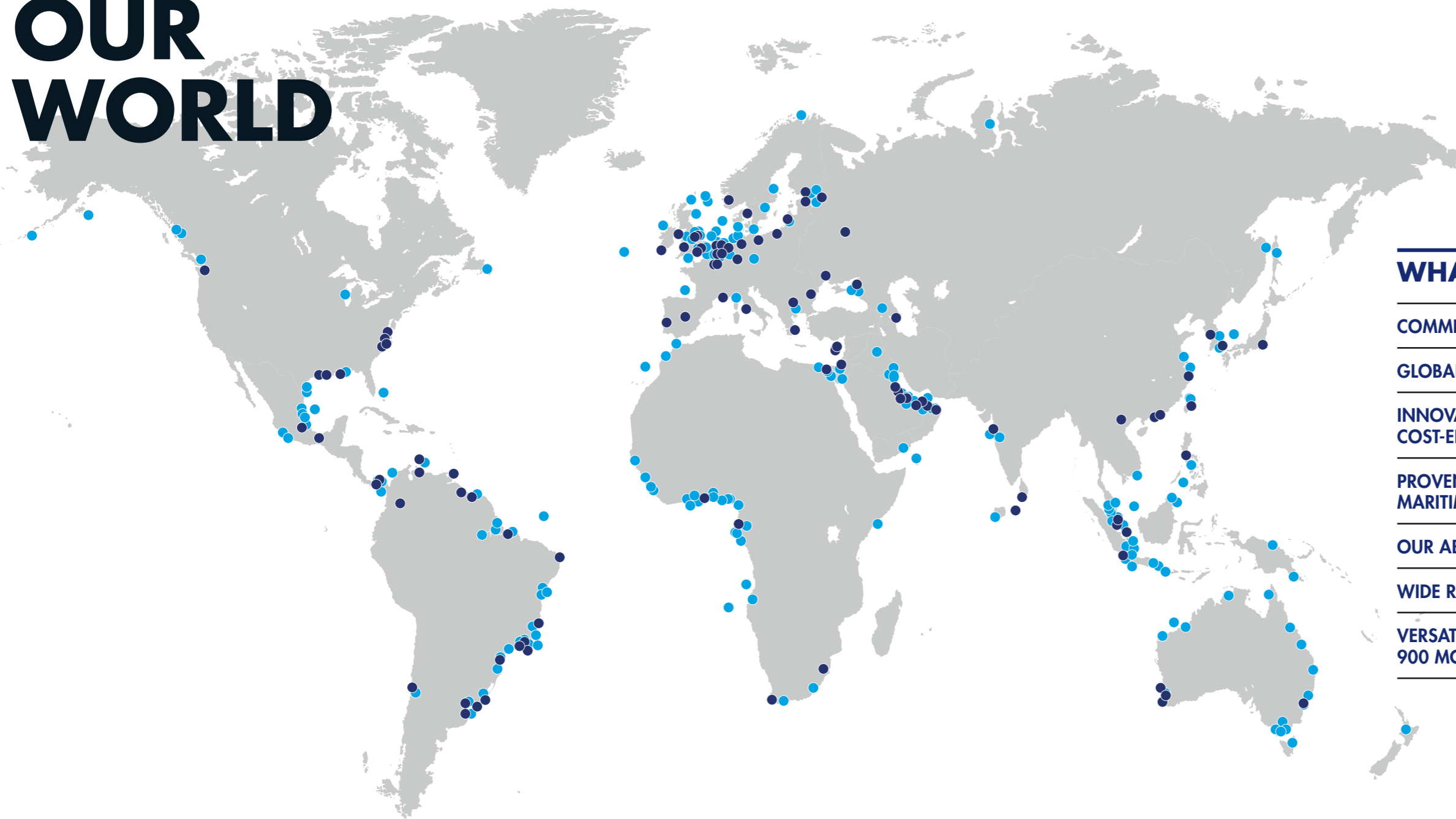
With safety as our core value we provide innovative, sustainable and all-round solutions. Realizing projects in remote locations - with a heightened environmental focus - is one of our specialties. In the international energy sector, including oil and gas and renewable energy, we offer a unique range of offshore services no other company can provide, including but not limited to the development, construction, transport, installation, subsea IRM, and decommissioning of offshore and onshore facilities.

With our integrated capabilities and innovative power, we offer a truly unparalleled combination of people, vessels and activities which enables us to break new grounds and create new horizons for our clients.

SOUTH KOREA – GABON
Transport of the 80,500mt Moho Nord
FPU 'Likouf' onboard the Vanguard.

OUR WORLD

OUR WORLD



WHAT SETS US APART

COMMITTED TO SAFETY

GLOBAL PRESENCE AND 11,700 EXPERTS

INNOVATIVE, SUSTAINABLE AND COST-EFFECTIVE SOLUTIONS

PROVEN TRACK RECORD IN SENSITIVE MARITIME ENVIRONMENTS

OUR ABILITY TO MANAGE COMPLEXITY

WIDE RANGE OF INTEGRATED SERVICES

VERSATILE FLEET OF MORE THAN 900 MODERN VESSELS

- Offices
- Projects & operations

PROVIDING SOLUTIONS FOR THE OFFSHORE ENERGY MARKET

OIL & GAS EXPLORATION



OFFSHORE DRILLING RIGS

OIL & GAS PRODUCTION – SHALLOW WATER



FIXED PRODUCTION STRUCTURES

OIL & GAS PRODUCTION – DEEP WATER



FLOATING PRODUCTION STRUCTURES

OIL & GAS REFINING AND PROCESSING



ONSHORE PLANTS & TERMINALS

RENEWABLES



OFFSHORE WIND FARMS

OFFSHORE ENERGY SOLUTIONS

OFFSHORE ENERGY SOLUTIONS

SAFE AND SUSTAINABLE

Our work goes beyond the provision of services. With safety as our core value we have developed a strict safety culture without any compromise. Our commitment is an incident-free working environment. Therefore Boskalis created the NINA safety program. NINA (No Injuries, No Accidents) sets clear values and rules, which explain what we expect from our people with regard to their safety behavior. Our program meets and exceeds the industry standards.

NINA makes people aware of their own responsibility regarding safety and encourages them to take action if operations are unsafe and approach others if they are at risk. NINA is embedded in our organizational systems and managed by leading indicators.

Boskalis is known for its dedication to the environment. Wherever possible, we work to mitigate environmental concerns. With our 'Building with Nature' initiative we encourage stakeholders like oil companies, EPIC contractors, authorities, universities, and NGOs to join forces together to research, understand and reduce impact of offshore and marine operations on the environment.

STANDARDS OF EXCELLENCE

- ISO 14001 International environmental quality
- OHSAS 18001 Occupational health and safety
- ISO 9001 Business management



SAFETY STATEMENT

Our people are our most valuable assets, making safety a core value. Our goal is: No Injuries No Accidents. This is embedded in our company's culture and supported through Values and Rules. All employees, including our sub-contractors, are expected to take these values and rules to heart.

VALUES

- I AM RESPONSIBLE FOR MY OWN SAFETY
- I APPROACH OTHERS ABOUT WORKING SAFELY
- I TAKE ACTION IN CASE OF UNSAFE OPERATIONS IF NECESSARY, I WILL STOP THE WORK
- I ACCEPT FEEDBACK ABOUT MY SAFETY BEHAVIOUR REGARDLESS OF RANK AND POSITION
- I REPORT ALL INCIDENTS, INCLUDING NEAR-MISSES, TO INFORM OTHERS AND BUILD ON LESSONS LEARNED

RULES

- PREPARE A RISK ASSESSMENT FOR EACH PROJECT, VESSEL OR LOCATION
- OBTAIN A PERMIT TO WORK FOR DEFINED HIGH-RISK ACTIVITIES
- MAKE A JOB HAZARD ANALYSIS FOR HAZARDOUS NON-ROUTINE ACTIVITIES
- BE INFORMED ABOUT RISK & CONTROL MEASURES
- BE FIT FOR DUTY AND WEAR THE PPE REQUIRED

QATAR
Air diver pre-dive check for maintenance work at a single point mooring buoy.



A TEAM BUILT AROUND YOUR NEEDS



'BOSKALIS HAS THE RESOURCES TO BUILD A GLOBAL TEAM AROUND THE CHALLENGES YOU FACE'



With our commitment to safety, professionalism, entrepreneurship and drive, our 11,700 experts are focused on achieving the best result for our clients.

In addition to a dedicated crew, you can count on our highly skilled professionals from a wide range of disciplines. These include hydraulic, transport, marine & civil engineering, ecology, morphology, geology, geophysics and marine biology experts as well as surveyors, planners, designers, construction and decommissioning specialists.

As your partner you can rely on our expertise, experience and commitment to execute operations safely, on time and within budget.

OUR ABILITY TO MANAGE COMPLEXITY



GERMAN SECTOR, NORTH SEA
The Expedition, Sherpa, Alpine and Union Sovereign are installing the world's biggest and most powerful offshore converter platform (DoWin beta) on behalf of TenneT TSO, while the Rockpiper arrived to start the solid ballast operations.

'INVOLVE US EARLY ON AND WE CAN SIGNIFICANTLY IMPROVE YOUR PROCESSES, MITIGATE RISKS AND MINIMIZE UNCERTAINTIES'

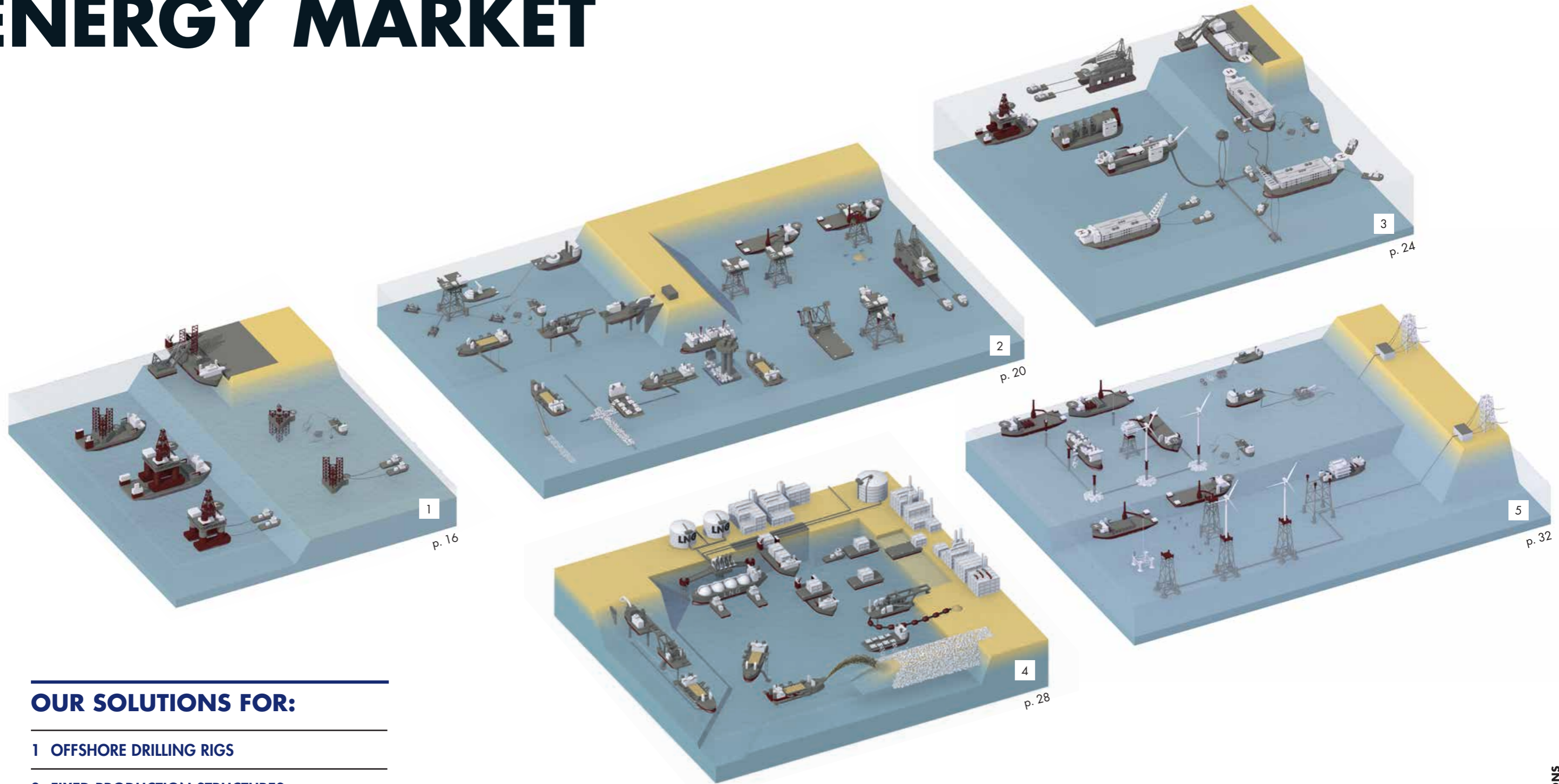
- In the **pre-design** phase we can help determine the feasibility of your business case.
- During the **design phase** we will create a solution that fits your requirements.
- As your **main contractor**, we can streamline execution by managing sub-contractors and communicating with stakeholders.
- We can provide cost-effective solutions by offering reliable (long-term) **IRM campaigns**.
- At the end of the lifecycle we are able to reduce the total cost of ownership and limit the environmental footprint through our **decommissioning** services.



top
BRAZIL – SINGAPORE
Transport of two semi-submersible drilling rigs onboard the Vanguard. The clearance between the two cargoes, while loading onboard the vessel, was less than 25 feet.

bottom
DANISH SECTOR, NORTH SEA DP3
Diving Support Vessel working on an extensive IRM Diving Campaign at the Tyra East platform for Maersk Oil.

OUR SOLUTIONS FOR THE OFFSHORE ENERGY MARKET



OUR SOLUTIONS FOR:

- 1 OFFSHORE DRILLING RIGS
- 2 FIXED PRODUCTION STRUCTURES
- 3 FLOATING PRODUCTION STRUCTURES
- 4 ONSHORE PLANTS AND TERMINALS
- 5 OFFSHORE WIND FARMS

OFFSHORE DRILLING RIGS



left
MAASVLAKTE 2, THE NETHERLANDS
The Jack-Up Rig Ensco 122 onboard the Forte.

middle
UNITED STATES – SINGAPORE
The Summit towing the semi-submersible drilling rig for ultra-deep waters, Atwood Condor.

right
GRAND HARBOUR, MALTA
Dry-docking services for the Noble Paul Romano onboard the Vanguard.



Safe ocean transport and on-time delivery is of the essence when it comes to moving offshore drilling rigs from one location to another around the world. With our fleet, together with our in-house engineering and project management capabilities, we can serve our clients with a full range of transport and marine services.

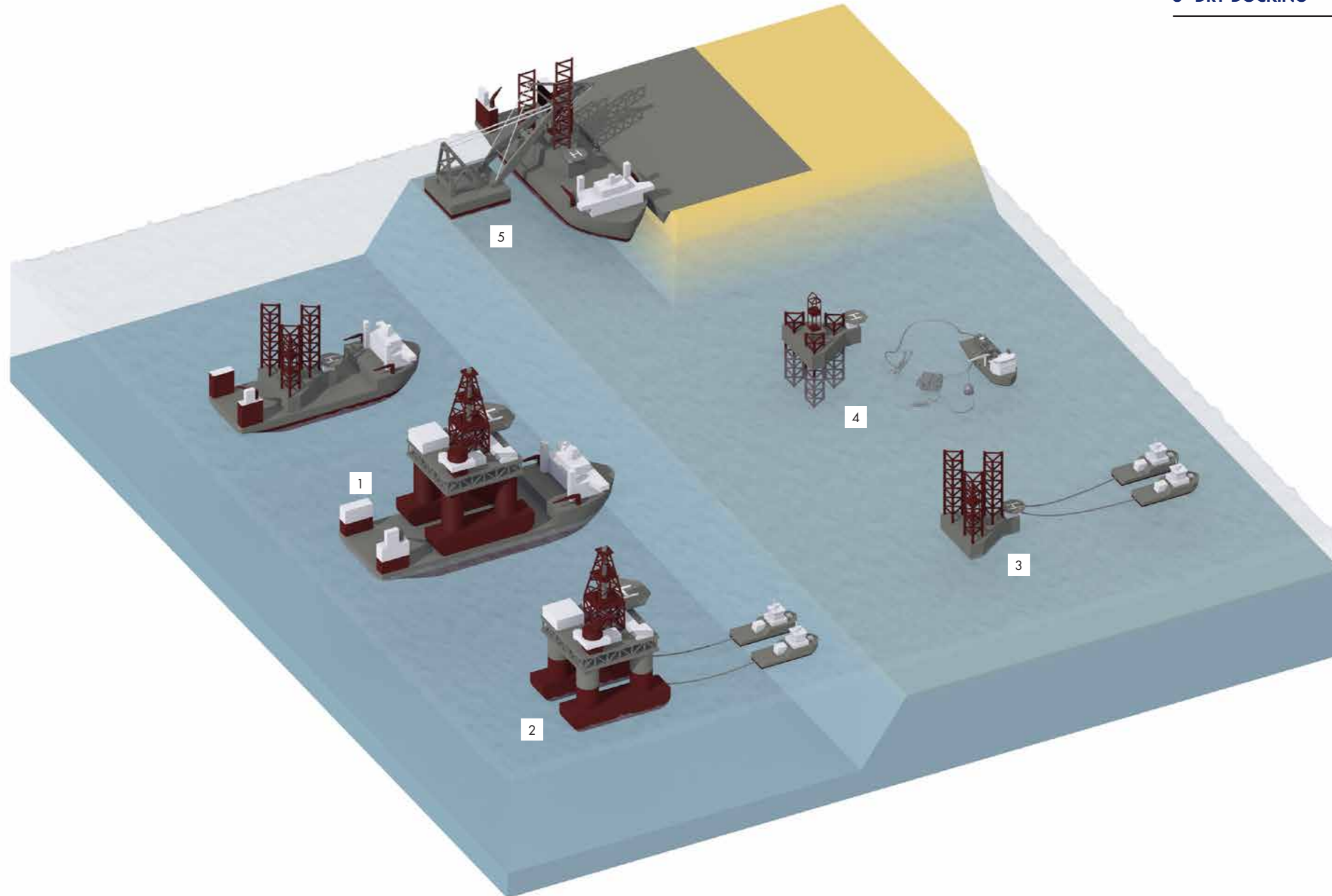
The sheer size and versatility of our fleet of semi-submersible, heavy marine transport vessels and ocean going tugs means we are able to serve clients to relocate their offshore drilling rigs anywhere in the world. Taking the size and features of the rig into account, we can offer the most flexible and effective transport solution.

Our anchor handling tugs (AHT) can provide solutions for short distance towage and mooring & hook-up services for semi-submersible drilling rigs. With our sheerlegs we can offer assistance with rig modifications.

A safe and reliable operation of your offshore drilling facility is essential. With our diving and Remotely Operated Vehicle (ROV) capabilities we offer under water inspection in lieu of dry-docking (UWILD) and subsea survey services. With our semi-submersible heavy lift vessels we can offer a unique dry-docking solution.

CHINA - BRAZIL
The semi-submersible drilling rig SS Amazonia onboard the Trustee. Draft restrictions required removing the thrusters in order to transport the rig.

OFFSHORE DRILLING RIGS



OUR SOLUTIONS

1 DRY TRANSPORT

2 OCEAN TOWAGE

3 SHORT DISTANCE TOWAGE

4 SUBSEA IRM & UWILD

5 DRY-DOCKING

FIXED PRODUCTION STRUCTURES

The transport and installation (T&I) of fixed offshore production structures present challenges because of the hostile marine environments and adverse soil conditions involved. Planning, engineering, construction and installation of offshore platforms tends to involve numerous disciplines and subcontractors. If not managed properly this results in complex interfaces with the associated cost, time and schedule risks. Being involved at an early stage we can offer integrated T&I services by streamlining subcontractors and eliminating interfaces.

Boskalis offers a total marine scope for the T&I of fixed production facilities. We have in-house engineering, procurement, project management and SHE-Q services. Using the versatile fleet of semi-submersible, heavy marine transport vessels and AHTs, sheerlegs, barges, fallpipe, cable laying, construction and diving support vessels, as well as our 3,000t DP-2 crane vessels, we can offer fully integrated T&I solutions. This includes seabed preparation, load-out at the fabrication site, transport to the field, lifting and launching jackets and installation of topsides. In addition, we offer services for subsea infield installation of umbilicals, floating hoses, power cables, and subsea infrastructure pipeline end manifolds (PEM).

Boskalis has a long track record with sea to shore landfall construction and trenching for offshore pipelines. With our fallpipe vessels we can stabilize offshore pipelines or cables. We are experienced in correcting free spans and the reduction of pipe and cable stresses.

A safe and reliable operation of your offshore production facility is essential. With our diving support vessels we offer IRM services and light construction work by diving and ROV interventions. We have an in-house department dedicated to inspection, repair and maintenance campaigns.

Through our decommissioning services we reduce the total cost of ownership and limit your environmental footprint. Our services include recycling and disposal of structure parts and cleaning (contaminated) tailings in compliance with the strictest environmental standards.

NAM CON SON BASIN, VIETNAM
Installation of the 4,200mt Thien Ung BK-TNG topside by sheerleg Asian Hercules III.

VLISSINGEN, THE NETHERLANDS
The Expedition towing a barge loaded with a new-built jacket for the Statoil-operated Gina Krog platform.



BULL ARM, NEWFOUNDLAND
The load-out of the 42,000mt Hebron Utilities Process Module from the Blue Marlin



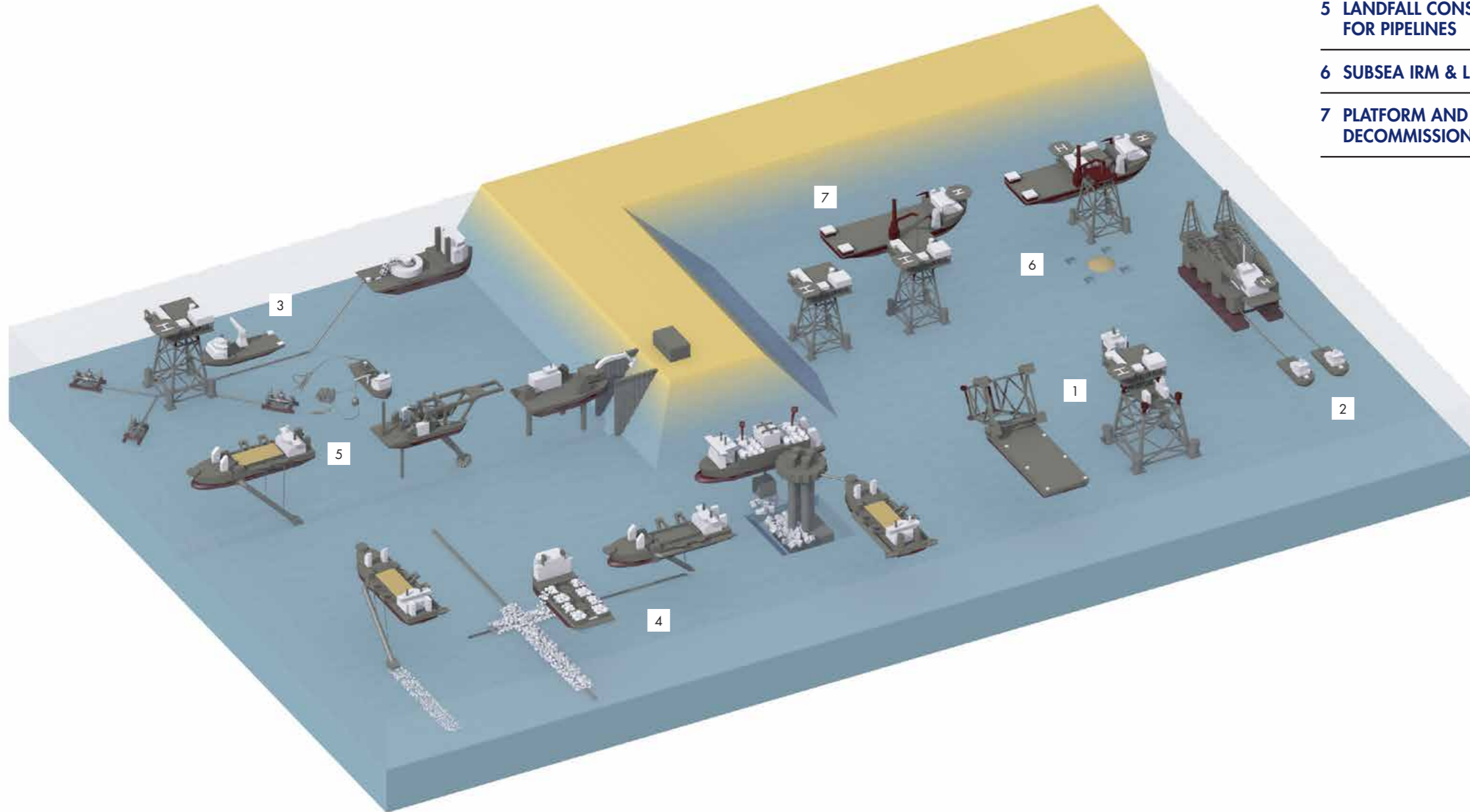
DE RUYTER FIELD, THE NETHERLANDS
Seabed preparation works, with the Trailing Suction Hopper Dredger the Oranje, for pipeline installation and burial.



NORTH SEA
Taktif 4 and 7 taking part in the preparation and removal of the QAB platforms from the Dutch Continental Shelf.



FIXED PRODUCTION STRUCTURES



OUR SOLUTIONS

- 1 PLATFORM T&I
- 2 MARINE SUPPORT OF CONSTRUCTION VESSELS
- 3 INFIELD FLOWLINE, UMBILICAL, POWER CABLE AND SUBSEA INFRASTRUCTURE (PLEM) INSTALLATION
- 4 SEABED INTERVENTION & SUBSEA ROCK INSTALLATION
- 5 LANDFALL CONSTRUCTION AND TRENCHING FOR PIPELINES
- 6 SUBSEA IRM & LIGHT CONSTRUCTION WORK
- 7 PLATFORM AND SUBSEA STRUCTURE DECOMMISSIONING

FLOATING PRODUCTION STRUCTURES

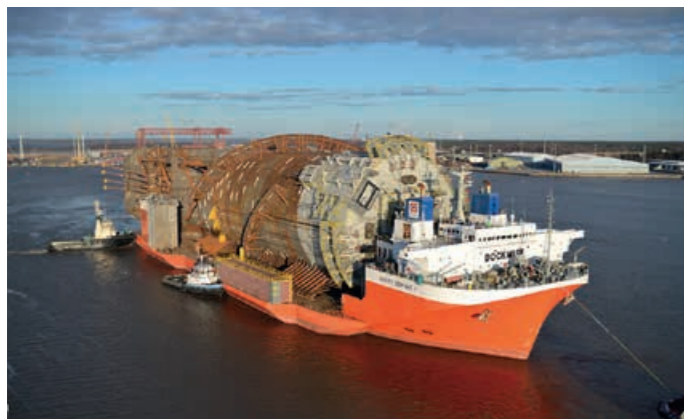


SOUTH KOREA – NORWAY
Transport of the Goliat FPSO, with a diameter of 107 meters, onboard the Vanguard.

The T&I of floating production facilities such as TLPs, semis, SPARs, FPSOs or FLNGs often present challenges due to their dimensions and complexity, as well as the planning and scheduling. The installation is often the critical stage in the realization of the total project.

With our long-standing and reliable track record we offer the total marine scope for the T&I of floating production structures. With our semi-submersible heavy marine transport vessels, ocean going tugs and AHTs, sheerlegs, construction and diving support vessels we offer fully integrated T&I solutions. This includes transport to the field, heading control & positioning, mooring of the FPU, and hook-up of risers and turrets.

A safe and reliable operation of your offshore production facility is essential. With our diving support vessels we offer UWILD, hook-up, and IRM services by diving and ROVs. We have an in-house department dedicated to IRM campaigns. Additionally, with our semi-submersible heavy lift vessels we can offer dry-docking of FPUs.

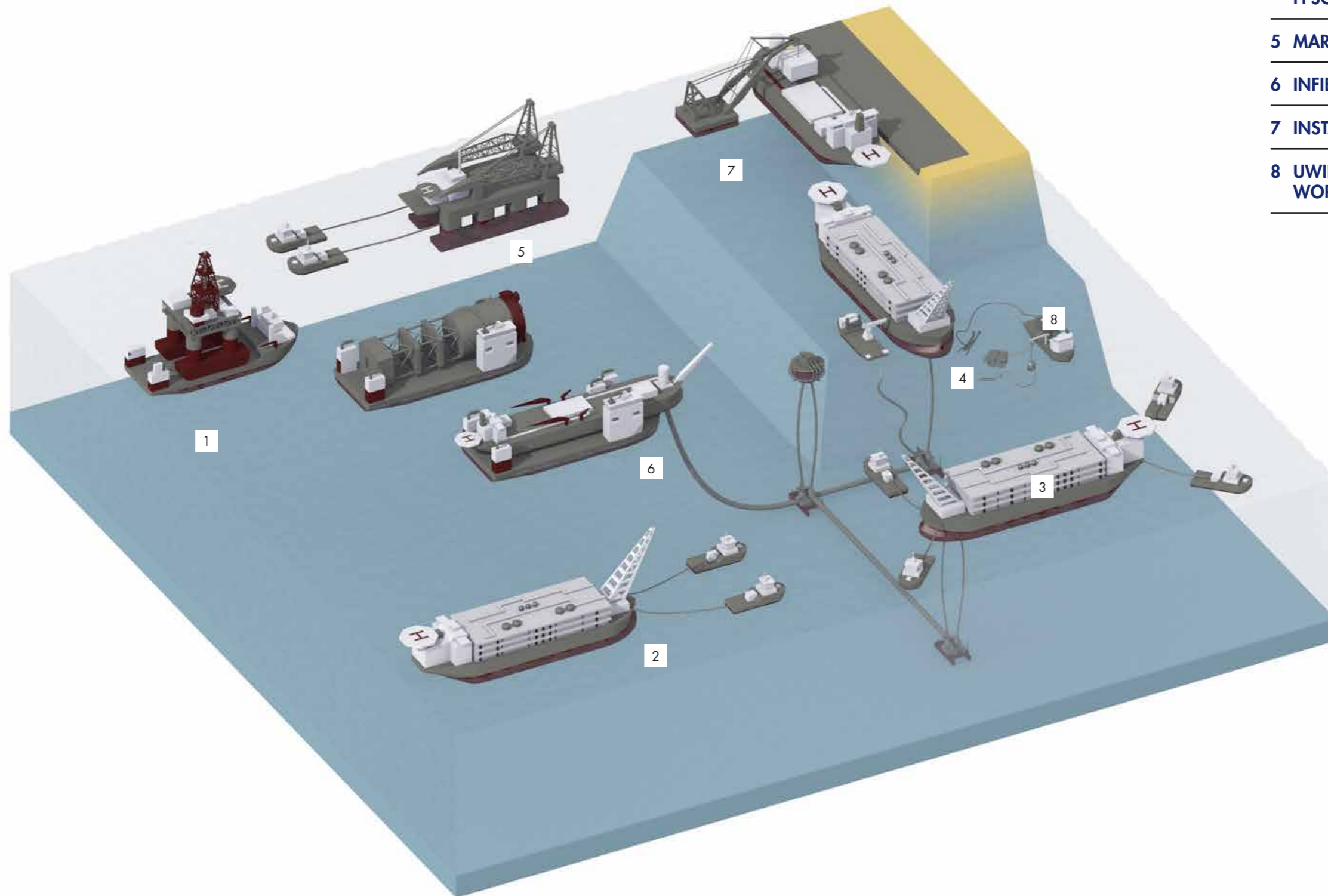


left
FINLAND – UNITED STATES
Transport of the 184m (605ft) long and 34m (110ft) wide Lucius spar onboard the Mighty Servant 1. The 23,000mt weighing truss spar was loaded by means of a stern side skid-on operation.

middle
SINGAPORE
Floating sheerleg Asian Hercules loading a module on the FPSO Cidade de Anchieta.

right
SOUTH KOREA – NORWAY
Three tugs of Fairmount Marine towing the Petrojarl Knarr FPSO.

FLOATING PRODUCTION STRUCTURES



OUR SOLUTIONS

- 1 DRY TRANSPORT
- 2 OCEAN TOWAGE
- 3 MOORING INSTALLATION, STATION KEEPING & HOOK-UP SERVICES
- 4 RISER AND TURRET INSTALLATION OF FPSOS/FLNGS
- 5 MARINE SUPPORT OF CONSTRUCTION VESSELS
- 6 INFIELD DRY-DOCKING
- 7 INSTALLATION OF MODULES
- 8 UWILD, SUBSEA IRM & LIGHT CONSTRUCTION WORK

ONSHORE PLANTS AND TERMINALS



DARWIN, AUSTRALIA
Logistical management services for the Ichthys LNG project, including 19 transports of modules with a.o. the Forte from different fabrication yards to the LNG plant in Darwin.



left
TAIWAN
Sea to shore landfall construction of 130km gas pipeline.

middle
BARROW ISLAND, AUSTRALIA
Land reclamation and harbor construction for the Gorgon LNG project.

right
ROTTERDAM, THE NETHERLANDS
Escort and birthing of an LNG carrier by Smit tugs.

Boskalis has an unrivaled track record of providing innovative solutions for onshore processing plant and terminal developments. A (pre) feasibility and design study for an oil and LNG import/export facility involves evaluating a complex matrix of interrelated parameters and uncertainties. During the Pre Front-End Engineering Design (Pre-FEED) phase we can test different concepts you may have regarding feasibility of designs for both cargos and material offloading facility (MOF) development. Once the Front-End Engineering Design (FEED) phase is underway we collaborate with you to develop a strategy for the MOF development and the delivery of modules from fabrication yards to the offloading facility.

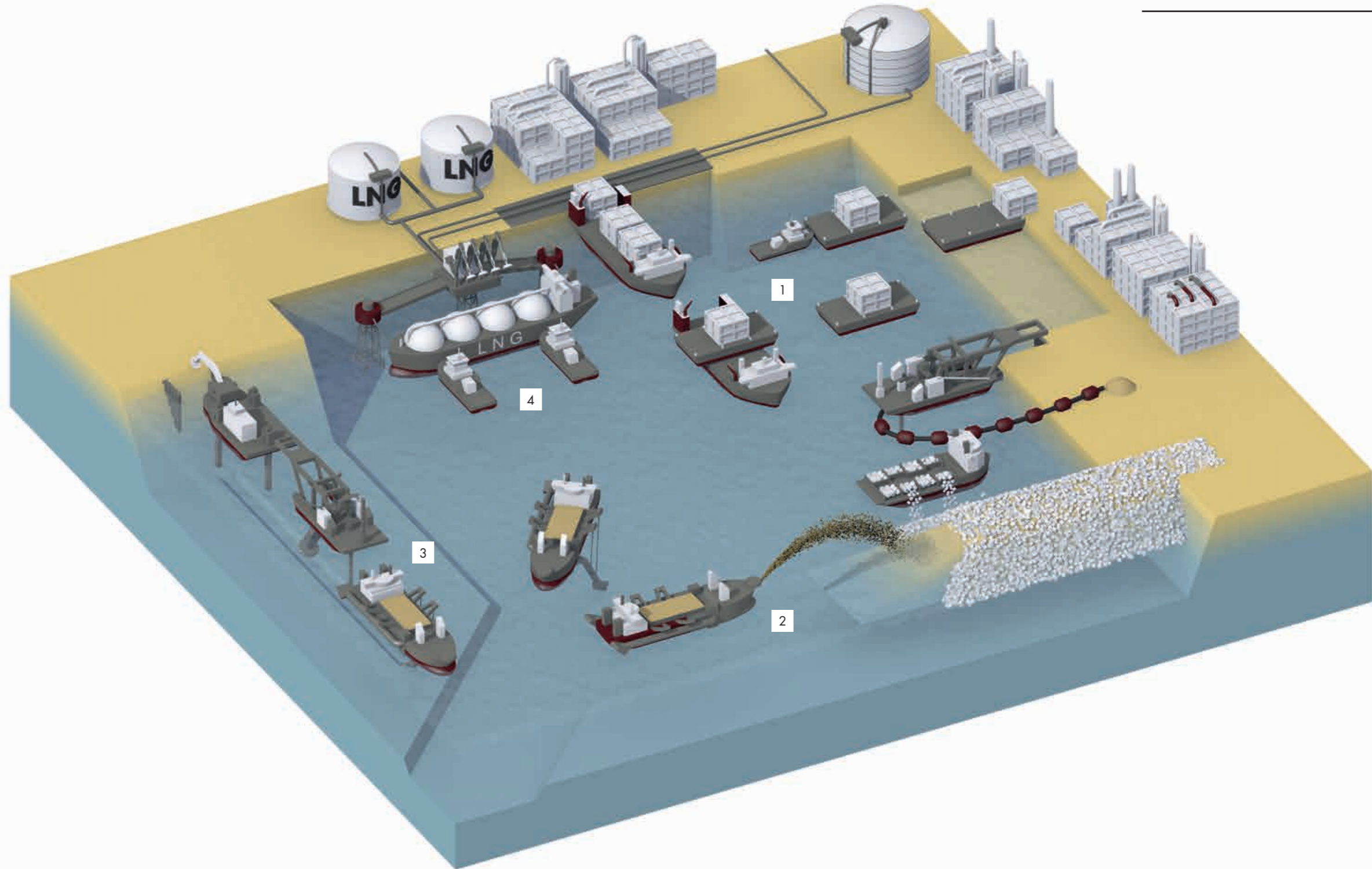
The complexity and size of these projects mean that numerous disciplines and contractors are involved. In addition, the time-consuming nature of the design and planning phases mean that the construction phase often becomes time-critical. We add value by developing innovative, best-for project solutions and by optimizing the port construction and development process through (parallel) design, permitting and execution.

We plan, manage and execute the transport of modules from multiple fabrication yards to the MOF under one single contract, utilizing our full breadth of heavy marine transport assets, ranging from the semi-submersible heavy transport vessels to the Giant barges. Our turnkey logistical management solution supports your project by providing schedule certainty, flexibility and continuous optimization of the module transportation with one single interface.

Boskalis has a long track record with sea to shore landfall construction, trenching for offshore pipelines, land reclamation, and breakwater construction. With fallpipe vessels we can stabilize offshore pipelines or cables. We are experienced in correcting free spans and the reduction of pipe and cable stresses.

Once your facility is operational we can provide cost-effective solutions by offering reliable (longterm) terminal and towage services through Smit Lamnalco.

ONSHORE PLANTS AND TERMINALS



OUR SOLUTIONS

- 1 LOGISTICAL MANAGEMENT OF ONSHORE MODULES
- 2 LAND RECLAMATION & PORT CONSTRUCTION
- 3 LANDFALL CONSTRUCTION & TRENCHING FOR PIPELINES
- 4 TERMINAL SERVICES

OFFSHORE WIND FARMS

BALTIC SEA, GERMANY
Floating sheerleg Taklift 4 transporting a pre-piled jacket for the Wiking offshore wind farm, towed by the Union Wrestler.



top
WEST OF DUDDON SANDS, UNITED KINGDOM
Scour protection of wind turbine foundation with fallpipe vessel the Seahorse.

middle
BALTIC SEA, GERMANY
Pile installation by the Boskalis Giant 7 using a self-levelling pre-piling template.

bottom
LUCHTERDUINEN, THE NETHERLANDS
Export cable laying and shore approach with the Trenchformer.



Planning and installation of offshore wind farms can be challenging because of harsh environmental conditions, heterogeneous soil profiles and scheduling risks.

Seabed preparation, installation of foundations and offshore high voltage converter stations, as well as survey and removal of unexploded ordnance from the seabed and the installation of infield and export cables tends to involve numerous disciplines, contractors and suppliers. When properly managed this will result in simplified interfaces and effective solutions in line with your cost and time expectations.

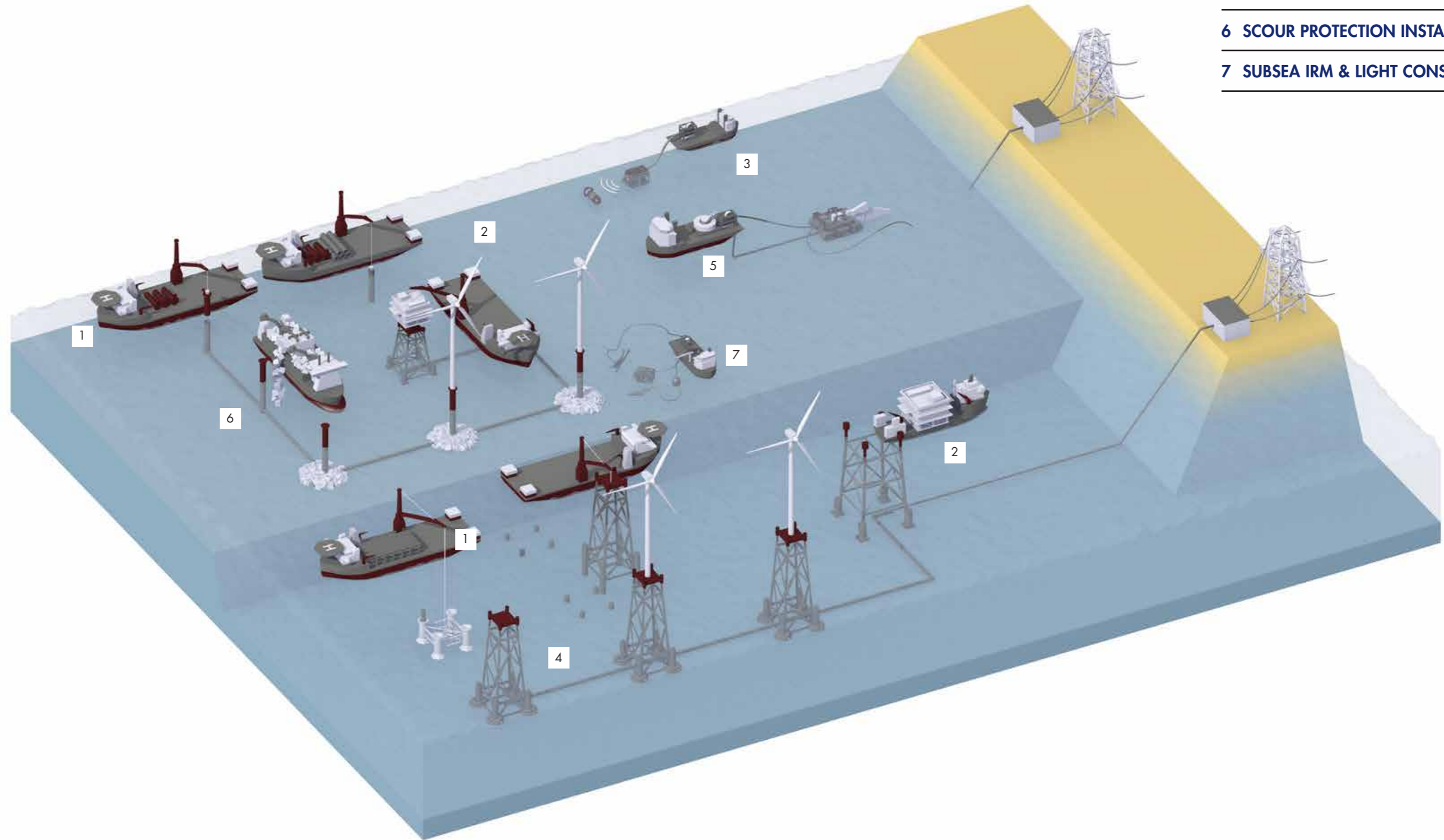
The alignment between our in-house environmental and geotechnical knowledge, marine engineering capabilities, project management and procurement, helps us develop cost-effective project solutions. Combining this with our cable-laying capabilities enables us to offer turnkey solutions for the development of offshore wind farms.

Our versatile fleet of vessels and our fleet management capabilities allow us to select the most effective installation spreads that will bring T&I activities well within project timelines and budgets.

During operation we can offer long-term IRM services by diving and / or ROVs. We have an in-house department dedicated to inspection campaigns.

With our successful track record of installing offshore wind farms in Northwest Europe you can rely on our commitment to execute efficient, safe and reliable operations.

OFFSHORE WIND FARMS



OUR SOLUTIONS

- 1 FOUNDATION T&I
- 2 CONVERTER STATION T&I
- 3 UNEXPLODED ORDNANCE SURVEY AND REMOVAL
- 4 INFIELD POWER CABLE LAYING
- 5 EXPORT POWER CABLE LAYING
- 6 SCOUR PROTECTION INSTALLATION
- 7 SUBSEA IRM & LIGHT CONSTRUCTION WORK

OUR OFFSHORE FLEET



Boskalis operates one of the largest fleet of specialized offshore vessels and barges in the world. We serve a variety of projects from ocean transport of a drilling rig to the subsea installation of an offshore production platform or an offshore wind farm. Due to the requirements of each individual project and the solution engineered, the fleet is regarded as one of the most versatile to serve a variety of different concepts even within a single project.

The Vanguard is the latest state-of-the-art semi-submersible heavy transport vessel. Due to her 'bowless' design she can accommodate overhang on both bow and stern and has a deadweight capacity of 117,000 ton.

The Ndurance and Ndeavor are multi-purpose vessels and can easily be adjusted for cable laying, deep-sea seabed excavation, subsea rock placement or diving support. The vessels are DP2 operated and designed for beaching. The Rockpiper and Seahorse fallpipe vessels can accurately position and place rocks to depths up to 1,500 meters.

The Constructor, Komodo, Atlantis, Da Vinci and Protea are DP2 / DP3 dynamically positioned diving support vessels, which are fully equipped with AIR/SAT diving and ROVs to perform subsea construction activities, as well as to support IRM contracts for offshore and subsea structures.

Our long distance ocean going AHTs, with 205 tonnes bollard pull, are designed to safely handle heavy and difficult assignments. AHTs and other specialist transport vessels, like the Union Manta or the Nicobar are primarily deployed to support offshore installation activities.

Floating sheerlegs offer cost-effective and flexible solutions for heavy lift projects. Our largest sheerleg, the Asian Hercules III, offers a lifting capacity up to 5,000 ton. We have a broad range of non-self propelled barges and pontoons. The Giant 6, our largest semi-submersible barge, has a deadweight capacity of 21,000 ton.

With the conversion of one of our semi-submersible heavy transport vessels our fleet has been expanded with a unique 3,000t capacity revolving crane vessel (Bokalift 1). With a deck space of 7,000 m², the vessel is able to load multiple structures, resulting in fewer transits from/to the fabrication and/or disposal yards. Its DP-2 capabilities prevent loss time for anchor spread deployment. The Bokalift 1 is able to work in harsh environments, can accommodate 150 persons and has a helicopter deck for offshore transfers.

OUR OFFSHORE FLEET



HEAVY TRANSPORT VESSELS

(Semi-submersible, up to 117,000 DWT)

Vanguard, Blue Marlin, White Marlin, Black Marlin, Mighty Servant 1, Mighty Servant 3, Transshelf, Transporter, Target, Treasure, Talisman, Trustee, Triumph, Swan, Swift, Teal, Forte, Fjord, Fjell

MULTI-PURPOSE VESSELS

(DP2, cable laying, construction support, diving support, subsea rock installation, up to 7,500 DWT)

Ndurance
Ndeavor
Spirit



FALLPIPE VESSELS

(Up to 26,000 DWT)

Rockpiper
Seahorse



DIVING SUPPORT VESSELS

(DP2, DP3, AIR, SAT systems installed)

DP3 DSV Protea (AIR diving / ROV)
DP2 DSV Constructor (AIR/SAT diving / ROV)
DP2 Komodo (AIR/SAT diving / ROV)
DP2 Kamara (ROV)
DP2 Atlantis (AIR/SAT diving / ROV)
DP2 Da Vinci (AIR/SAT diving / ROV)



OFFSHORE SUPPORT VESSELS

(DP2, ROV support)

Union Manta, Kamara, Nicobar,
Union Sovereign

ANCHOR HANDLING & OCEAN TOWAGE TUGS

(Anchor Handling Tug (Supply) Vessels > 150 T BP)

Union Manta, Union Princess, Union Sovereign, Union Bear, Union Lynx

(Anchor Handling Tug Vessels, 150 T BP)

Nicobar, Seraya, Sentosa, Angola, Union Wrestler, Union Warrior, Union Fighter, Union Boxer, Kamara, Komodo, Union Sapphire, Union Diamond
(Ocean Towage Tugs up to 205 T BP)
Sherpa, Glacier, Summit, Expedition, Alpine



HEAVY LIFT VESSELS

(Lifting capacity up to 5,000 T)

BOKALIFT 1, Taklift 4, Taklift 6 and Taklift 7
Asian Hercules, Asian Hercules II and Asian Hercules III

SEMI-SUBMERSIBLE AND BALLASTABLE BARGES

Semi-submersible Giant 5 and Giant 6 (up to 21,000 DWT)

Flat top Barges (up to 14,000 DWT)

Floating Super Pallets (up to 5,000 DWT)



LET'S TALK



MALAMPAYA FIELD, PHILIPPINES
Seabed preparation works with the Ndeavor for the installation of the Depletion Compression Platform in Malampaya gas field.

'TELL US
ABOUT YOUR
CHALLENGES'

For over 100 years, Boskalis has helped clients meet some of the toughest challenges. How can we help you?

Go to www.boskalis.com/offshore and give us a call.