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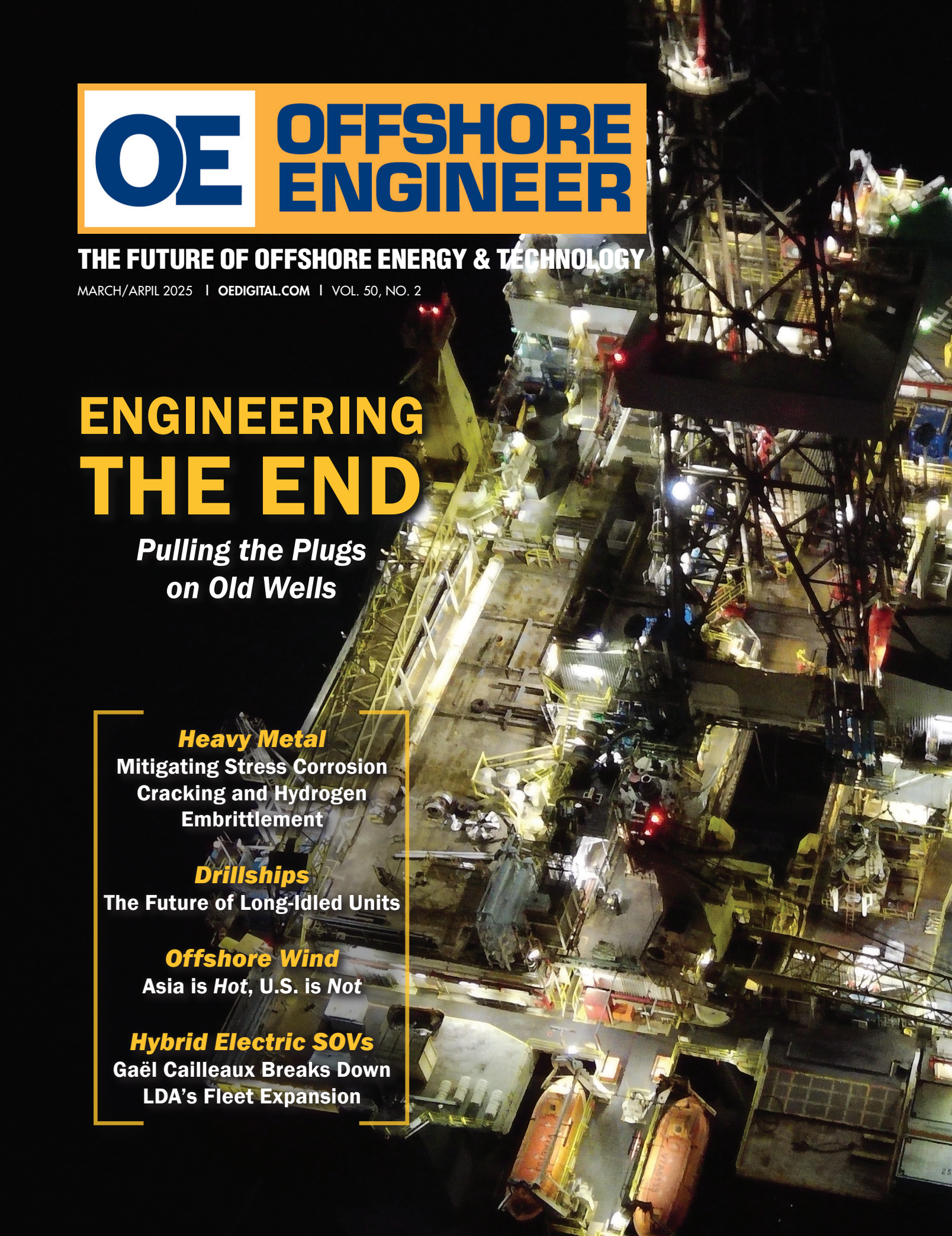

ENGINEERING THE END

Pulling the Plugs on Old Wells

Heavy Metal
Mitigating Stress Corrosion Cracking and Hydrogen Embrittlement

Drillships
The Future of Long-Idled Units

Offshore Wind
Asia is *Hot*, U.S. is *Not*

Hybrid Electric SOVs
Gaël Cailleaux Breaks Down LDA's Fleet Expansion

Breaking New Ground in Sustainability

ABS has a long history of supporting Floating Production Storage and Offloading (FPSO) projects, having classed the first FPSO vessel in U.S. waters in 1978. Today, ABS continues to lead the industry by providing guidance on safety and innovation, leveraging new technology to support larger, more complex FPSOs for sustainable operations globally.

The ABS-classed *Liza Unity* has set a new benchmark in sustainability by becoming the first FPSO in the world to receive the SUSTAIN-2 notation from ABS. This notation represents the next level in ABS's vessel sustainability program, designed to help fleets meet the rigorous environmental and human elements requirements outlined in the United Nations' Sustainable Development Goals (SDGs).

Having been the first FPSO to achieve the SUSTAIN-1 notation in 2021, which recognized critical sustainability aspects such as pollution control and waste management, the *Liza Unity* has now earned SUSTAIN-2. This new recognition highlights additional attributes, including the usage of low-carbon fuels and human-centered design.

The *Liza Unity* FPSO is owned by ExxonMobil Guyana Limited and operated by SBM Offshore. It was the second FPSO built for ExxonMobil's Stabroek Block development in Guyana. It was also the first FPSO delivered under SBM Offshore's Fast4Ward® program and has an installed production capacity to produce approximately 220,000 barrels of oil per day.

With a rich history of supporting FPSO projects, ABS continues to lead the industry by providing guidance on safety and innovation, supporting larger, more complex FPSOs for sustainable operations globally.

Contact the ABS team by sending an email to **globaloffshore@eagle.org** or by visiting **www.eagle.org/offshore**.

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"ABS continues to work closely with our clients to develop innovative solutions for new market challenges. With the award of SUSTAIN-2, we are proud to continue to support SBM Offshore and their comprehensive strategy to address sustainability considerations."

Miguel Hernandez
Senior Vice President,
Global Offshore,
ABS

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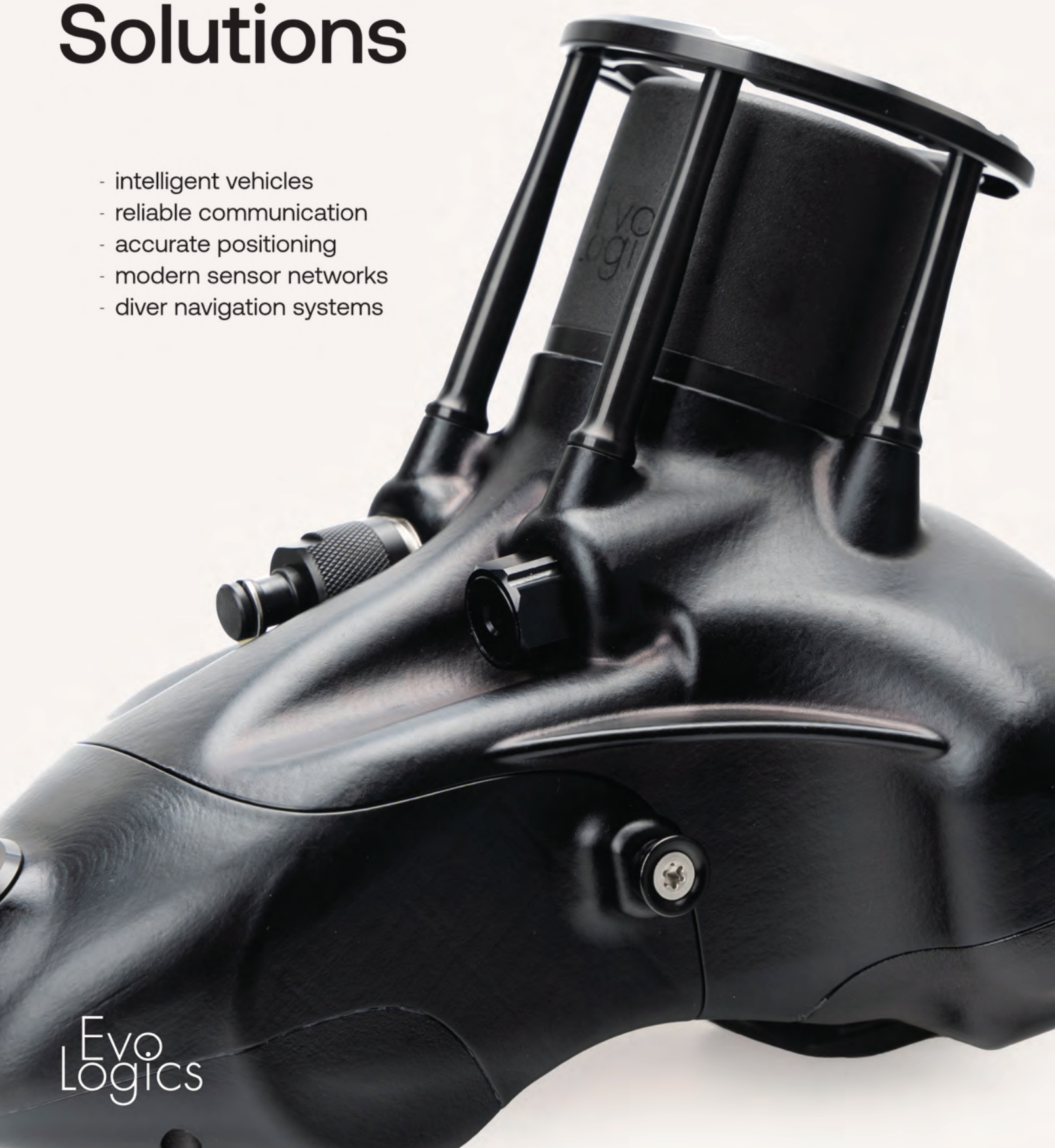

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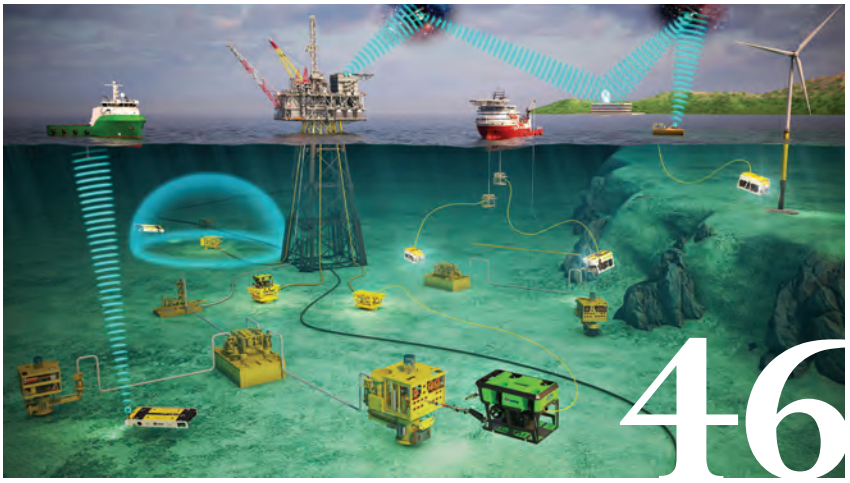

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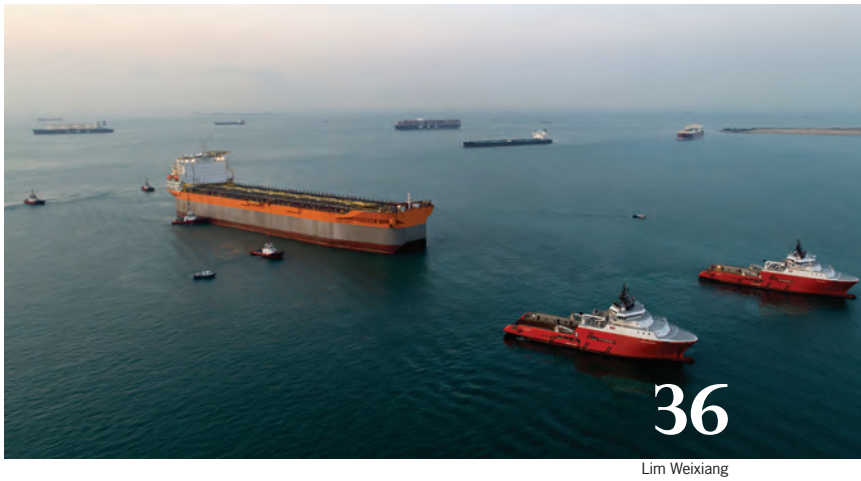

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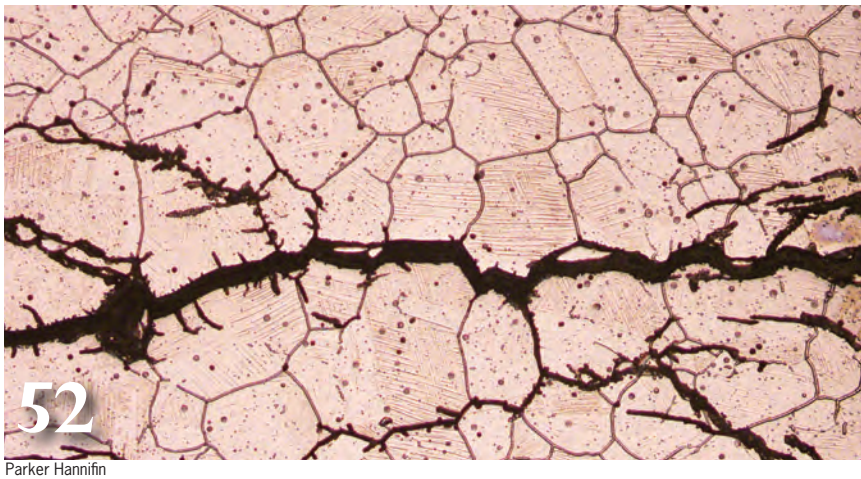

Parker Hannifin

Engineering Construction Industry Training Board

As we steam toward another OTC in Houston, it will be most interesting to see how this event fares in 2025. The size and scope of the exhibition has plummeted in recent years following an all-time high of 108,300 visitors in 2014. As happens in the volatile oil and gas sector, wild swings are the norm rather than exception. Following the 2014 event oil started a protracted path down through 2020, then the Covid pandemic of early 2020 exacerbated the situation. OTC has rebounded in part, driven by the traditional oil and gas industry plus the opening of its doors to 'renewable energy.' But as anyone reading these pages knows too well, the offshore wind market in the U.S. is effectively dead.

Or is it?

Philip Lewis, Director of Research at Intelatus, is a well-recorded and oft-cited energy and maritime industry insider, and in typical form he takes a deep dive into U.S. offshore wind in this edition. While news surrounding U.S. Offshore Wind hardly inspires the popping of champagne corks today, Lewis reports that there are signs of hope for longer term optimism. And while the U.S. market is down, markets in Europe and Asia are expanding quickly. Following Lewis' report on the U.S. market, Alisa Reiner breaks down developments in Asia, where China and its closed energy market are clearly the kings of offshore renewables.

Looking at oil and gas markets more specifically, there has been a significant stumble out of the gate in 2025, as the world collectively digests the impacts of tariffs coming out of Washington, and how the potential trade war could impact economic development and activity globally. In this edition we welcome insights from Sofia Forestieri, Senior Analyst, Esgian, for here insights on a relatively small in size but large in value market sector: Drillships. In her story "The Future of Long-Idle Drillships: Cold-Stacked or Dead Stacked", Forestieri offers some keen insights on how several industry leaders view this fast-moving sector.

Turning attention to the more granular technical side of the business, we're pleased to offer insights on Stress Corrosion Cracking (SCC) and Hydrogen Embrittlement (HE), which if left unchecked can severely compromise the structural integrity, safety and profitability of your offshore structures. While this story gives an overview, Parker Hannifin's Anshul Godha, Materials Scientist, and Paula Lepore, Global Projects Engineering Manager, will discuss the matter at depth – and answer your questions real time – in a webinar entitled *"A Brand-New Approach to Understanding and Mitigating Stress Corrosion Cracking and Hydrogen Embrittlement"*. https://bit.ly/3Y1hiAS

Check out the 2025 Media Kit via the QR Code Below

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Sofia Forestieri is a Senior Analyst at Esgian, specializing in offshore rig market analysis, energy economics, and sustainability. She has global experience in field operations and analytics.

Maciej Jóźwiak is the Technical and Green Transition Manager at GLO Marine.

Nitin Kulkarni is a MPD specialist with 20 years of experience in drilling engineering, operations, and technology development. Currently working with Blade Energy Partners in Houston Texas, he leads deepwater MPD and well-control projects, integrating advanced drilling technologies to enhance safety and efficiency. His expertise spans both operators and service providers, giving him a deep understanding of the drilling value chain. Nitin is also dedicated to training industry professionals on MPD best practices.

Wendy Laursen has 20 years of experience as a journalist. In that time, she has written news and features for a range of maritime, engineering and science publications. She has completed a Master of Science research degree in marine ecology as well as diplomas in journalism, communication and subediting.

Philip Lewis is Director Research at Intelatus Global Partners. He has extensive market analysis and strategic planning experience in the global energy, maritime and offshore oil and gas sectors. Intelatus Global Partners has been formed from the merger of International Maritime Associates and World Energy Reports.

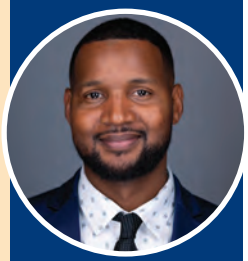
Alisa Reiner is a second-year Master of Environmental Management student at Yale, specializes in energy geopolitics, markets, and security, with experience in energy research and consulting.

Terrance Roberts serves as Global Business Development Manager, Global Offshore, FLNG, focusing on capturing opportunities in the fast-paced FLNG market, by supplying critical risk mitigation guidelines to potential project developers, ensuring their projects adhere to industry regulatory codes and standards.

Teresa Wilkie is the Director of RigLogix within Westwood Global Energy Group, leading a team of experienced offshore rig market analysts. She has over a decade of knowledge as an analyst in the oil and gas industry bringing expertise from her time at IHS-Markit (formerly ODS-Petrodata) and Esgian (formerly Bassoe Offshore).


Lewis


Reiner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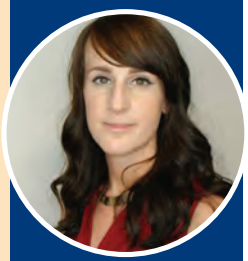
Wilkie

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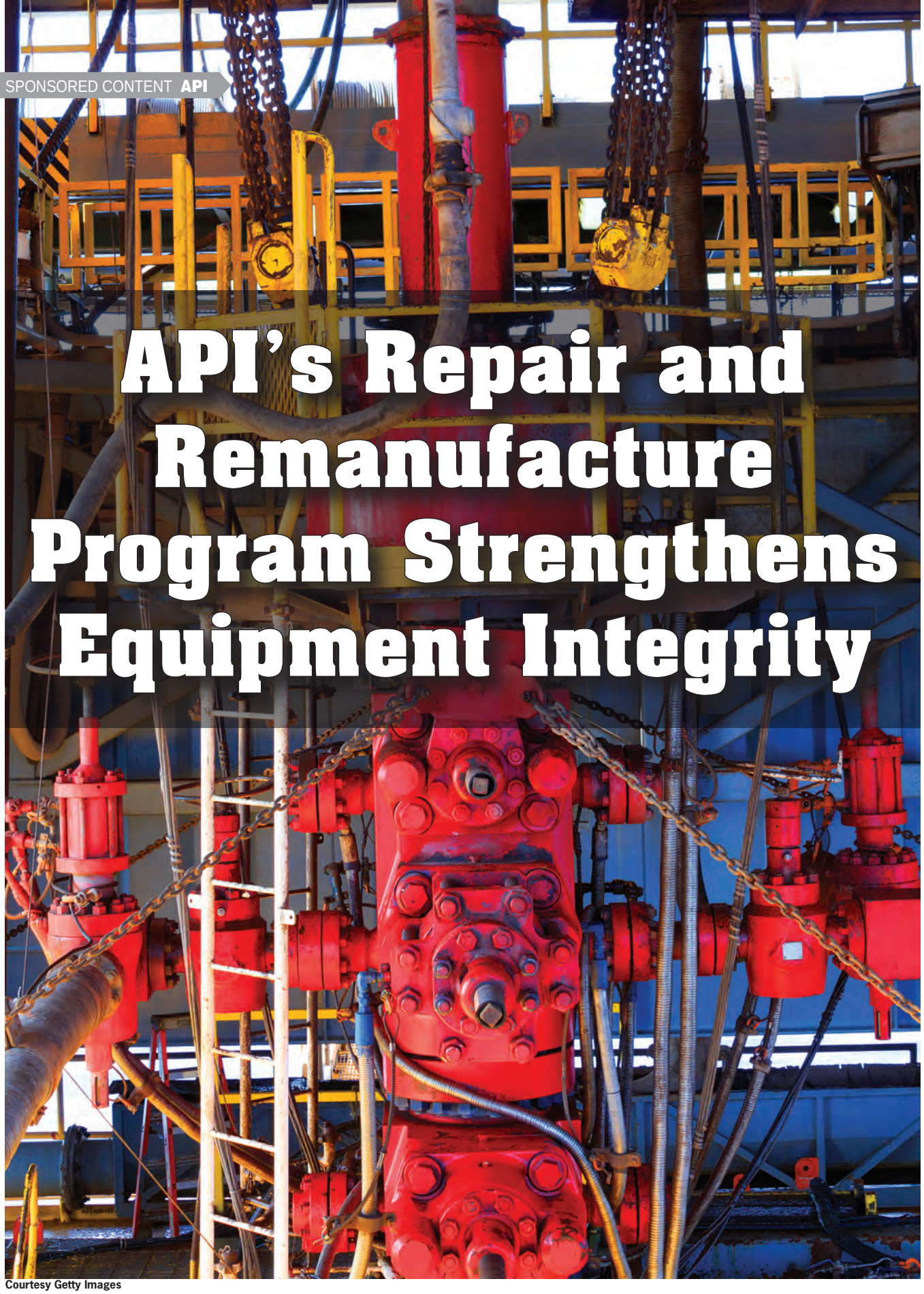
API's Repair and Remanufacture Program Strengthens Equipment Integrity



Courtesy Getty Images

After years of intensive drilling in the North Sea, an operator's blowout preventer (BOP) shows signs of seal degradation, a failure that could compromise well control. To ensure continued reliability, the operator sends it to a company for repair, expecting it to be restored to full functionality before returning to service.

It's a common undertaking for the operator. Months earlier off the coast of Louisiana at another project site, another BOP needed repair and was serviced at a different facility. As a result, despite both pieces of equipment undergoing remanufacture, the repairs were not performed to a common standard. Each repair company followed its own internal protocols, leaving the operator with an open question: How could they be certain that both repairs delivered the same level of quality, safety and performance?

For operators, whether managing equipment across multiple regions or working with different repair companies over time, consistent repair and maintenance is critical to ensuring safe operations. Without a recognized auditable framework, differences in repair protocols — inspection methods, welding standards and pressure testing, for instance — could yield substantially different results, increasing the risk of premature failures.

At the same time, for repair companies, a standardized certification process creates an industry-recognized licensing structure, allowing companies with the highest standards to distinguish themselves from competitors with less rigorous processes. A clear formal credential allows companies to demonstrate to customers that its work meets the highest standards of safety and reliability.

A Structured Approach to Repair and Remanufacture

The new API Repair and Remanufacture Program changes this dynamic. By establishing a formal licensing framework for organizations performing these services, the program ensures that repaired equipment —regardless of where the work is done and by whom —meets the same rigorous safety and performance benchmarks. Operators now are assured that all API-licensed repair facilities follow a uniform, auditable process, and repair organizations can earn a certification that sets them apart in the market.

To participate, repair companies must meet two core requirements:

1. Demonstrate compliance with an applicable API standard
2. Implement a quality management system that aligns with API Specification Q1, *Quality Management System Requirements for Organizations Providing Products for the Petroleum and Natural Gas Industry* (now in its 10th edition)

Once licensed, repair facilities can apply the API Repair and Remanufacture Mark to the repaired equipment, a visible credential that signifies compliance with API's rigorous quality and safety standards. To maintain certification, these facilities undergo annual audits that verify continued adherence to API's requirements, ensuring that repair quality remains consistent over time.

The program delivers benefits for both operators and repair organizations. For operators, it provides a clear and trusted pathway for verifying the integrity of repaired equipment. Operators merely select API-licensed organizations that have demonstrated their capability to make repairs in accordance with API's globally recognized standards.

And for repair organizations, API licensing offers a distinct competitive advantage. Achieving API certification differentiates them from non-certified competitors, assuring customers that licensed organizations' work meets third-party industry-recognized and accredited standards.

The First Step in Standardizing Repair and Remanufacture

The first standard incorporated under the initiative is API 16AR (2nd edition), Repair and Remanufacture of Drill-Through Equipment. It provides a structured, traceable process for repairing and remanufacturing drill-through equipment, covering key processes such as inspection, testing, welding and marking of critical drilling components. These requirements ensure that all repaired equipment and components return to service in safe, reliable working conditions, reducing the risk of failure.

As API expands its Repair and Remanufacture Program, it will incorporate additional standards, extending standardized repair and remanufacture protocols to a wider range of critical oil and natural gas equipment.

A New Standard for the Industry

The API Repair and Remanufacture Program is a major step in an industry where safety is paramount. For operators, this means greater predictability and control over equipment repairs, ensuring that components covered under the program—regardless of where they are serviced—meet the same uncompromising safety and performance standards.

For repair organizations, API certification will increasingly become a key differentiator, as operators seek out trusted partners that can deliver verified, high-quality repairs.

As the program expands, it will help shape the future of oil and natural gas equipment maintenance, enhancing safety, reliability and sustainability across the industry.

All images courtesy GLO Marine

IP CODE COMPLIANCE: More than a Regulatory Formality, it Impacts Commercial Viability

By Maciej Jozwiak, Technical Manager, GLO Marine

With the International Code of Safety for Ships Carrying Industrial Personnel (IP Code) now in force under SOLAS Chapter XV, offshore vessel owners are facing new compliance challenges. This regulation applies to vessels carrying more than 12 industrial personnel and mandates stricter safety, stability, and fire protection measures.

For vessels already classed under the Special Purpose Ship (SPS) notation, transitioning to compliance is relatively straightforward. However, many offshore support vessels (OSVs), including Platform Supply Vessels (PSVs) and Construction Support Vessels (CSVs), were not initially designed to meet these standards. That is narrowing their operational profile and this step is not following the market trends. There is a huge demand for CSOVs that can be covered by mobilized for purpose PSVs. Such mobilization can be done by temporary installation of for example motion compensated gangways and accommodation units. Non compliant vessels require engineering modifications, safety system upgrades, and operational

changes to obtain an Industrial Personnel Safety Certificate (IP Certificate)—a requirement for continued operation in offshore industrial projects.

The IP Code is more than just a regulatory formality; it directly affects a vessel's commercial viability. Without proper compliance, OSVs risk losing contracts and being sidelined from the offshore market. To avoid operational disruptions, vessel owners must act quickly to evaluate compliance gaps and implement necessary modifications.

The Impact of the IP Code on OSV Owners

For OSV owners, meeting IP Code requirements means addressing several key challenges. Many vessels require structural reinforcements, new stability calculations, and upgrades to fire safety systems and life-saving appliances. Modifications must be carefully planned to align with the vessel's dry-docking schedule to minimize downtime. In addition, vessel owners must navigate the certification process with classification societies like DNV, ABS, or Lloyd's Register, ensuring that every change meets regulatory approval.

GLO Marine has been working closely with offshore vessel owners to simplify this transition, leveraging our expertise in marine engineering, regulatory compliance, and offshore vessel retrofits. We successfully conducted IP Code compliance assessments for two Norwegian PSVs, setting a clear path for their certification and operational readiness under the new regulations.

GLO Marine's Experience: The Norwegian PSV Project

To assist an offshore vessel owner, GLO Marine performed comprehensive IP Code GAP analyses on two PSVs, assessing their structural, safety, and operational

readiness. These vessels, not originally built under SPS notation, required a full compliance evaluation.

Through our extensive experience working with DNV on SPS class notation projects, we developed a structured compliance approach that covered structural modifications, fire safety requirements, damage stability assessments, and evacuation procedures. We analyzed the vessels' arrangements, escape routes, and fire protection measures to ensure they aligned with the IP Code's personnel safety standards.

Following this assessment, we presented the vessel owner with two compliance options.

The first option involved limited modifications to meet basic compliance requirements while maintaining a lower personnel onboard (POB) capacity. The second, more extensive option ensured full compliance and allowed for a higher (POB), making the vessels more competitive in the offshore market. The owner opted for full compliance, requiring a combination of structural upgrades, safety system installations, and fire protection reinforcements.

Delivering Full IP Code Compliance: Engineering, Class Approval

With the compliance strategy finalized, GLO Marine took the lead in engineering the required modifications and obtaining classification approvals. The GLO Marine team carried out full engineering scope consisting of: structural integration of the new equipment, upgrade of the fire zones and main division, ensuring proper means of evacuation and personnel safety. Damage stability calculations were conducted to validate the vessels' watertight integrity under the IP Code's stricter stability criteria.

Fire safety upgrades included installing new fire doors and improving onboard fire suppression systems to meet the latest regulatory standards. Additionally, we integrated new enclosed lifeboats and additional life rafts to accommodate the increased industrial personnel onboard, ensuring compliance with evacuation and survival capacity requirements. Muster stations were redesigned for better accessibility, improving emergency response efficiency.

Beyond technical modifications, GLO Marine managed the classification process, handling all interactions with DNV and the Flag Administration to obtain class approval for the vessels. We prepared and submitted all regulatory documentation, overseeing plan approval and

surveys required for the issuance of the Industrial Personnel Safety Certificate (IP Certificate). By ensuring that the engineering work met classification requirements from the outset, we streamlined the approval process, avoiding delays and ensuring that the vessels remained on schedule for compliance.

Implementation Support: Supervision, Project Management & Riding Crews

GLO Marine's role extended beyond engineering and assistance in classification process. To ensure that modifications were executed correctly, GLO Marine committed to supervising the implementation phase during the vessels' planned dry-dockings. The GLO Marine team will oversee shipyard execution, ensuring that all engineering modifications are carried out according to the approved plans.

Additionally, we will provide project management and technical supervision, coordinating with shipyard teams and subcontractors to ensure that compliance work is completed on time and within budget.

A critical part of the retrofit process includes piping system overhauls and HVAC modifications, areas that require specialized expertise to integrate new fire safety and personnel accommodation requirements. To address this, we will deploy riding crews with expertise in piping and HVAC system upgrades, ensuring that all systems are fully aligned with the IP Code's safety standards.

By staying involved throughout the entire compliance journey, GLO Marine ensures a seamless transition from engineering to execution, minimizing project risks and ensuring vessels meet regulatory deadlines.

GLO Marine: Your Partner for IP Code Compliance

With the IP Code now in effect, offshore vessel owners must take proactive steps to ensure compliance. GLO Marine provides end-to-end support, from the initial GAP analysis and engineering solutions to certification approvals and implementation supervision. Our expertise in SPS class notations, offshore vessel retrofits, and regulatory compliance ensures that our clients can navigate these new requirements efficiently.

Our experience with DNV and other classification societies, combined with our hands-on approach to supervision and project execution, makes us the ideal partner for OSV owners seeking a streamlined, cost-effective path to IP Code certification.

If your vessel needs to comply with SOLAS XV and the IP Code, now is the time to act. Contact GLO Marine today to discuss your compliance strategy and ensure that your vessel remains fully operational under the new regulations.

The Future of Long-Idle Drillships: Cold-Stacked or Dead-Stacked?

Noble Corporation's recent decision to sell the Pacific Meltem and Pacific Scirocco for non-drilling purposes highlights a key issue in the drillship market: What happens to cold-stacked rigs that are unlikely to return to work? With the floater market showing signs of weakness and contract opportunities becoming scarcer, reactivating these units is proving even more challenging.

By Sofia Forestieri, Senior Analyst at Esgian

Esgian Rig Values has adjusted its valuations since early 2025 to reflect these conditions, reducing 6th generation drillship values by approximately 12%, 7th generation values by approximately 6.5%, and cold-stacked rig values by a further 10% in February leading to a 24% reduction year to date for the latter. While some of these could technically be reactivated, the high costs and uncertain contract prospects make recycling or conversion a more viable option for older, long-idle rigs.

Transocean, which holds the largest pool of cold-stacked drillships, may eventually have to make tough decisions on rigs such as Discoverer Clear Leader and Discoverer Americas, which have been stacked for over seven years. Valaris DS-11, stacked since 2022, is another possible recycling/conversion candidate. Meanwhile, the demand outlook over the next 24 months remains challenging, with contracted competitive utilization projected to decline from 90% to 73% by December 2025.

With no confirmed contracts for several rigs rolling off contract, owners have little incentive to reactivate cold-stacked assets, especially as doing so would only introduce more competition and pressure on already softening day-rates. Selling these rigs for drilling purposes would only introduce further competition, potentially bidding against their own fleet in an already oversupplied market. However, some alternatives to scrapping are emerging.

Market rumours suggest that Turkish Petroleum (TP) is looking to acquire up to four drillships. While specific units have not been confirmed, this strategy could provide an attractive solution for owners seeking to sell stacked rigs at substantially higher prices than scrapping, without creating additional competition. Since 2018, 25 drillships have exited the market, with 21 scrapped and 4 sold for conversion.

The most recent drillship taken out of the drilling fleet was Transocean's 6 th generation Ocean Rig Olympia,

which is to be converted for deep-sea mining. Meanwhile, Noble recycled the 6 th generation Pacific Mistral and Pacific Bora in 2021 for $10 million and $14.5 million, respectively. That year saw the highest number of drillship retirements, with 9 units recycled amid the market turbulence caused by the COVID-19 pandemic.

Drillship sales for Non-Drilling Purposes

Presently, 13% of the total drillship fleet is cold-stacked. This accounts for 14 rigs, all of which are young and modern, with delivery years ranging between 2009 and 2023, including designs such as 7th generation Samsung 12000 and DSME 12000. Three rigs have also never worked, the 7th generation 12,000-ft Pacific Meltem, Valaris DS-13, and Valaris DS-14, being stacked shortly after delivery. The pool of cold-stacked drillships is controlled by three companies - Noble, Transocean and Valaris.

List of Cold-Stacked Drillships

With Noble's divestment, the landscape of cold-stacked drillship ownership is shifting. While Noble will soon exit this space, Transocean and Valaris still hold a considerable number of long-idle rigs, each facing different strategic and financial challenges. For Noble, this move aligns with its aggressive strategy to cut costs and focus on a more competitive, high-spec fleet, a direction further reinforced by its merger with Diamond Offshore in September 2024.

Transocean currently holds 9 cold-stacked drillships. Aside from Discoverer Inspiration (stacked for 294 days and currently held for sale) and Discoverer India (stacked for 4.5 years), the other rigs have been idle for over 7 years. Reactivation costs pose a significant challenge; however, scrapping these rigs would have a major financial impact, with their Book Value significantly higher than their Market Value.

Esgian values the Transocean Enhanced Enterprise Class rigs, Discoverer Clear Leader, Discoverer Americas, Discoverer Inspiration between $64 and $75 million. ustoMSC P10000 Deepwater Champion is valued between $144 and $159 million, and Samsung 12000 Ocean Rig Mylos, Ocean Rig Athena and Ocean Rig Apollo are valued between $165 and $185 million.

With recycling most likely not a viable option, Transocean is left with the expensive option of reactivation, which could cost as much as $100 to $150 million per rig, or simply leave them stacked with minimal upkeep or what could best be described as 'dead-stacked'.

Drillship sales for non-drilling purposes

2018 – present

Sale date	Name	Sales type	Seller	Buyer
Feb-23	Ocean Rig Olympia	Conversion	Transocean	Global Sea Minerals Resources
Aug-21	Pacific Mistral	Recycling	Noble	GMS
Aug-21	Pacific Bora	Recycling	Noble	GMS
Jul-21	Discoverer Spirit	Recycling	Transocean	Undisclosed
Jul-21	Discoverer Enterprise	Recycling	Transocean	Undisclosed
Jul-21	Discoverer Deep Seas	Recycling	Transocean	Undisclosed
May-21	West Navigator	Recycling	Seadrill Ltd	Rota Shipping
Mar-21	Aban Abraham	Recycling	Aban Offshore	Last Voyage
Mar-21	Aban Ice	Recycling	Aban Offshore	Undisclosed
Jan-21	Titanium Explorer	Recycling	Vantage Drilling	Undisclosed
Oct-20	Noble Bully I	Conversion	Noble	Orleans Asset Holdings
Oct-20	Noble Bully II	Conversion	Noble	Orleans Asset Holdings
Aug-20	Valaris DS-6	Recycling	Valaris	Undisclosed
Jul-20	Valaris DS-5	Recycling	Valaris	Rota Shipping
Jul-20	Valaris DS-3	Recycling	Valaris	Rota Shipping
Mar-20	Vitoria 10000	Conversion	Best Oasis	Albeas
Nov-19	Deepwater Discovery	Recycling	Transocean	Rota Shipping
Oct-19	Vitoria 10000	Recycling	Petrobras	Best Oasis
Sep-19	Ocean Rig Paros	Recycling	Transocean	Rota Shipping
Aug-19	Belford Dolphin	Recycling	Dolphin	Undisclosed
Jan-19	SC Lancer	Recycling	Schahin	Undisclosed
Nov-18	GSF C.R. Luigs	Recycling	Transocean	Rota Shipping
Nov-18	Deepwater Frontier	Recycling	Transocean	Rota Shipping
Nov-18	Deepwater Millennium	Recycling	Transocean	Rota Shipping
Sep-18	Jasper Explorer	Recycling	Focus Offshore Services	GMS

Source: Esgian Rig Values

List of cold-stacked drillships

14 drillships are cold-stacked

Name	Owner	Days stacked	Delivered	Design Category	Full Design Category
Pacific Scirocco	Noble	2653	2011	Drillship 6th gen	Samsung 10000
Pacific Meltem	Noble	2592	2014	Drillship 7th gen	Samsung 12000
Discoverer Inspiration	Transocean	280	2009	Drillship 6th gen	Transocean Enhanced Enterprise Class
Discoverer Clear Leader	Transocean	2638	2009	Drillship 6th gen	Transocean Enhanced Enterprise Class
Discoverer Americas	Transocean	3232	2008	Drillship 6th gen	Transocean Enhanced Enterprise Class
Discoverer Luanda	Transocean	2577	2010	Drillship 6th gen	Transocean Enhanced Enterprise Class
Discoverer India	Transocean	1658	2010	Drillship 6th gen	Transocean Enhanced Enterprise Class
Deepwater Champion	Transocean	3232	2010	Drillship 6th gen	GustoMSC P10000
Ocean Rig Mylos	Transocean	3079	2013	Drillship 7th gen	Samsung 12000
Ocean Rig Athena	Transocean	2898	2014	Drillship 7th gen	Samsung 12000
Ocean Rig Apollo	Transocean	3202	2015	Drillship 7th gen	Samsung 12000
Valaris DS-11	Valaris	813	2013	Drillship 7th gen	DSME 12000
Valaris DS-13	Valaris	412	2023	Drillship 7th gen	DSME 12000
Valaris DS-14	Valaris	412	2023	Drillship 7th gen	DSME 12000

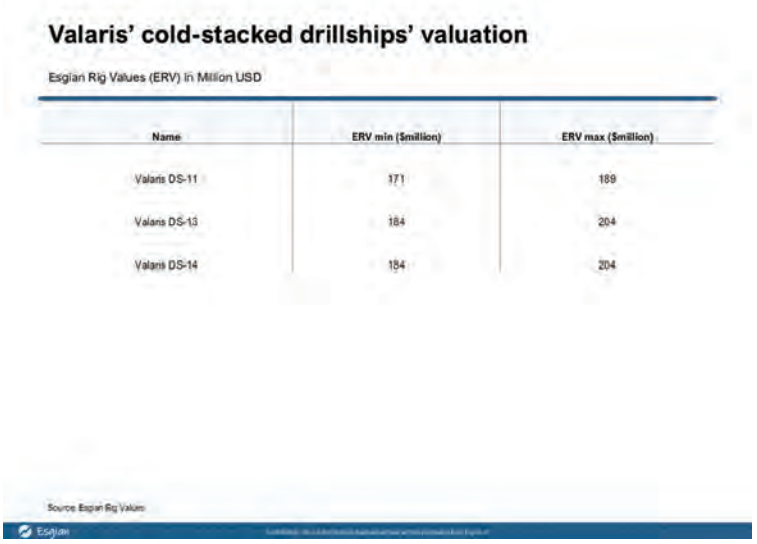
Source: Esgian Rig Values

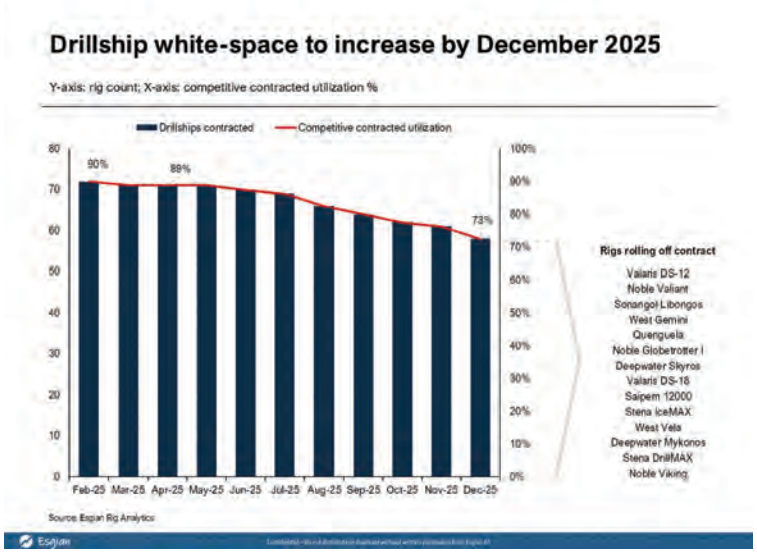
Transocean's cold-stacked drillships' valuation

Esgian Rig Values (ERV) in Million USD

Name	ERV min	ERV max
Discoverer Inspiration	64	75
Discoverer Clear Leader	64	75
Discoverer Americas	64	75
Discoverer Luanda	67	77
Discoverer India	59	70
Deepwater Champion	144	159
Ocean Rig Mylos	165	183
Ocean Rig Athena	166	184
Ocean Rig Apollo	168	185

Source: Esgian Rig Values





Transocean's Cold-Stacked Drillships' Valuation

Valaris faces a different challenge with its 3 cold-stacked drillships. Two of them, newbuilds Valaris DS-13 and Valaris DS-14, were acquired for an aggregate price of $337 million and stacked shortly after. Despite being cold-stacked for nearly a year and a half, Valaris has actively marketed these rigs, indicating that they have been maintained in good condition.

As a result, Esgian estimates that reactivation would cost approximately $40 to $50 million, and would take about 6 months to complete. Valaris DS-11, on the other hand, was delivered in 2013 and has been stacked for a little over two years.

It could be a potential candidate for recycling or conversion and is currently valued between $171 and $189 million. This valuation considers the rigs' cold-stacked status, meaning that selling them for non-drilling purposes, such as conversion or recycling, would result in materially lower sales prices.

Valaris' Cold-Stacked drillships' Valuation

With demand softening and utilization expected to decline, what does this mean for the viability of long-term cold-stacked rigs? The current competitive drillship fleet totals 80 rigs. Competitive contracted utilization* is 89%, projected to average around 86% by the end of the second quarter of this year, and to drop to 71% by December, with 14 drillships rolling off contract by year-end and no confirmed future contracts so far.

*Competitive contracted utilization is the number of rigs contracted (current and future) divided by the competitive fleet.

Drillship White-Space to Increase by December 2025

With demand now being pushed into late 2026 and beyond in key deepwater regions such as the US GOM, South America, West Africa, and Southeast Asia, the existing fleet is already facing increasing competition for contracts. This tightening market dynamic suggests that bringing additional capacity online through the reactivation of cold-stacked rigs is not a viable solution in the short term.

Image courtesy Well-Safe Solutions

Rig Retirements Set to Rise as Utilization Falls to Lowest Level Since 2021

By Teresa Wilkie, Director of RigLogix, Westwood Global Energy Group

As has historically been the case, when utilisation is high and the availability of marketed rigs is tight, the probability of stacked rigs being reactivated is more likely. This explains why attrition began to fall in 2021 and shrunk to near nought by 2023, when utilisation was the highest it has been in the past decade. However, during the sustained downturn which ran from 2014 through to 2018, before a slight recovery in 2019 (until Covid-19 hit in 2020), the number of rigs being retired or sold for purposes outside of the active drilling market was particularly high – averaging around 43 rigs per year over the 2014-2020 period.

Last year, attrition started to pick up again as market softness began creeping in, especially in the UK North Sea semisub market, where four of the seven assets were retired.

Year to date, nine rigs have been confirmed for removal from the active fleet. These consist of four jackups – owned by Shelf Drilling, White Fleet Drilling and Well Services Petroleum – and three 8500-series semisubs owned by Valaris, all of which were under 15 years old. Additionally, Noble confirmed the disposal of two modern S12000-design, ultra-deepwater drillships that it inherited during its acquisition of Pacific Drilling – one of which never drilled a single well and was just 10 years old.

The average age of assets retired from the fleet has continued to reduce for floating rigs, with drillships reducing

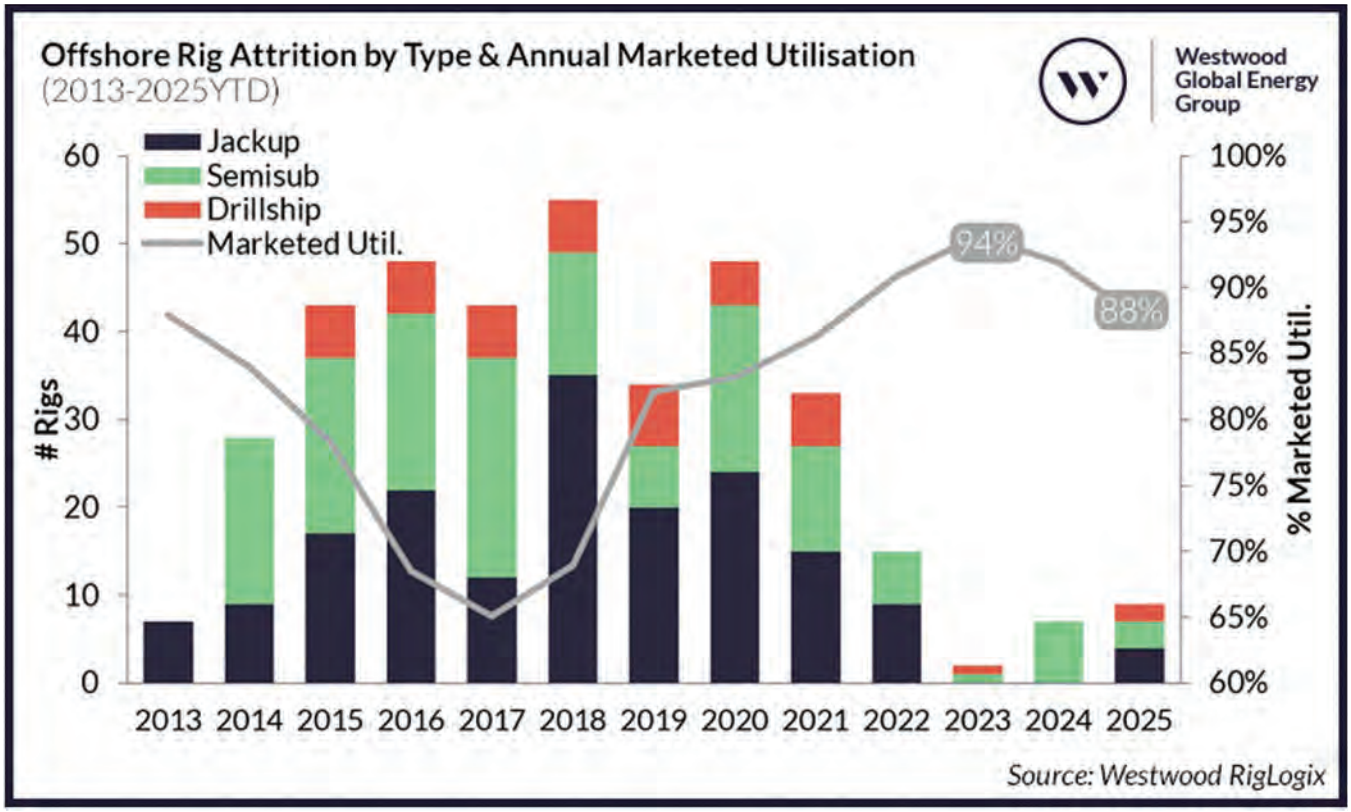


Figure 1: *Offshore Rig Attrition By Type & Annual Marketed Utilisation (2013-2025YTD).*

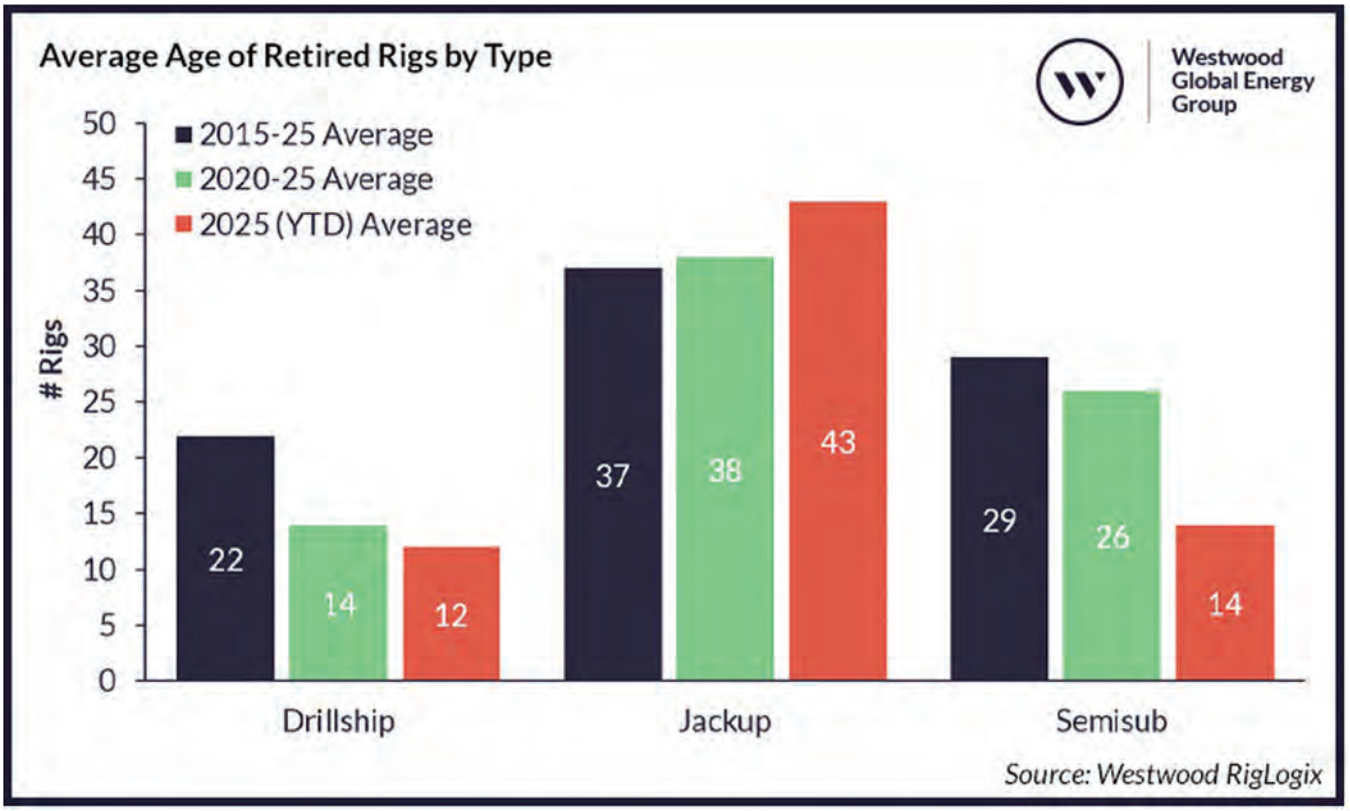


Figure 2: *Average Age of Retired Rigs by Type.*

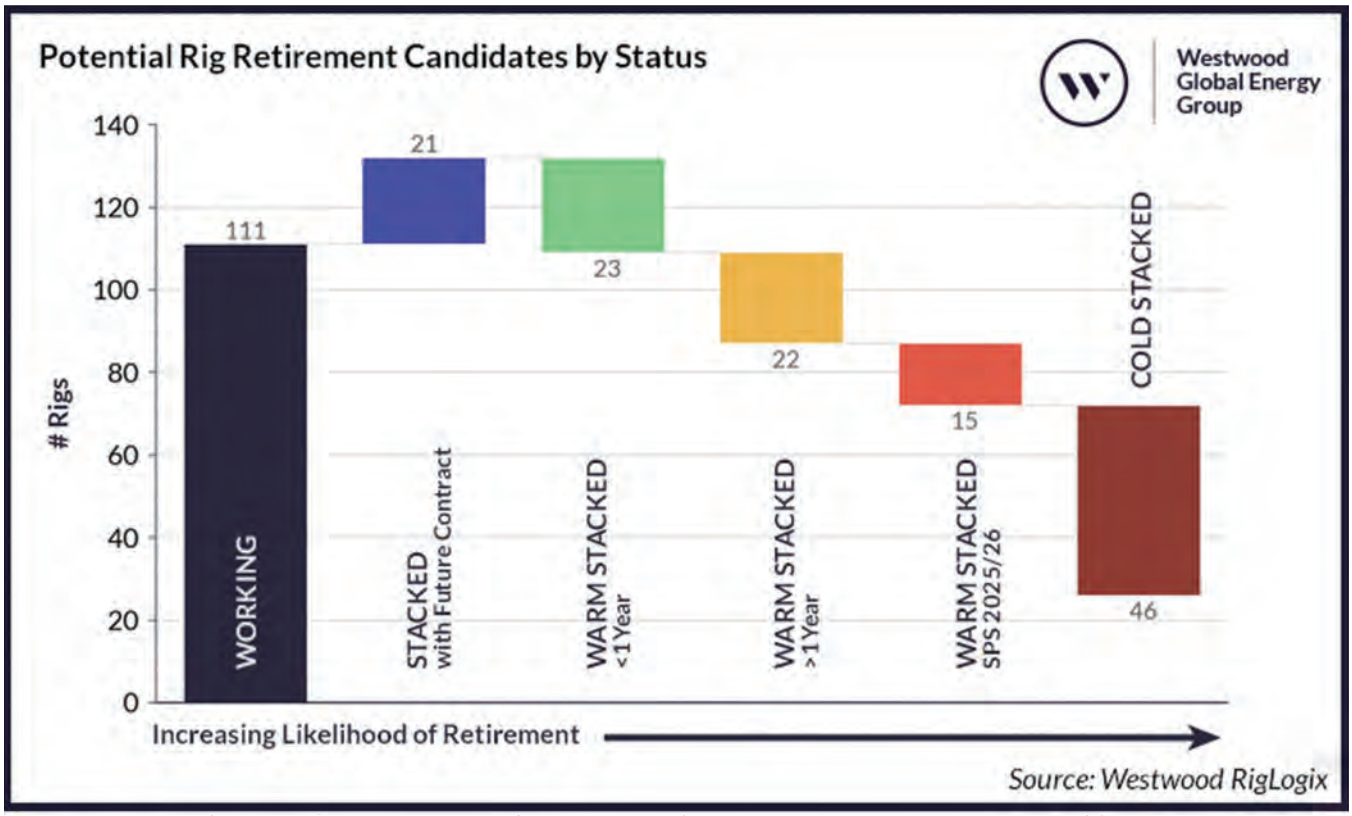


Figure 3: *Figure 3: Potential Rig Retirement Candidates by Status. Note: Includes jackups over 38 years, drillships over 14 years and semisubs over 26 years.*

by eight years over the last five years, and semisubs reducing by three years. However, jackups have not followed the same pattern, with a slight increase recorded during the same period, of a one-year increase in average age of attrition. For the four assets confirmed for removal year to date, this figure is significantly higher at 43 years old.

Of course, falling utilisation and age are not the only factors to sway the likelihood of a rig finally hitting the scrap heap, and in fact RigLogix records 87 units over 40 years old that are still currently drilling. Generally, rigs that have limited future prospects, have been without work or cold-stacked for some time (meaning a costly reactivation programme), and are due the often very expensive five-yearly special periodic survey (SPS), are also considerations.

Other factors can be one-off designs in a contractor's fleet, where they may not be able to spread spare parts costs etc, out-of-favour designs (as seen with the small variable deck load on the 8500-series semisub), and of course mergers between owners, which often enables easier culling decisions as owners look to streamline fleets.

Figure 3 indicates that there are certainly more candidates that could be considered for removal over the coming year, when taking into account the average rig attrition age during the 2020-25 period alongside the status, stacked duration and SPS due date.

For jackups, 39 of these units are cold stacked and 19 are warm stacked (seven of these for over a year). Eight of these warm assets do not have a valid SPS in place and three more will expire this year or next if not renewed. Most of the units included in Westwood's analysis are located in the Middle East, India or US waters, with Shelf Drilling and Enterprise Offshore owning most of these rigs.

For drillships, there are just five cold-stacked assets, all between 14 and 16 years old. There are seven warm or hot stacked units (none of which have been idle for more than a year) and four of these do not have a valid SPS, or it will expire in 2025 or 2026. Most of the drillship candidates are in Southeast Asia or the Mediterranean, with Transocean, Seadrill, Stena, Vantage and Saipem owning these assets.

Finally, for semisubs, the pool for candidates (based on the above factors) is small – primarily due to the high level of attrition already undertaken in the segment over the past decade, which has resulted in total supply of the fleet reducing by 59% (119 rigs) since March 2015. There are only two cold-stacked and three warm-stacked assets. Just one of the warm units has been idle for over a year and, all but one rig, either do not have a valid SPS, or it will expire in 2025 or 2026. However, two of these assets are located in the land-locked Caspian, where bringing in new rigs is a challenge and therefore makes them less likely to be scrapped. The remaining assets are currently in Las Palmas (Canary Islands), the North Sea or Canada and are owned by Dolphin Drilling, Well-Safe and Transocean. The combination of the reduced pool of retirement candidates and the ongoing softness in demand means an increased chance of a younger, hotter unit being retired.

To sum up, due to the reduction in jackup, drillship and semisub demand and utilisation this year, we will likely see more assets moved to cold stack due to not having follow-on commitments in place. Meanwhile, further M&A activity could also be in the works.

These factors we believe will spur further older, idle and surplus assets to be removed from the fleet, which in the long run may help set the stage for a stronger recovery in utilisation from the second half of 2026 onwards, when Westwood expects to see a rebound in demand.

Charting the Evolving U.S Offshore Wind Landscape

By Philip Lewis, Research Director, Intelatus Global Partners

Only four or five months ago, the U.S. offshore market seemed poised to embark on a phase of major expansion to become one of the world's largest markets for offshore wind installations. How things have changed with the swearing in of the new Trump Administration, which clearly promoted and followed through on its anti-offshore wind stance during the election campaign. The table below summarizes the high-level impacts to the U.S wind forecast since January.

Previous administration "business as usual" case

- Set goals to reach 30 GW of offshore wind by 2030 and 110 GW by 2050.
- Developers proposed a pipeline of over 100 GW of project capacity and ~6,800 turbines to be installed, of which ~58 GW to be commissioned by 2035.
- Behind the targets were commitments to invest in locally built vessels and multiple turbine, monopile and subsea cable factories.

Updated forecast based on Trump administration actions

- The overall pipeline has fallen to ~86 GW and ~5,680 turbines.
- The revised forecast is for ~15 GW of capacity and ~1,100 turbines to be grid connected by 2035, ~43 GW less than the previous forecast.
- As a result of the uncertainty developers have deferred investment plans and several manufacturing facility investments have been cancelled.

The long-term pipeline still amounts to ~85 GW of installed capacity, but much of this is forecast to be commissioned late in the next decade, going into the 2040's.

The high-level message is that there will be no new permitting, no new project approvals and more legal challenges to existing project approvals, resulting in limited activity and higher developer risk for at least the next four years. Uncertainty has increased and confidence in the segment has been thoroughly shaken.

In our latest U.S. market report, Intelatus Global Partners takes a deep dive into the changes to the offshore wind landscape in the United States and assesses the impact on project activity.

What has Happened?

On the day that he was sworn in to office, President Trump issued a Presidential Memorandum entitled "Temporary withdrawal of all areas of the Outer Continental Shelf for offshore wind leasing and review of the federal government's leasing and permitting practices for wind projects".

Under the Presidential Memorandum on offshore wind, there will be no new offshore wind leases issued on the outer continental shelf (OCS) until the suspension is withdrawn, existing awarded leases supporting ~40-80 GW will be reviewed to see if there are any legal reasons to cancel the leases and no new construction and operation approvals will be given, which currently impacts ~14 GW of project capacity. In the worst case, at least 50 GW of project capacity which developers had planned to advance over the next four years will not materialize.

As a direct result of the changing environment, several developers have delayed projects and several significant supply chain investments have been cancelled. Utilities and developers in Massachusetts and Rhode Island have recently asked for a three-month extension to negotiations for ~2 GW of power purchase agreements for the South Coast Wind and New England Wind projects. Whilst New England Wind has completed permitting, SouthCoast Wind has yet to secure the award of permits from three federal agencies. As a result, the developer, Ocean Winds, has recognized a ~$270 million impairment on its U.S. offshore wind portfolio and expects a delay in project construction from 2026 to 2030. The permitted Atlantic Shores South development has already seen one of its approved permits withdrawn by the Environmental Protection Agency for further review. Legal challenges outside of federal agencies to permitting projects are also ongoing, including multiple cases addressing permitting issues put forward to district courts and to the Supreme Court.

While not directly targeted at offshore wind, other presidential executive orders and initiatives will impact offshore wind projects, such as tariffs on imports or a proposal to impose penalties on owner/operators of Chinese-built vessels. Further, disbursement of IRA (Inflation Reduction Act) related tax credits, on which many offshore wind projects rely, is on hold and law makers are reviewing which tax credits will remain in the new federal budget.

Is that it – is the industry in the U.S. dead and buried?

While the industry has taken quite a hit over the last few months, there are some reasons to maintain longer-term optimism premised on the activities of several individual states. The foundation of this optimism is ~81 GW of state procurement targets. Nine Northeast and Mid-Atlantic states have established legally binding offshore wind targets amounting to ~53 GW through 2040. On the Pacific Coast, California and Oregon seek to collectively procure 28 GW of floating wind by 2045. Other states add ~17.5 GW of inferred targets to the planning pipeline. To date, ~9 GW of federally permitted capacity has secured offtake agreements and a further 2.5 GW is expected to be procured within this year.

~5.5 GW of commercial wind farm capacity is being built. Offshore construction works are advancing on Vineyard 1, Revolution, CVOW-C, Sunrise and will start on Empire Wind 1 in early April, and site assessment for future developments continues in other offshore leases.

What does this mean for the maritime supply chain?

Offshore wind construction and O&M vessels were previously designated as vessels of "national interest", meaning they received priority treatment for preferential financing terms under the Federal Ship Financing Program (MARAD Title XI). It is unclear how this program will be managed going forward but it is assumed that the priority will no longer be on offshore wind vessels.

While there remains space for foreign flag construction vessels, mainly for turbine and foundation installation and cable lay, much of the offshore wind market in the USA is restricted to Jones Act vessels.

One Jones Act compliant WTIV (WTIV Charybdis), one scour protection vessel (Acadia), three Tier 1 SOVs (two ECO new builds, one for Ørsted's Northeast Cluster and one for Empire Wind, and one Fincantieri Bay vessel for Dominion's CVOW-C), one Tier 2 SOV (a Hornbeck SOV conversion) and 38 CTVs (excluding around options and SOV daughter craft) are currently either operational or are being built.

Further, ongoing construction of windfarms in the Northeast Atlantic has resulted in numerous short – and medium-term vessel charters for vessels holding a U.S flag, including tugs, AHTSs, PSVs, MPSVs and OSVs, many from the Gulf of Mexico oil & gas fleet.

However, the uncertain outlook for the Jones Act wind fleet is not so positive.

The cost of Dominion's WTIV Charybdis is forecast to rise to around $625 million by time of delivery (at least one year late) versus an initial $500 million cost estimate and compared to the $325 million cost of WTIVs contracted in Asian yards with similar specifications in the same period. The WTIV will initially be busy with the construction of 176 turbine CVOW project, but thereafter opportunities outside of new construction and major component exchange for existing wind turbines are potentially limited. The Charybdis could possibly take work in the European segment if the market supply tightens and rates increase sufficiently, although this is not an immediate opportunity.

Great Lakes Dredge & Dock is building the first Jones Act compliant purpose-built wind farm fallpipe rock installation vessel, the Acadia. Originally estimated to cost around $197 million, the current cost estimate for the vessel which is being built at Hanwha Philly Shipyard is close to $250 million. The vessel will be delivered too late for its planned first assignment, foundation preparation at Empire Wind, where work will be undertaken by Great Lakes' partner Van Oord. The delivery date for the vessel has slipped from November 2024 to September 2026. The vessel is contracted to work at Ørsted's Sunrise Wind and a further unnamed permitted project. Given the current vessel delivery delays and challenges to permitted projects, this vessel may still face significant utilization risks.

Pricing challenges have also impacted the logistics segment.

Three tier one SOVs are being built by ECO (two) and Fincantieri Bay Shipbuilding (one). These vessels currently have secured long-term contracts for permitted projects with offtakes, which currently provides utilization mitigation. If off-hire, it is anticipated that these vessels would struggle to find profitable utilization. The vessels are reported to cost ~$97-168 million. Similar spec SOVs contracted in Europe in the same period were priced at ~$62-69 million.

U.S. CTV pricing is indicated at ~$12-15.5 million per vessel with a construction cycle time of at least 12 months per vessel (and as much as 15-20 months). By comparison, leading Southeast Asian yards will sell European specification CTVs for around ~$6 million per vessel, with build cycles of 8-10 months and capacity to produce 10 vessels a year. The challenge for much of CTV fleet will be redeployment. Over one quarter of the fleet has secured long-term operations support charters, with the remaining delivered vessels working in the construction and commissioning phases. As project permitting stops and challenges to existing permitted projects and leases increases, the utilization outlook is not positive.

Wait and See

While it would be easy to write-off the U.S. wind market, there remain short- and mid-term opportunities. As long as developer confidence in the market can sustain, the longer-term opportunity continues to have great potential.

GEOPOLITICS & CLIMATE CHANGE
OFFSHORE WIND IN EAST ASIA & PACIFIC

By Alisa Reiner

The East Asia and Pacific (EAP) region is rapidly emerging as a global leader in offshore wind energy, a critical component of the clean energy transition. With its vast coastlines, growing energy demand, and ambitious decarbonization goals, the region is poised to play a pivotal role in shaping the future of renewable energy. However, this growth is unfolding against a backdrop of complex geopolitical tensions, economic challenges, and technological hurdles.

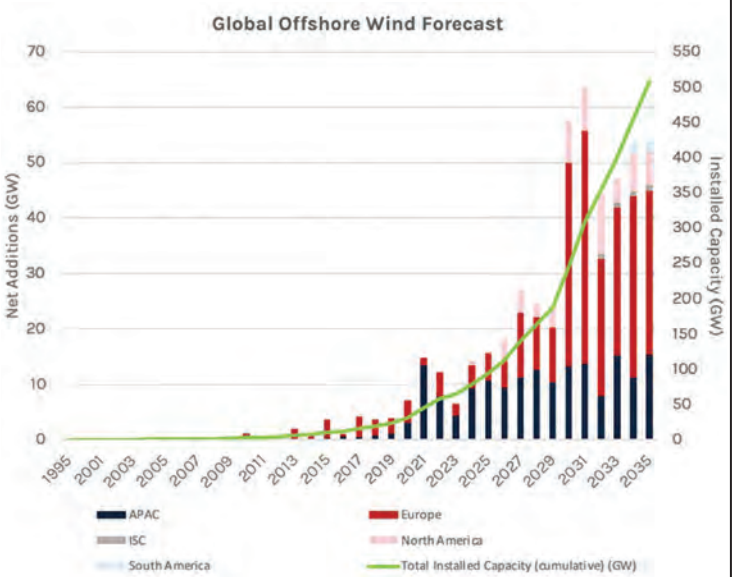
Five key markets, including China, Taiwan, Japan, Vietnam, and the Philippines, demonstrate the opportunities and challenges facing offshore wind development in the EAP region. These nations are not only at the forefront of offshore wind innovation but also at the intersection of competing maritime claims and geopolitical interests.

The Growing Importance of Offshore Wind

Offshore wind energy has become a cornerstone of global efforts to combat climate change and reduce reliance on fossil fuels. Unlike onshore wind farms, offshore installations can harness stronger and more consistent winds, making them ideal for densely populated coastal regions.

Globally, offshore wind capacity stood at about 75 GW in 2023 but is projected to grow exponentially to over 510 GW by 2035 and nearly 1,200 GW by 2050. This rapid expansion is driven by advancements in technology—particularly floating wind turbines that can operate in deeper waters—and increasing commitments from governments to achieve net-zero emissions targets.

The EAP region is at the heart of this transformation. By 2035, its cumulative installed offshore wind capacity is



Source: interpretation of data from Intelatus Global Partners. Data Collection was capped as of November 1, 2024.

expected to reach approximately 144 GW. China leads the charge with aggressive targets and substantial investments, while Taiwan and Japan are steadily building their capabilities. Emerging markets like Vietnam and the Philippines are also beginning to explore their offshore wind potential.

China: The Global Powerhouse

China dominates the offshore wind landscape in EAP, with an installed capacity of approximately 37 GW as of 2024—more than any other country in the world. The nation's ambitious renewable energy policies aim to expand this capacity to nearly 90 GW by 2030.

China's success is underpinned by its robust and vertically integrated supply chains, low-cost production capabilities, and significant government support. Coastal provinces such as Guangdong, Fujian, Zhejiang, Jiangsu, and Shandong are leading the way in developing offshore wind projects. Additionally, China is investing heavily in "deep-sea" wind farms, which require advanced floating turbine technology.

However, China's dominance also raises concerns about market dependencies and geopolitical risks. The country controls a significant portion of the global supply chain for offshore wind components, including rare earth minerals (REMs) essential for turbine production. This concentration of resources has prompted other nations to diversify their supply chains to reduce reliance on Chinese imports.

Taiwan: Balancing Opportunity and Risk

Taiwan has positioned itself as a key player in the offshore wind sector with an installed capacity of approximately 3 GW as of 2024. The island's government has set ambitious targets to achieve up to 55 GW of offshore wind capacity by 2050 as part of its Net-Zero Roadmap.

Offshore wind is critical for Taiwan's energy security. Currently, 98% of its energy is imported, making the island vulnerable to supply disruptions. Offshore wind offers a pathway to reduce dependence on fossil fuels while supporting Taiwan's energy-intensive semiconductor industry—a global leader in advanced chip production.

Yet Taiwan's geopolitical situation poses significant challenges. Tensions with China create risks for infrastructure projects near contested waters in the Taiwan Strait. International investors have expressed concerns about these risks, leading to higher insurance premiums and potential delays in project timelines. Despite these challenges, Taiwan remains an attractive market due to its favorable incentives and strategic importance in the global renewable energy landscape.

Japan: Floating into the Future

*Maps courtesy CIA: The World Factbook

Japan's unique geography—characterized by deep coastal waters—makes it an ideal candidate for floating offshore wind technology. While Japan's current installed capacity is modest at just 0.3 GW, its government aims to achieve up to 45 GW by 2040.

Japan has pioneered floating wind technology with several demonstration projects already operational. These innovations could unlock vast areas for development far from shorelines where traditional bottom-fixed turbines are not feasible. However, high costs and regulatory barriers have slowed progress. Japan also faces grid integration challenges due to its isolated electricity network split between two frequencies (50 Hz in eastern and 60 Hz in western regions).

To overcome these hurdles, Japan is strengthening partnerships with European firms while investing in domestic manufacturing capabilities. With steady annual additions projected through 2035, Japan's offshore wind sector is poised for gradual but significant growth.

Vietnam: Untapped Potential

Vietnam boasts high technical potentials for offshore wind—an estimated 599 GW—yet its installed capacity remains negligible. The government's Power Development Plan VIII targets up to 6 GW by 2030 and over 70 GW by 2050, although only around 3.5 GW of offshore wind capacity is realistic by 2035 given the current project pipeline.

Vietnam's South Central region offers attractive conditions for bottom-fixed turbines due to shallow waters near existing port infrastructure. However, regulatory uncertainties and insufficient grid capacity have hindered progress. International developers have been cautious about entering Vietnam's market due to unclear policies and high investment risks. Despite these challenges, Vietnam's extensive experience in offshore oil and gas could provide a foundation for developing its offshore wind industry if regulatory support to attract foreign capital is implemented.

The Philippines: A High-Stakes Frontier

The Philippines also has significant potential for floating offshore wind due to its deep waters and fragmented geography comprising over 7,000 islands. The country's technical potential stands at approximately 178 GW.

Offshore wind could address several pressing issues for the Philippines: reducing reliance on imported fossil fuels, alleviating land-use conflicts for energy development, and enhancing energy independence amid volatile global markets. However, like Vietnam, the Philippines faces significant obstacles including regulatory inefficiencies and limited local supply chain capabilities. Recent government initiatives, such as streamlined permitting processes, offer hope for accelerated development.

The first commercial-scale projects are expected online by 2030 with gradual growth thereafter.

Geopolitical Challenges

Offshore wind development in EAP does not exist in a

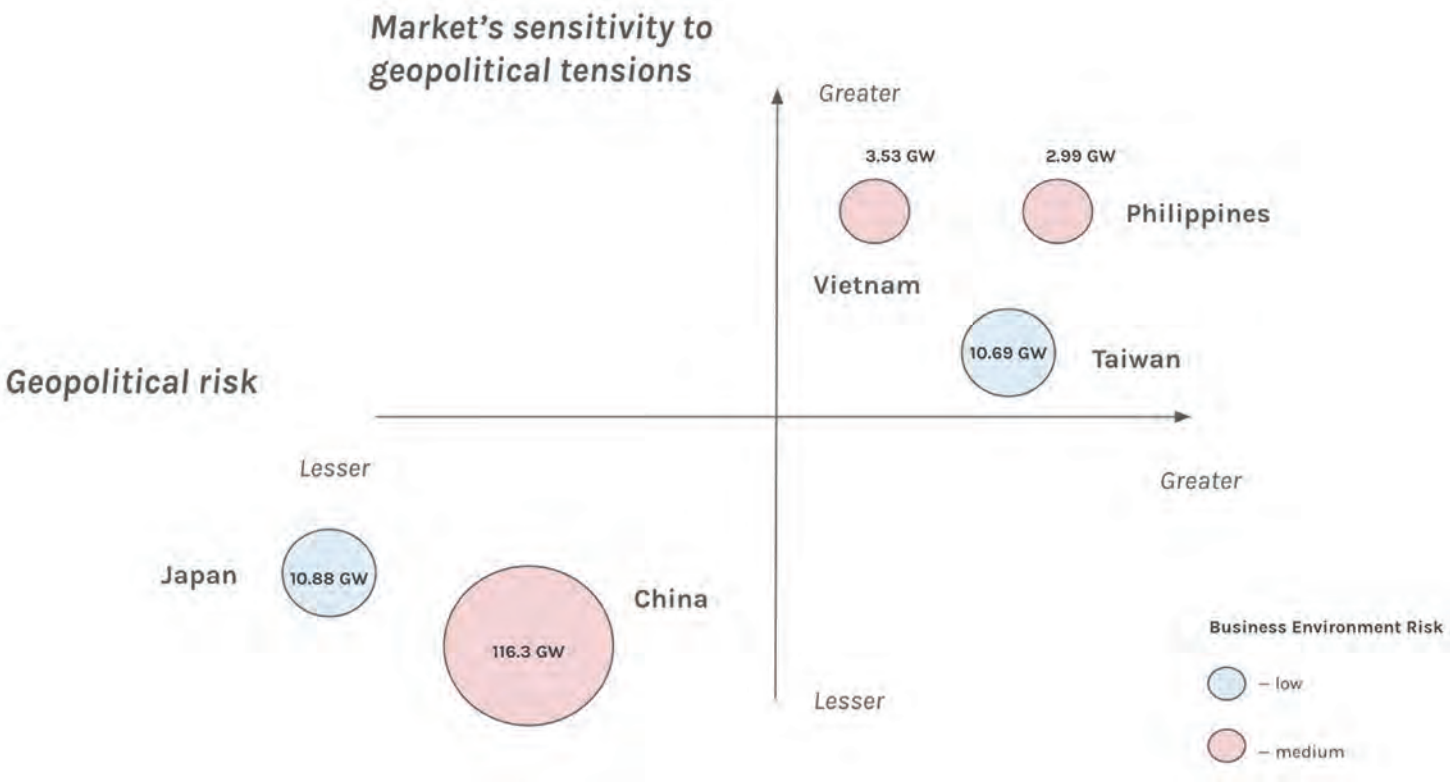


Exhibit 8 Geopolitical risk—market sensitivity—business environment risk matrix. Bubbles and their titles represent the total installed capacity market size (projected for 2035). Source: author's creation. For the "business environment risk" indicator, interpretation of data from Allianz Trade ("Country Risk Ratings & Reports," Allianz Trade, accessed December 4, 2024, https://www.allianz-trade.com/en_US/resources/country-reports.html).

vacuum—it is deeply intertwined with regional geopolitics:

1. Territorial disputes: Competing claims over maritime territories, such as the Pratas Islands, Paracel Islands, Spratly Islands, and Macclesfield Bank the South China Sea, create risks for infrastructure projects near contested waters.

2. China's strategic dominance: China's assertive actions, including militarization of artificial islands in the East and South China Seas, raise concerns about security vulnerabilities for neighboring countries.

3. Supply chain and investment leverage: Heavy reliance on Chinese components exposes other nations to economic coercion or trade disruptions in case of potential disputes. Further, China's investment in its neighbors' infrastructural development creates asymmetric dependencies. For instance, the State Grid Corporation of China owns a 40% stake in the National Grid Corporation of the Philippines, which could become a threat to the latter's national sovereignty and energy security.

4. Cybersecurity risks: Increased offshore wind farms' technological sophistication and reliance on digital control systems makes them vulnerable to cyberattacks that could disrupt operations or compromise national grid stability.

Opportunities Ahead

Despite geopolitical complexities and technical hurdles, the outlook for offshore wind in EAP remains promising:

- **Technological advancements:** Innovations in floating turbines and energy storage solutions will unlock new opportunities across deep-water regions, most notably Japan and the Philippines.
- **Policy support:** EAP governments are increasingly prioritizing renewable energy through strategic plans, favorable policies, and incentives aimed at attracting foreign developers and investors.
- **Diversification:** Partnerships with European original equipment manufacturers (OEMs), developers, and suppliers could enhance supply chain resilience and decrease reliance on Chinese imports.

Going forward, China, despite rising geopolitical tensions with regional neighbors and the United States along with domestic economic challenges, will continue leading the charge due to its scale and cost advantages. Japan and Taiwan's markets are projected to grow steadily with increased technological expertise, especially for offshore technologies, and diversification of supply chains and capital sources to include European partnerships. Emerging markets like Vietnam and the Philippines must overcome regulatory bottlenecks to attract investment while balancing geopolitical risks and dependencies on Chinese investments.

In EAP, offshore wind holds immense promise as both an engine of economic growth and a pillar of sustainable development—provided nations can navigate turbulent waters ahead.

Image courtesy LDA

One-on-One with GAËL CAILLEAUX, RENEWABLES GENERAL MANAGER, LDA

***Louis Dreyfus Armateurs**, a 170-year-old French family-owned company operating across a broad swath of maritime and offshore energy, recently announced a shipbuilding order and fleet expansion with the order for a series of three next generation SOVs, a series that will lean on five years of experience operating some of the first Hybrid-Electric SOVs. **Gaël Cailleaux, Renewables General Manager, LDA** takes a deep dive into the company, the investment in the future fleet, and the lessons learned from that first series of ships that will be leveraged in the next series.*

LDA's journey over the past five years has been marked by significant strategic shifts. Moving away from its traditional dry bulk transportation division, the company has refocused on specialized industrial services, including aircraft parts transportation, telecom cable activities, and renewable energy support. Today, LDA operates a fleet of over 100 vessels – 23 under the French flag – and employs 3,000 people, and it continues to expand its footprint in key maritime sectors.

"We've seen tremendous growth across our core businesses," said Cailleaux. "In transportation and logistics, we're set to double our fleet of RoRo vessels. In submarine cable installation and repair, we've added four new vessels since 2019. And in offshore wind, we've secured a major contract with Vattenfall for up to three new SOVs, complementing our existing fleet serving Orsted."

EXPANDING THE OFFSHORE WIND FLEET

A major milestone in LDA's offshore wind ambitions came with its recent announcement of a new series of SOVs designed to support operations in the North Sea's challenging conditions. The company has selected Salt Ship Design as the naval architect and ZPMC shipyard in China to construct the vessels.

"We're not newcomers to this market," Cailleaux notes. "Our first SOVs, Wind of Change and Wind of Hope, were launched in 2019 for Ørsted and have proven to be highly successful, leading to contract extensions. This experience allowed us to win a competitive bid with Vattenfall, and we're applying those lessons to refine our next-generation vessels."

To that end, the new SOVs will feature enhanced crew comfort, optimized workspaces for technicians, and cutting-edge energy efficiency measures. They will also be designed to withstand North Sea conditions with 99% operational uptime, ensuring reliable service for offshore wind farms.

One of LDA's key innovations in its new SOVs stems from real-world operational data. Hybrid-electric propulsion, first introduced in the Wind of Change, has proven to be a game-changer in reducing fuel consumption and emissions.

"Based on years of operational insights, we've made three major improvements," Cailleaux said. "First, a redesigned layout for technician workflow, reducing unnecessary steps and improving efficiency. Second, optimized electrical systems and energy-efficient equipment to cut consumption. And third, enhanced seakeeping capabilities for better performance in rough waters."

OFFSHORE WIND'S GROWTH & LDA'S ROLE

The offshore wind sector is expanding at an unprecedented pace. Europe's installed capacity is set to quadruple from 40GW today to 140GW by 2030, fueling demand for SOVs and Crew Transfer Vessels (CTVs). Cailleaux sees this as a major growth driver for LDA's fleet.

"As wind farms move further offshore, the industry will rely more on SOVs than CTVs," Cailleaux said. "This aligns well with our expertise. We're also actively involved in installing inter-array cables, which complements our vessel operations."

Beyond fleet expansion, decarbonization is another pressing priority. The maritime industry accounts for [approximately] 3% of global CO2 emissions, and LDA is committed to sustainable solutions, exploring full-electric,

Image courtesy LDA

> *"We're not newcomers to this market. Our first SOVs, Wind of Change and Wind of Hope, were launched in 2019 for* **Ørsted** *and have proven to be highly successful, leading to contract extensions. This experience allowed us to win a competitive bid with* **Vattenfall**, *and we're applying those lessons to refine our next-generation vessels."*
>
> **– GAËL CAILLEAUX, RENEWABLES GENERAL MANAGER, LDA**

Image courtesy SALT

e-methanol, and other alternative fuels to meet client demands for greener vessels.

FRANCE'S SAINT NAZAIRE OFFSHORE WIND FARM

Among LDA's most notable projects is the Saint Nazaire Offshore Wind Farm, located 10 nautical miles off the French coast. LDA first secured a contract to install inter-array cables, successfully completing the project in 2020-2021. Building on this success, the company later won a contract to operate three CTVs for ongoing maintenance, supporting both General Electric (turbine manufacturer) and EDF (wind farm operator). "It was a complex, multi-phase project that showcased our ability to deliver end-to-end solutions in offshore wind," Cailleaux said. "It also reinforced the strong synergy between our divisions."

NAVIGATING A SHIFTING GEOPOLITICAL LANDSCAPE

Geopolitical events have added uncertainty to global markets, but LDA sees offshore wind as a resilient and growing sector. Through the LDA lens, there are three major markets today:

- **Europe** – The world's most mature offshore wind market here LDA is "very active."
- **North America** – Political decisions have slowed this market, but LDA has no exposure here.
- **Asia** – An interesting market in its infancy. LDA is engaged and interested to expand here.

While developments in North America remain outside its immediate focus, the European market continues to offer substantial opportunities. "Geopolitical challenges are actually accelerating offshore wind development in Europe, and we're well-positioned to benefit from this growth," Cailleaux said.

LDA's ambitions received a major boost in February 2024, when InfraVia acquired an 80% stake in the company, paving the way for a €1 billion investment over the next several years. This capital infusion will enable LDA to double its fleet, accelerate technological innovation, and further its commitment to energy transition.

"We're entering a new era of growth and innovation," Cailleaux concludes. "With this investment, we will design the maritime services of tomorrow, integrating cutting-edge technologies into our fleet and infrastructure."

TODAY, LDA OPERATES A FLEET OF OVER 100 VESSELS – 23 UNDER THE FRENCH FLAG – AND EMPLOYS 3,000 PEOPLE, AND IT CONTINUES TO EXPAND ITS FOOTPRINT IN KEY MARITIME SECTORS.

Images courtesy LDA

Photo courtesy Lim Weixiang

FPSO FLEET FILLS OUT

The global FPSO fleet is trending towards more, and large capacity, newbuilds.

By Wendy Laursen

The FPSO market in 2025 is expected to remain stable, with 10 to 12 offshore production projects reaching final investment decisions (FIDs)—a continuation of 2024 trends. Brazil remains a focal point, with Petrobras leading significant developments, including the Petrobras 86 project and SEAP 1 and SEAP 2 FPSOs. Shell's Gato do Mato project is also anticipated to move forward early in the year.

"The year is front-loaded with Brazil's activity," says Matt Tremblay, Vice President, Global Offshore at ABS. "We expect around four to six FIDs in both the first and second halves of 2025, with the majority leaning toward new construction. However, some conversions will still play a role."

Traditionally, FPSO conversions—modifying existing tanker hulls for offshore production—offered a cost-effective and faster alternative to newbuilds. However, the industry has seen an increasing tilt toward new construction, with 80% of projects in 2024 being newly built.

This trend is fueled by major players such as Exxon and Petrobras, who are commissioning high-capacity FPSOs, exceeding 200,000 barrels per day. Tremblay notes, "Conversions can't accommodate FPSOs of this scale, as they're larger than even the biggest ultra-large crude carriers (ULCCs). And with limited shipyards capable of building them, costs are naturally higher."

The global supply chain remains a critical concern

THE LIZA UNITY FPSO IS DESIGNED TO PRODUCE APPROXIMATELY 220,000 BARRELS OF OIL PER DAY, TO HAVE ASSOCIATED GAS TREATMENT CAPACITY OF 400 MILLION CUBIC FEET PER DAY AND WATER INJECTION CAPACITY OF 250,000 BARRELS PER DAY.

Image courtesy SBM Offshore

"These projects are not pushed off the quayside at the earliest opportunity. We want to make sure that they're fully commissioned and ready for operation."

– Alexander Glenn,
Chief Operating Officer of SBM Offshore

for FPSO construction. Tremblay emphasizes that while equipment delivery delays have stabilized, prices continue to rise.

"The cost of FPSOs has soared," he said. "The P-78 FPSO was contracted at $2.5 billion, but just a few years later, P-84 and P-85 are each valued at $4.1 billion."

A key factor behind this cost escalation is vendor strategy. Tremblay compares FPSO equipment manufacturers to offshore drillers: "After years of financial losses, they're holding off on expanding capacity and instead capitalizing on high demand to maximize profitability. ABS has surveyors embedded in these shops, and we see firsthand that capacity isn't being added."

Another part of the supply chain equation is the shipyard.

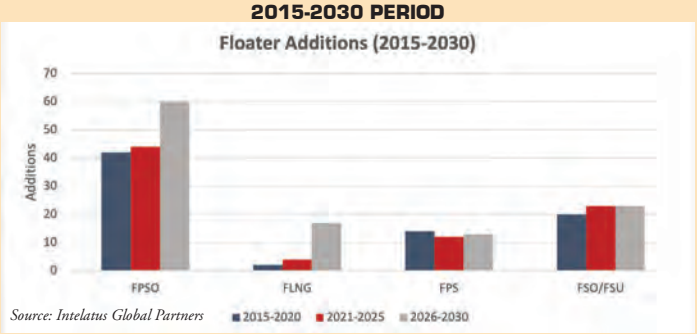
With only a handful of shipyards capable of building FPSOs, the market remains constrained, and China dominates, with four to five active yards, while South Korea's Hanwha is aggressively competing for market share, leveraging geopolitical concerns, specifically U.S./China relations.

Meanwhile, even the shipyards that dominate the FPSO sector are actively weighing their options, as shipyards must weigh the size and particularly the length of FPSO contracts against more profitable alternatives like gas carriers. "FPSOs take a lot of steel; they're big; they take up a ton of space. I can probably build three, maybe four gas carriers per square meter of dry dock space versus one

FPSO Building Yards

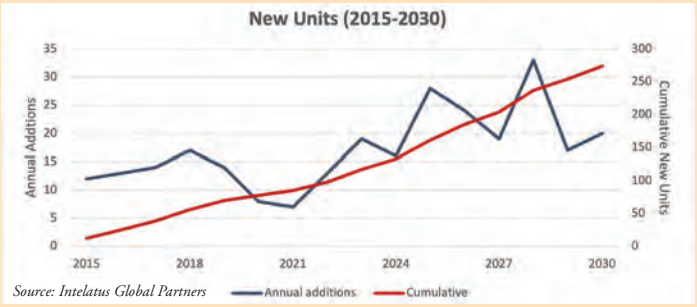
The following chart shows FPSOs, FLNGs, FPSs (semis, TLPs, spars and barges) and FSO/FSUs. An average of 13 units were added annually in 2015-2020. The booked and forecast units for 2021-2025 represent an average of 20 units per year, from which we infer a more active market.

NEW FLOATING PRODUCTION AND/OR STORAGE UNITS IN 2015-2030 PERIOD



Other floater segments, FPSOs are the largest as shown below.

FLOATER ADDITIONS IN 2015-2030



New builds account for slightly over 50% of all new floaters, the balance being conversions and upgrades of existing units.

Images courtesy SBM Offshore

PROSPERITY IS OPERATING IN THE STABROEK BLOCK, GUYANA AND CURRENTLY HAS PRODUCTION CAPACITY OF 252,000 BARRELS PER DAY.

FPSO; so I'm making more money building gas carriers than I am building FPSOs," observed Tremblay.

According to data from **Intelatus**, Chinese yards are currently forecast to build or convert two thirds of declared FPSOs in 2020-2030. Singapore is a far second place with ~15% share and the UAE in third place with ~8%. COSCO (~20% share), CIMC Raffles (~15% share), CMHI (~13% share), CSSC yards (~8%) and COOEC (~7%) are the main Chinese FPSO building and conversion yards. COSCO, CMHI and COOEC also have non-FPSO floater orders.

Seatrium, bringing together the history of Sembawang and Keppel, has an FPSO market share similar to CMHI (~15%), but is also a significant player in other floater segments with nine confirmed projects in the period.

Dubai Drydocks has an~8% FPSO share in the period and also a significant capture of other floaters with six confirmed projects.

SBM Offshore's Fast4Ward program, which builds standardized FPSO hulls on spec, helps to shorten delivery timelines, bringing newbuilds below the traditional 36–40 months to 24-27 months. The benefits of standardization have been demonstrated across many industries, but achieving it on an FPSO is challenging. Much of the topside equipment needs to be customized to each field's specific characteristics including reservoir pressures and fluid composition.

The Fast4Ward concept, developed in 2015, therefore focuses on standardization of the hull, says Alexander Glenn, Chief Operating Officer of SBM Offshore. Beyond that, rather than macro standardization, smaller elements such as light fittings and handrails are standardized. Within each customer's requirements, further standardization is possible too, and SBM Offshore tends to use the same contractors, making gains in quality, timeliness and safety by standardizing their supply chain.

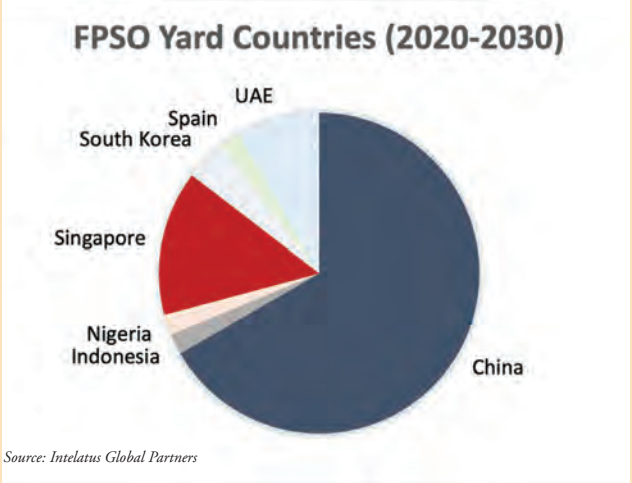
The first Fast4Ward contract was awarded in 2019. Since then, SBM has had three contracts in Brazil, four in Guyana and one in Suriname. Six have been delivered and three are under construction. The floaters are generally built in HWS Shanghai Waigaoqiao Shipbuilding or CMHI, with topside integration then occurring at a range of yards globally including BOMESC, Seatrium, CMHI and COSCO.

"Something that we've been focusing on is to deliver very complete and commissioned products. These projects are not pushed off the quayside at the earliest opportunity. We want to make sure that they're fully commissioned and ready for operation."

Glenn cites the example of the Prosperity FPSO in Guyana. "She sailed away from Singapore about two years ago and has been recordable-incident-free. She achieved first oil in line with the customer's schedule expectations, and only 30 days after first oil, she achieved gas injection. This meant that we could stop the flaring associated with the initial startup. Only 40 days after that, she was up to full

Drilling down to FPSO yards

Chinese yards are currently forecast to build or convert two thirds of declared FPSOs in 2020-2030. Singapore is a far second place with ~15% share and the UAE in third place with ~8%.



Source: Intelatus Global Partners

production capacity, and since startup, she has achieved an uptime of over 99.5%."

What we are seeing in the market is a steady increase in size and complexity, says Glenn. "In 2015, topsides typically weighed around 20,000 tons, we're now looking typically at 45,000 tons. That's typically the result of increasing capacity requirements. These assets are around 200,000 barrels of oil per day and about 400 million cubic feet of gas handling a day. In addition, we now have efforts to reduce carbon intensity which brings additional technology onto these assets, driving up topside weight."

This means more newbuild FPSOs, and more opportunities for Fast4Ward. It's a trend Glenn sees continuing with the increase in oil and gas developments off South America and West Africa. These regions have very deep water, very large and very productive reserves, and that productivity brings a lower carbon intensity and lower costs per barrel for developers.

All images courtesy Well-Safe Solutions

OETV
Watch the full interview with James Richards on ***Offshore Engineer TV***

ENGINEERING THE END: PULLING THE PLUG ON OLD WELLS

Well-Safe Solutions, a seven-year-old company with already more than 300 employees and 100 well decommissioning projects under its belt, relies on its fleet – two semisubmersibles and one jack-up – but more so on its engineering acumen to successfully, safely take old offshore assets out of action. ***James Richards, Well Abandonment Director, Well-Safe Solutions*** *discusses with Offshore Engineer insights on the technology driving the business, as well as the next fertile grounds for decommissioning activity.*

By Greg Trauthwein

Decommissioning is no longer the footnote of offshore development—it's a core engineering discipline. As the global offshore oil and gas sector faces the challenge of aging infrastructure, well abandonment has moved to the forefront of late-life asset strategy. At the center of this evolution is Well-Safe Solutions, a UK-based company purpose-built for well decommissioning, applying engineering precision to dismantle decades of legacy infrastructure safely and efficiently.

OE spoke with Richards to understand how the company is executing complex projects, advancing technical capabilities, and helping operators reduce cost and risk in one of the most uncertain phases of the asset lifecycle.

"Well abandonment is highly complex—it's where uncertainty, degraded infrastructure, and legacy engineering all converge," says Richards. "It requires specialized planning, purpose-built tools, and a different mindset than traditional drilling."

Richards began his career with BG Group in 2008, working globally on HPHT and deepwater campaigns before shifting to late-life operations in the North Sea with CNR in 2013. His transition into decommissioning—starting with the Murchison and Ninian Northern platforms—highlighted the scale and technical nuance of abandonment work. That experience led him to join Well-Safe Solutions in 2019, a move that aligned with the company's mission: to create a dedicated, de-risked approach to well P&A.

Today, Richards leads the company's well engineering team, overseeing everything from front-end studies to full-field execution. His focus is not just on operations, but on building the multidisciplinary team required to solve the unique challenges of well abandonment.

"You need a hybrid skillset—part drilling engineering, part intervention, part brownfield operations," he says. "P&A is not just about plugging—it's about forensic well evaluation, barrier design, and managing aging infrastructure with limited documentation."

A FIT-FOR-PURPOSE FLEET STRATEGY

Well-Safe's operating model centers on ownership and optimization of rigs tailored for decommissioning. The company currently operates three units: the Well-Safe Guardian and Well-Safe Defender, both semi-submersibles, and the Well-Safe Protector, a jack-up. All three assets were acquired from previous drilling campaigns and reactivated specifically for late-life operations.

"These rigs were selected not for their generation, but for their compatibility with legacy assets," Richards said. "We're not chasing seventh-generation drillships—we need units with the right load profiles, BOP specs, and deck layouts to safely interface with infrastructure from the 1980s and '90s."

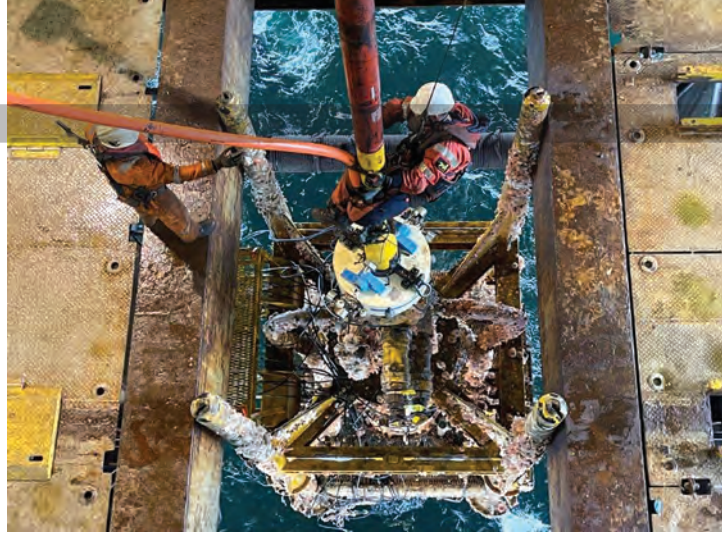
"We estimate that around 30% of subsea wells in the North Sea were drilled before diver-less systems became standard. That's more than a thousand wells that still require diver intervention."

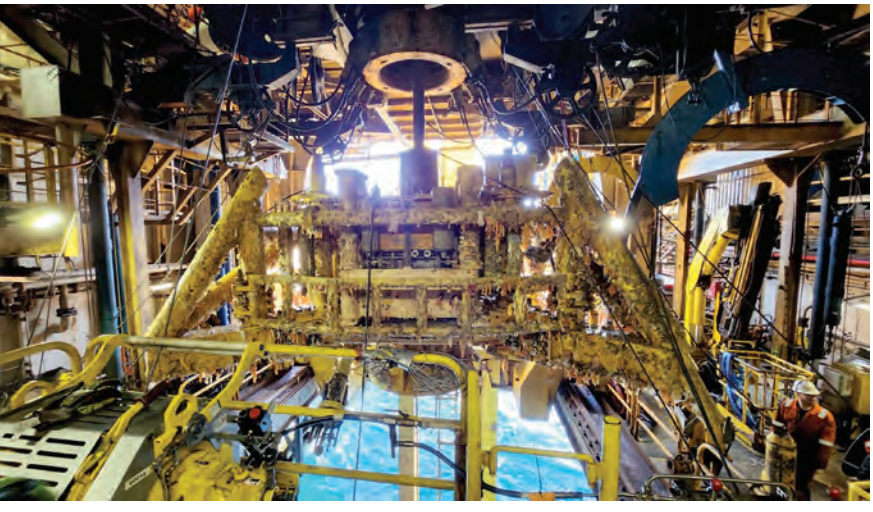
– James Richards,
Well Abandonment Director,
Well-Safe Solutions

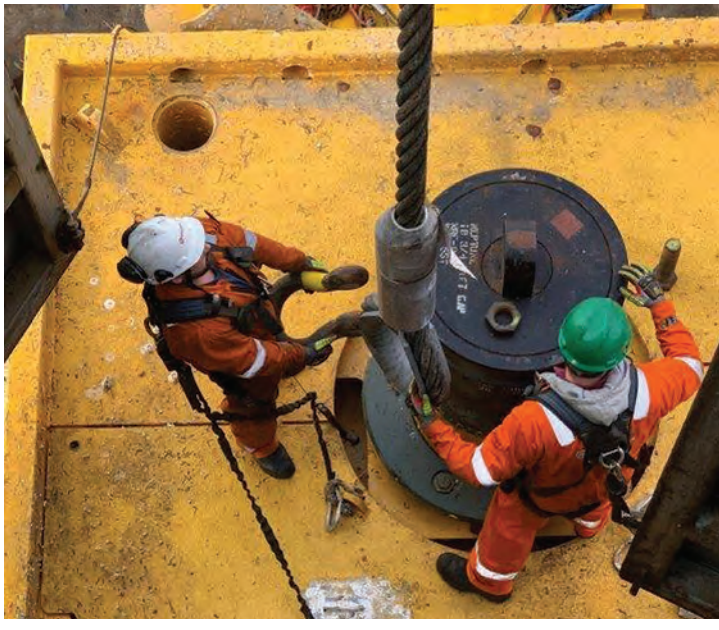
Unlike modern drilling rigs, whose high hook loads and complex well control systems may be incompatible with legacy wellheads, Well-Safe's rigs are tailored for lower-pressure environments and optimized for campaign-mode decommissioning. The company has decommissioned over 100 wells to date, with headcount now exceeding 30 across its offices in the UK and Malaysia.

WELL-SAFE GUARDIAN: A MULTI-MISSION PLATFORM

The company's flagship asset, the Well-Safe Guardian, is one of the few offshore rigs equipped with both a saturation dive system and a Trident Intervention Module, making it uniquely capable of subsea well decommissioning in the North Sea. "We estimate that around 30% of subsea







wells in the North Sea were drilled before diver-less systems became standard," says Richards. "That's more than a thousand wells that still require diver intervention."

The onboard D300 sat dive system allows divers to perform critical mechanical operations—manipulating valves, reinstating hydraulic control lines, or removing structural debris—that ROVs can't handle reliably. This eliminates the scheduling complexity of mobilizing a separate dive support vessel and allows Well-Safe to execute diving and rig-based abandonment operations in parallel.

The integration of SIMOPS (simultaneous operations) further enhances efficiency. "We can have divers preparing one well while we're setting mechanical barriers downhole on another. It's a force multiplier," Richards says. "And if something unexpected comes up—like a leaking line—we have the inbuilt capability to intervene without delay."

TECHNOLOGY IN CONTEXT: BEYOND THE SILVER BULLET

While emerging technologies are critical, Richards cautions against overreliance on novelty at the expense of fundamentals. "There's a tendency in decommissioning to look for silver bullets," he says. "But the biggest cost and risk reductions still come from front-end design—barrier strategy, risk analysis, contingency planning. If we can eliminate a barrier through engineering, we might cut P&A cost by 50%. No tool offers that magnitude of impact."

That said, technology plays a vital role when thoughtfully deployed. Well-Safe is actively exploring or utilizing:

- Thermite plugs, used to create foundational support for conventional cement barriers in difficult geometries;
- Multi-casing logging tools, enabling better diagnostics of annular pressure or barrier condition in old completions;
- Lightweight BOP systems using explosively actuated shear rams, a solution for wellheads that can't support full-weight hydraulic systems.

"These tools expand the envelope of what's possible—but they don't replace rigorous planning," Richards says. "We treat technology as another instrument in the toolbox—not the blueprint."

GLOBAL GROWTH, REGIONAL ADAPTATION

Well-Safe is currently expanding into Asia-Pacific, with new offices in Kuala Lumpur. The shift is driven by growing decommissioning demand in Australia, Southeast Asia, and eventually Brazil. "Southeast Asia is looking closely at North Sea P&A practices," Richards says. "But it's not a straight export—you have to adjust for different well types, geological conditions, and regulatory regimes."

Australia's offshore infrastructure is approaching end-of-life, while Brazil's shallow water assets—less visible than its high-profile pre-salt—are also nearing abandonment thresholds. Richards anticipates that knowledge transfer, not just hardware, will be Well-Safe's key export.

CCS AND THE NEXT PHASE OF LATE-LIFE STRATEGY

The overlap between well decommissioning and carbon capture and storage (CCS) is increasingly relevant. Many legacy assets being abandoned today could become future CCS injection sites—or at least must be assessed for CCS integrity risks. "If you're abandoning a well in a field with CCS potential, your barrier strategy needs to reflect that," Richards explains. "And conversely, if you're assessing a site for CCS, you need to understand the integrity of every legacy well. This is where our work directly supports future emissions mitigation."

Well-Safe has already supported several CCS pre-assessment projects and sees this as a natural extension of its technical base.

CASE STUDY: SIMOPS IN THE SOUTHERN NORTH SEA

A recent campaign using the Well-Safe Protector on a Southern North Sea platform illustrated the advantages of integrated, flexible operations. The team executed SIMOPS by performing digital slickline work from a moonpool while simultaneously deploying the BOP through the main rotary. The operation allowed for efficient plug placement without repeated BOP rig-up/rig-down between wells. Midway through the campaign, a velocity string—not listed in the well records—was discovered in one wellbore. Rather than halting operations, the team sidetracked to other wells, while a parallel onshore team engineered a recovery plan. By the time the program returned to the problematic well, the necessary tools were staged and ready, allowing abandonment to proceed without NPT.

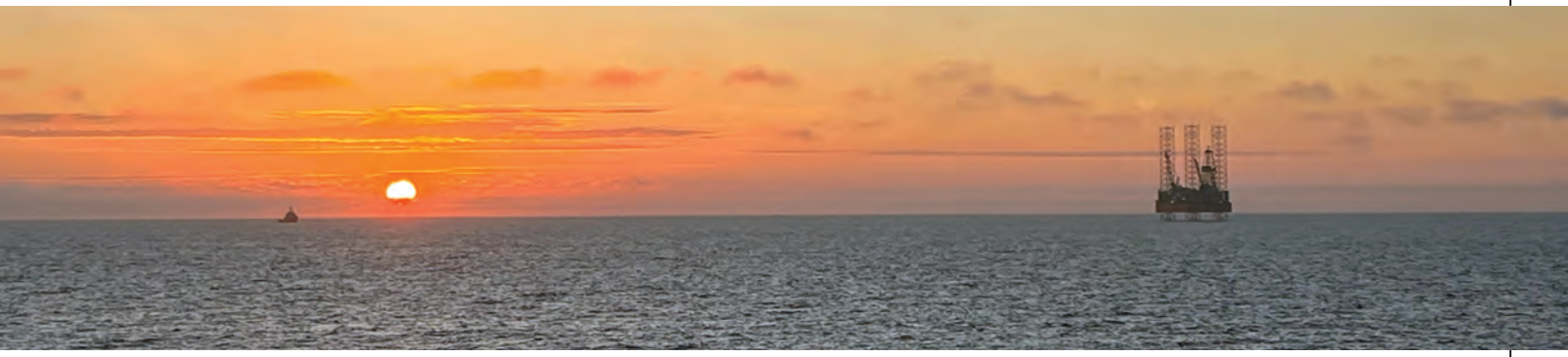
"That's the reality of decommissioning," Richards says. "Unknowns are part of the job. But with the right structure, you can solve problems without losing time."

ENGINEERING THE EXIT

Well-Safe's philosophy is rooted in treating decommissioning as an engineering discipline—not just a regulatory obligation. With purpose-built assets, a focused team, and a methodical approach to risk and cost reduction, the company is helping operators navigate the late-life phase more strategically. "Decommissioning isn't just about removing a liability," says Richards. "It's about applying engineering to secure the subsurface for the next 100 years—whether that's for permanent abandonment, CCS, or something else entirely."

For a sector confronting the full arc of the asset lifecycle, Well-Safe Solutions is engineering not just an exit—but a legacy.


WELL-SAFE
SOLUTIONS
WELL-SAFE
GUARDIAN
WELL-SAFE
GUARDIAN



WELL-SAFE GUARDIAN

Type: Semi-Submersible Drilling Rig
Original Build: 1985 (upgraded for P&A operations)
Water Depth Rating: Up to 1,500 ft
Well Depth Capability: ~20,000 ft
Notable Features:
- Integrated D300 saturation dive system
- Trident Intervention Module for subsea well access
- SIMOPS capability for simultaneous diving and rig-based operations
- Enhanced for legacy subsea wellhead interface
- Fully certified for UKCS operations

The skinny: Unique in the North Sea as the only rig with onboard saturation diving and subsea intervention tooling.

WELL-SAFE PROTECTOR

Type: Jack-Up Drilling Rig
Original Build: 1983 (converted for decommissioning)
Water Depth Rating: Up to 400 ft
Well Depth Capability: ~15,000 ft
Notable Features:
- Optimized for platform well P&A
- Digital slickline compatibility
- Equipped for SIMOPS with modular deployment
- Proven in congested surface infrastructure environments
- Advanced skidding and cantilever reach for tight well layouts

The skinny: Ideal for North Sea platform campaigns requiring flexible deployment and minimal footprint.

WELL-SAFE DEFENDER

Type: Semi-Submersible Drilling Rig
Original Build: 1983 (upgraded)
Water Depth Rating: Up to 1,500 ft
Well Depth Capability: ~20,000 ft
Notable Features:
- Second-generation semi optimized for well abandonment
- Configured for campaign-mode efficiency
- Modular setup supports rig-based and intervention operations
- Redundant well control systems for legacy completions
- Enhanced deck space for multi-well logistics

The skinny: Built for scalable subsea abandonment projects across the North Sea and beyond.

Image courtesy Saab Seaeye

KEEPING WATCH

No longer just FIFO workers, subsea vehicles are settling in for long-term IMR assignments.

By Wendy Laursen

Saipem's legion of subsea drones can operate continuously for up to 12 months, working 12-hour shifts and then recharging for 12 on a docking station located on the seabed.

The Hydrones are designed for inspection, maintenance and repair (IMR) activities at depths of up to 3,000 meters. The AI-enabled vehicles can be the size of a Fiat 500 and can perform complex tasks in challenging conditions.

Beyond subsea dormitories, Saipem plans to pair the drones with advanced stationary monitoring solutions, creating a subsea Internet of Things to efficiently assess the integrity of subsea infrastructure and drive operational decisions with greater automation and autonomy. Mauro Piasere – Chief Robotics and Industrialized Solutions, says: "Thanks to these drones and other advanced monitoring solutions, Saipem can enable a deep digital transformation of the subsea world where collected data are used to monitor and manage infrastructures more effectively."

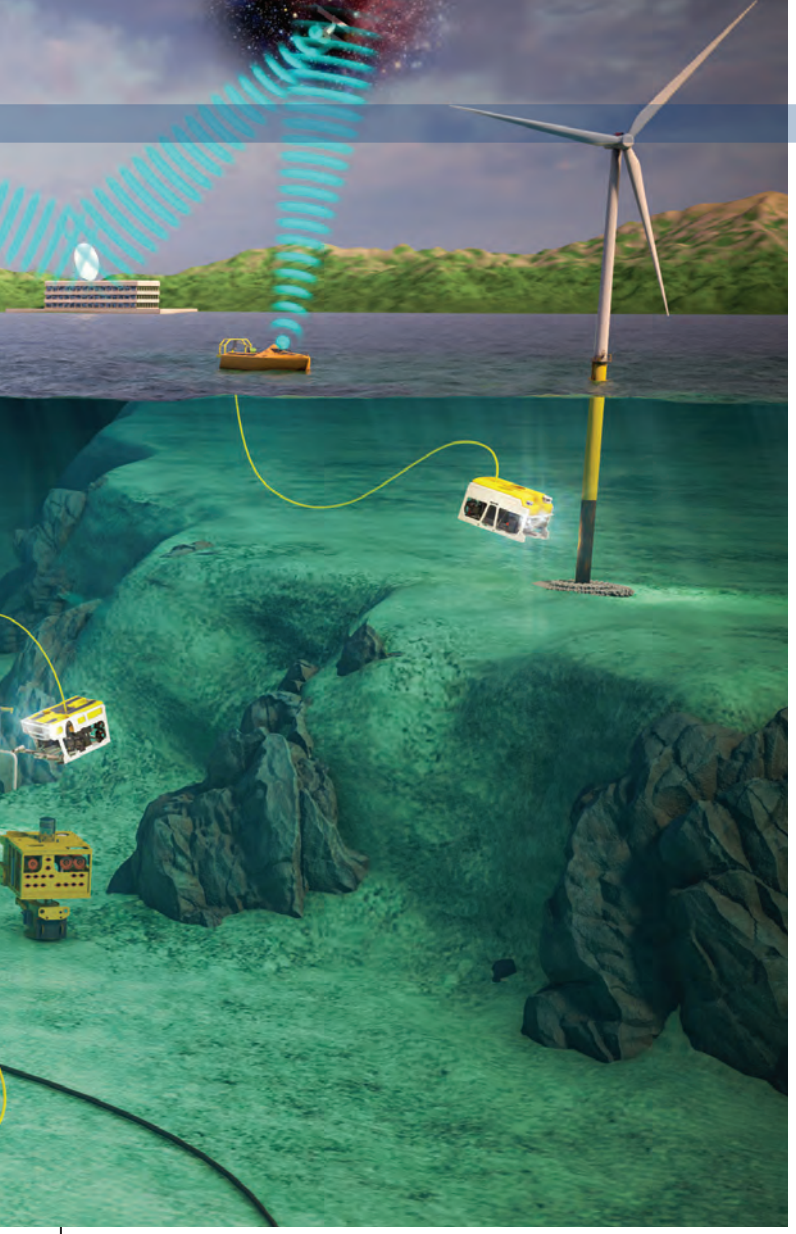


Image courtesy Saipem

"Thanks to these drones and other advanced monitoring solutions, Saipem can enable a deep digital transformation of the subsea world where collected data are used to monitor and manage infrastructures more effectively."

– MAURO PIASERE,
CHIEF ROBOTICS AND INDUSTRIALIZED SOLUTIONS, SAIPEM

Sensor technology is keeping pace with the needs of autonomous operation, with Teledyne finding increased demand for synthetic aperture sonar, high specification cameras and subsea LiDAR. Arnar Steingrimsson, Vice President of Sales - Marine Vehicles at Teledyne Marine, is also seeing demand for deeper operations, and along with longer stay times, this means bigger batteries and bigger vehicles.

Using AI, Teledyne has developed an autonomous system for identifying and tracking pipelines. "Grid surveys over an area don't guarantee the best data over the object of interest," says Steingrimsson. But while offshore energy companies are looking for operational gains, Steingrimsson is also seeing a greater interest in surveillance monitoring, sparked by recent sabotage events.

AUV residents are ideal. It's not feasible to have ships monitoring subsea infrastructure long-term, and the market is already responding. In response to Europe's growing security challenges, for example, German company FLANQ has just launched a suite of commercial-off-the-shelf USVs, drones and sensor payloads, powered by AI.

Crewed offshore support vessels are likely to see their workload reduce with the increasing use of USVs. Lloyd's Register recently granted Approval in Principle to Brazilian company TideWise for its 24-meter DP2 USV which has an endurance of 35 days and the ability to deploy a work-class ROV at depths of up to 2,500 meters. Like AUVs, the endurance of USVs in increasing.

Saab UK's recently released Seaeye SR20 ROV is designed with USVs or minimally crewed vessels in mind, says Jon Robertson, Managing Director at Saab Seaeye. It is also compatible with the latest camera and perception technologies, which means it can deliver high-quality, high-resolution inspection data. "As the market shifts toward greater automation, we're seeing more emphasis on automating both data acquisition and data processing to

Images courtesy Saab Seaeye

"As the market shifts toward greater automation, we're seeing more emphasis on automating both data acquisition and data processing to deliver actionable insights quickly."

– JON ROBERTSON,
MANAGING DIRECTOR, SAAB SEAEYE

SAAB UK'S RECENTLY RELEASED SEAEYE SR20 ROV IS DESIGNED WITH USVS OR MINIMALLY CREWED VESSELS IN MIND.

deliver actionable insights quickly.

These advancements are helping to shape the future of the IMR market by enabling more efficient, remote and continuous operations."

Robertson says the SR20 has a high payload capacity and can be quickly adapted to a variety of tasks whether it's conducting detailed inspections, performing complex maintenance work or handling heavy-duty repairs and equipment. It can remain stable, even in strong currents, to capture accurate data and perform precise interventions. The SR20 also comes equipped with dual Seaeye eM1-7 electric manipulators, and it will be compatible with subsea exchangeable tools in the future.

Reach Robotics has released its new X7 subsea manipulators which enable operators to execute dexterous intervention operations that traditionally have been performed by either divers or work class ROVs. "It seems many groups are trying to eliminate the risk and subsequent cost of human divers in the water," says Curtis Opsahl, Sales Engineer, The Americas. "And it appears that this is achievable for most tasks. Rigging, cutting, cleaning, NDT, reduction of biofouling — this can all be achieved by smaller ROVs with manipulators like Reach Robotics'.

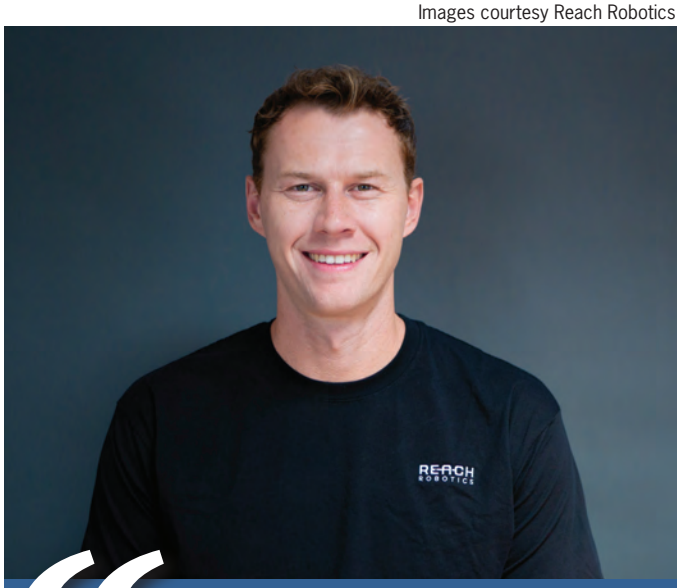
"By using a one-man-portable ROV to efficiently perform light intervention tasks, such as attaching lifting leader lines or threading hydraulic couplers, we eliminate the need for divers in the water or the expense of a work class ROV and its support vessel."

Even where specific force modulation, situational awareness or tooling requires a diver, these systems can be a force multiplier by preparing the areas or doing some prework, not too dissimilar to a surgeon's assistant, he says. "And we're only on the cusp of what these systems can do. While there may always be a need for divers in certain situations, if we can reduce that reliance by, say, 75%, we're eliminating a material amount of human risk."

Oceaneering Product Manager Iain Wylie says the company's Freedom AUV can hover and work in six de-

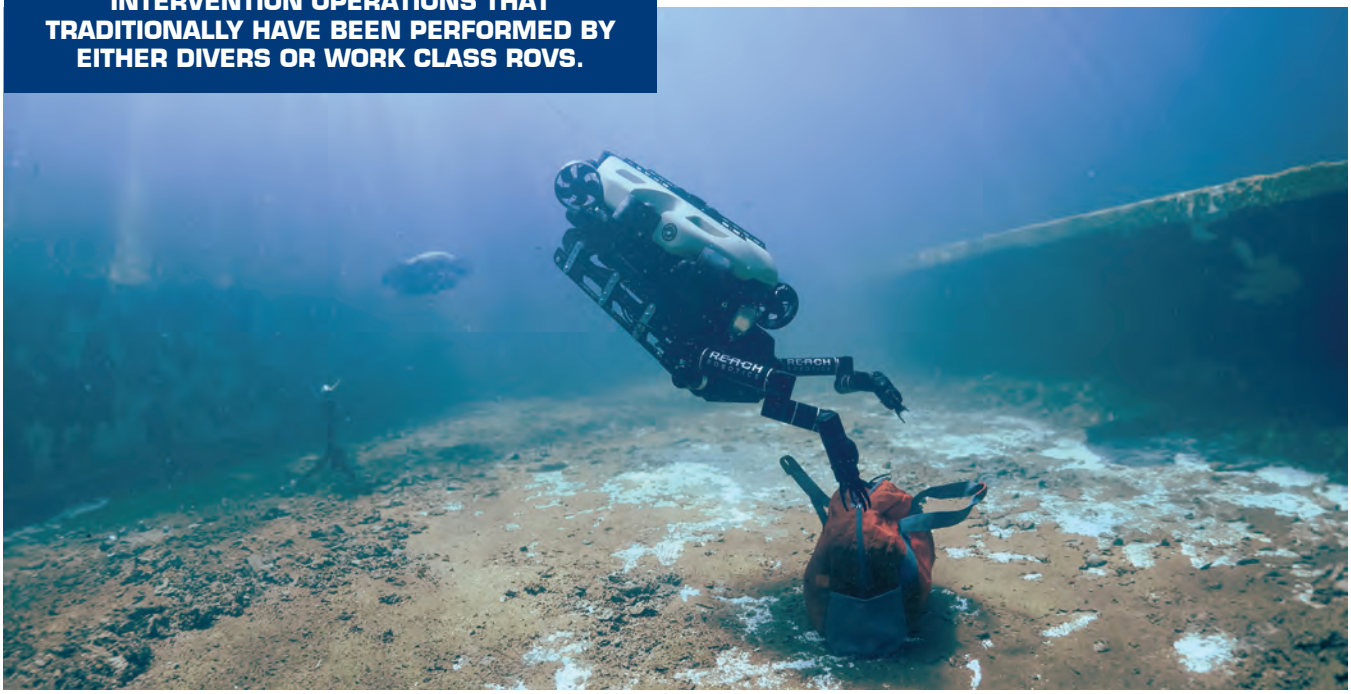
Images courtesy Reach Robotics

REACH ROBOTICS HAS RELEASED ITS NEW X7 SUBSEA MANIPULATORS WHICH ENABLE OPERATORS TO EXECUTE DEXTEROUS INTERVENTION OPERATIONS THAT TRADITIONALLY HAVE BEEN PERFORMED BY EITHER DIVERS OR WORK CLASS ROVS.

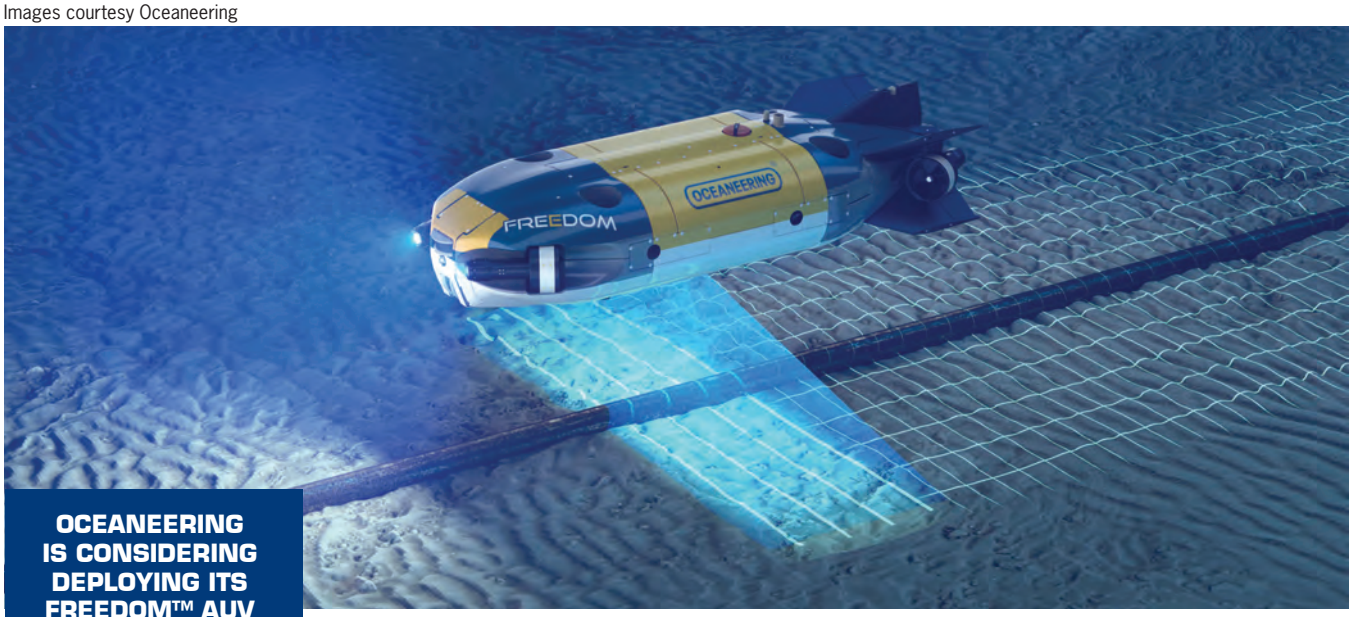


"Rigging, cutting, cleaning, NDT, reduction of biofouling — this can all be achieved by smaller ROVs with manipulators like Reach Robotics'."

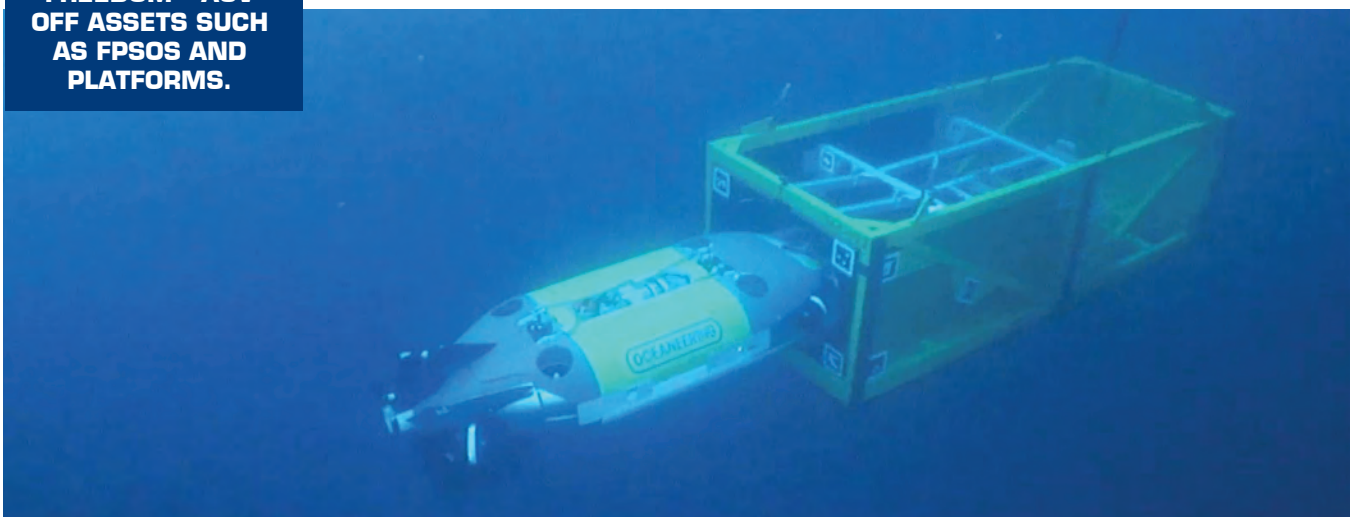
– CURTIS OPSAHL,
SALES ENGINEER, THE AMERICAS, REACH ROBOTICS



Images courtesy Oceaneering



OCEANEERING IS CONSIDERING DEPLOYING ITS FREEDOM™ AUV OFF ASSETS SUCH AS FPSOS AND PLATFORMS.



grees of freedom so as it approaches subsea structures, like pipeline manifolds, it can get close to the asset and capture a 360-degree image of the structure before continuing with its survey.

Inspection is the backbone of an integrity program, ensuring the damage mechanisms are monitored and fatigue models are accurate, he says, and the Freedom AUV helps reduce the cost of data capture allowing for more cost-effective compliance or more frequent inspections to support data driven risk-based inspection.

The more AUVs achieve, the more is expected of them. "Once we start accessing sites with the AUV we naturally will get pushed to do more than inspect," says Wylie. "Our engineered solutions group stands ready to handle these requests and see what we'd be able to do with what we have. Recently the team was able to cut a 6" pipe and install a pressure retaining plug deployed by a third party V8 observation class ROV."

Oceaneering is considering deploying its Freedom™ AUV off assets such as FPSOs and platforms to reach areas within radius without needing additional vessel support. "In my experience, one of the biggest issues facing maintenance and repair is the cost and opportunity of access, usually via vessel," says Wylie.

Remote and autonomous systems will lead to a reduction in costs and risk, he says. "Vessels can be much smaller with less accommodation required to achieve the same outcome. Maintenance and repair is already done remotely from ships by ROV, this just takes people another step away."

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KEYS TO KEEPING OFFSHORE METAL STRUCTURES SHIP SHAPE

MITIGATING STRESS CORROSION CRACKING (SCC) AND HYDROGEN EMBRITTLEMENT (HE) IN OFFSHORE STRUCTURES.

*Understanding, finding and deploying strategies to mitigate stress corrosion cracking (SCC) and hydrogen embrittlement (HE) are essential to protecting investments in offshore structures. **Paula Lepore**, Global Projects Engineering Manager and **Anshul Godha**, Materials Scientist at Parker Hannifin discuss a new approach to understanding the potential problem and devising a solution.*

By Greg Trauthwein

*Sign up her for Parker Hannifin's WEBINAR entitled **"A Brand-New Approach to Understanding and Mitigating Stress Corrosion Cracking and Hydrogen Embrittlement."***
https://bit.ly/3Y1hiAS

Offshore structures face numerous challenges in harsh marine environments, with stress corrosion cracking (SCC) and hydrogen embrittlement (HE) being among the most significant threats to structural integrity and longevity. These conditions can lead to sudden and catastrophic failures, jeopardizing safety and incurring substantial costs. ***Offshore Engineer*** recently sat down with Paula Lepore, Chief Engineer at Parker Hannifin's Instrumentation Products Division, and Anshul Godha, Material Scientist at Parker Hannifin, to discuss the latest approaches to understanding and mitigating SCC and HE.

The SCC and HE Threat

Stress corrosion cracking is a form of environmentally assisted cracking that occurs when a material under high stress is exposed to a corrosive environment. SCC can cause brittle fractures in otherwise ductile materials, particularly in offshore infrastructure such as pipelines and pressure vessels. Hydrogen embrittlement, on the other hand, results from hydrogen atoms diffusing into metals, reducing their ductility and leading to sudden failure. In offshore settings, where structures are exposed to stress and corrosive marine conditions, even minor cracks can propagate rapidly, risking both safety and operational continuity.

"Together, SCC and HE represent significant threats to

> *Periodic sampling and testing are also crucial in identifying issues early in the field."*
>
> **– Paula Lepore,**
> **Chief Engineer at Parker Hannifin's Instrumentation Products Division, Parker Hannifin**

offshore structures," Godha explained. "These phenomena can initiate cracks earlier than expected and cause rapid propagation, compromising structural integrity and requiring costly repairs."

Monitoring and Testing Techniques

Detecting SCC and HE early is essential for preventing long-term damage. While visual inspection is the most straightforward method, it is often insufficient, particularly for subsea structures or hard-to-reach areas. Advanced non-destructive testing (NDT) methods, such as ultrasonic testing, magnetic particle inspection, and dye penetrant testing, are more effective. Additionally, electrochemical techniques can assess material susceptibility to corrosion, while standardized chemical testing, like ASTM G123 and G38, help evaluate different alloy grades.

"A combination of monitoring and testing methods often provides the most comprehensive assessment," Lepore noted. "Periodic sampling and testing are also crucial in identifying issues early in the field."

Proactive Mitigation Strategies

When it comes to mitigating the effects of SCC and HE, prevention from the outset is paramount. This means selecting the right materials during the design phase—preferably alloys that can withstand the harshest environments. Additionally, minimizing stress through appropriate design practices, such as avoiding sharp corners, using stress relief annealing, and ensuring proper welding, is essential.

Cathodic protection, a technique to reduce metal corrosion electrochemically, is also vital. Keeping water from stagnating and allowing proper drainage can prevent localized corrosion. Having redundant systems in place as a safeguard against unexpected failures is equally important.

Real-World Challenges and Solutions

One practical example shared by Godha involved chemical injection skids used in the oil and gas industry, where components are exposed to extreme pressures (up to 15,000 PSI) and corrosive environments. Traditionally made from coiled stainless steel, these components are prone to SCC under high stress and chloride-rich conditions. Such scenarios illustrate the importance of understanding material behavior under real-world conditions, beyond lab testing.

In the power generation sector, highly stressed alloys exposed to atomic hydrogen can suffer rapid embrittlement, leading to catastrophic failures. Managing these risks requires a nuanced understanding of both material properties and environmental factors.

The Future of Mitigation: Innovations on the Horizon

Looking ahead, advanced material development is leading the charge in combating SCC and HE. High-perfor-

Together, SCC and HE represent significant threats to offshore structures. These phenomena can initiate cracks earlier than expected and cause rapid propagation, compromising structural integrity and requiring costly repairs."

– Anshul Godha,
Material Scientist, Parker Hannifin

mance stainless steels and nickel-based alloys are being designed to resist both phenomena, offering potential breakthroughs in offshore applications. Additionally, digital technologies such as AI, machine learning, and digital twin simulations are enabling engineers to predict and manage stress conditions proactively.

Real-time monitoring systems using advanced sensors are also becoming more prevalent, offering early detection and predictive maintenance opportunities. One promising development from Parker-Hannifin is the SuperShield technology, which significantly improves corrosion resistance while maintaining compatibility with traditional materials.

Mitigating SCC and HE requires a multifaceted approach, combining material selection, stress management, environmental control, and continuous monitoring. As offshore operations continue to push the limits of engineering, integrating new technologies and practices will be crucial to safeguarding structural integrity and minimizing downtime.

"Understanding the problem from the start and applying preventive measures is far more cost-effective than dealing with failures later," Godha emphasized.

For a deeper dive into on the SCC and HE topic, sign up for Parker Hannifin's free webinar scheduled for May 13, 2025:
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Transforming Deepwater Managed Pressure Drilling: A Closer Look at the Subsea Integrated Riser Joints

By Nitin Kulkarni, Project Manager- MPD

Overview

Deepwater drilling has long been a cornerstone of global energy production, yet it remains one of the most technically challenging sectors of the oil and gas industry. The introduction of Managed Pressure Drilling (MPD) has significantly improved the safety and efficiency of deepwater drilling operations. One of the most critical advancements in this domain is the development of Integrated Riser Joints (IRJ), which serves as a fundamental component of MPD operations.

IRJ technology has been an important tool for developing deepwater MPD operations. A recent technical paper, published by the Society of Petroleum Engineers and presented at the IADC/SPE International Drilling Conference at Galveston, provides a detailed review of IRJ technology, covering its design, operational benefits, and implementation challenges. This article highlights the paper's key points and examines the role of IRJs in deepwater MPD operations.

The Role of MPD in Deepwater Drilling

Managed Pressure Drilling (MPD) is an advanced technique designed to address the challenges associated with drilling in high-pressure, high-temperature (HPHT) reservoirs commonly found in deepwater environments. Conventional drilling techniques often prove insufficient when dealing with the narrow pressure margin between formation pore pressure and fracture gradients. This challenge is depicted in Figure 1. If the mud weight is too low, it may not provide sufficient hydrostatic pressure to counteract formation pore pressure, leading to influxes of formation fluids (kicks) and, in extreme cases, well blowouts. If the mud weight is too high, it may exceed the formation's fracture gradient causing fractures and leading to lost circulation into the fractures.

MPD enables real-time pressure management while reducing the risk of influx and loss circulation and thus the technology has been instrumental in improving drilling efficiency, optimizing well designs, and enhancing safety measures in complex drilling environments.

Figure 1a. Pore Pressure and Fracture Gradient Window (Drilling Window) land, shallow water wells

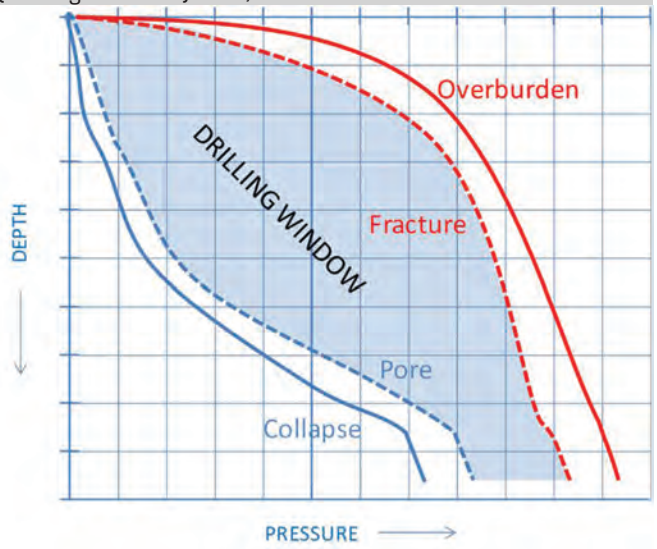
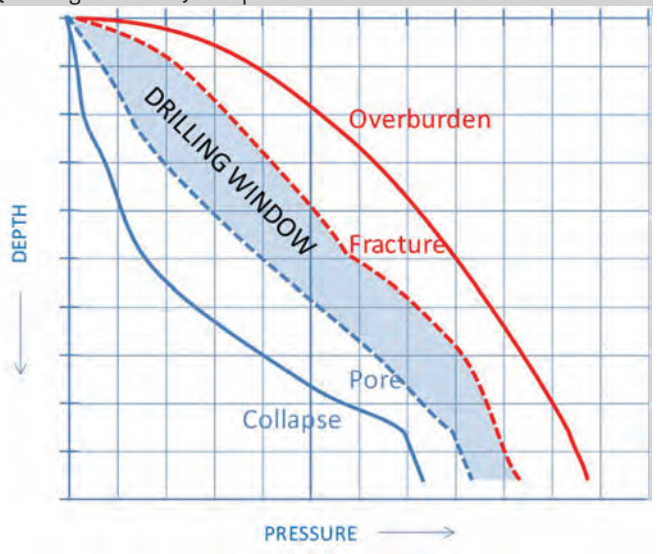


Figure 1b. Pore Pressure and Fracture Gradient Window (Drilling Window) Deepwater water



The Evolution of Integrated Riser Joint (IRJ)

The IRJ is a crucial component in deepwater MPD operations, representing a significant advancement in MPD technology. It serves as an interface between the surface MPD system and the marine riser, enhancing operational efficiency and safety in deepwater drilling.

During the early days of deployment of MPD systems on floating rigs, several limitations impacted efficiency and safety of operations. One major challenge was the placement of the RCD designed for onshore and jack-up MPD systems, in deepwater environment. The RCD had to be installed above the tension ring on the riser as shown in Figure 2.

The RCD was mounted on a riser slip joint that remained collapsed and locked, restricting the movement and flexibility of riser operations in dynamic offshore environments.

RCDs originally designed for onshore applications did not have a top connection, preventing the installation of a diverter, a critical safety device in deepwater operations. Without the diverter feature, the system's capability to manage wellbore fluids and gas kicks in riser was significantly limited.

The integration of the RCD with the marine riser lead to the development of a new RCD design called the marine RCD. These RCDs were positioned above the tension ring (ATR-RCD) and they featured a larger inner diameter for accommodating the BOP test plug. Additionally, the inclusion of a top flange allowed for the installation of a conduit connecting the RCD to the rig's diverter, improving safety and reducing environmental risks.

The installation above the tension ring required modifications to the marine riser setup, leading to increased rig-up time and complexity. This presented several challenges and affected the efficiency and flexibility of deepwater MPD operations. One of the most significant drawbacks was the space limitation. Since the ATR- RCD was positioned above the tension ring, it occupied considerable space, thereby reducing the available room for the rig's telescopic joint.

The development of the Below-Tension-Ring RCD (BTR-RCD) and the IRJ system effectively addressed these limitations by seamlessly integrating the system directly into the marine riser.

Figure 2. Early Concepts: Use of Onshore RCD, Conventional Annular BOP, and Standard Flow Spool with Side Outlet Valves

Image courtesy Weatherford

Components and Functions of the Integrated Riser Joint System

The IRJ consists of the following key components highlighted in Figure 3:

Figure 3. Integrated Riser Joint Schematic

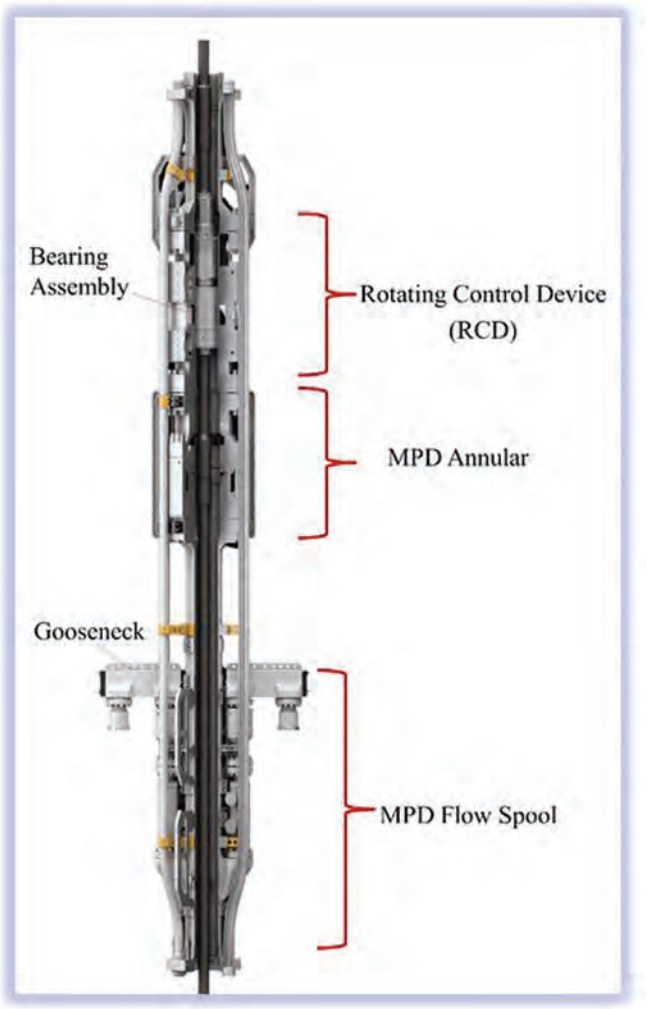


Image courtesy SLB

Figure 4. Active Control Device with seal sleeve

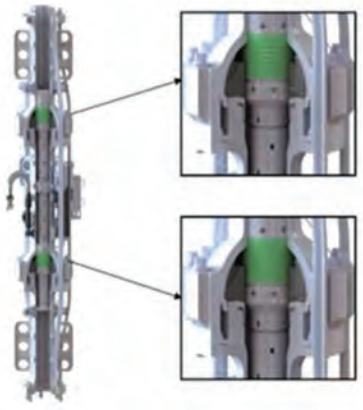


Image courtesy NOV

Below-Tension-Ring Rotating Control Device (BTR-RCD)

The BTR-RCD is an essential component of the IRJ system. Similar in functionality of onshore RCD, the BTR-RCD diverts returning fluids away from the rig floor while creating a sealed environment around the drill string and allowing the vertical and rotational movement of drill pipe essential for drilling operations. The primary benefits include:

- Continuous pipe movement under pressure.
- Prevention of uncontrolled release of gas.
- Reduce the risk of stuck pipe and wellbore instability.

Active Control Device (ACD)

An alternative to the BTR-RCD is the Active Control Device. Unlike the RCD, the ACD does not require rotation and uses a pressure-activated sealing system. The ACD can maintain wellbore integrity even under high-pressure conditions and is particularly useful for deepwater MPD operations.

MPD Annular and Flow Spool

The MPD Annular, also called Annular Isolation Device (AID), acts as a barrier for isolation of the wellbore below the RCD when the RCD or ACD needs servicing. It provides additional pressure control, ensuring continuous wellbore integrity.

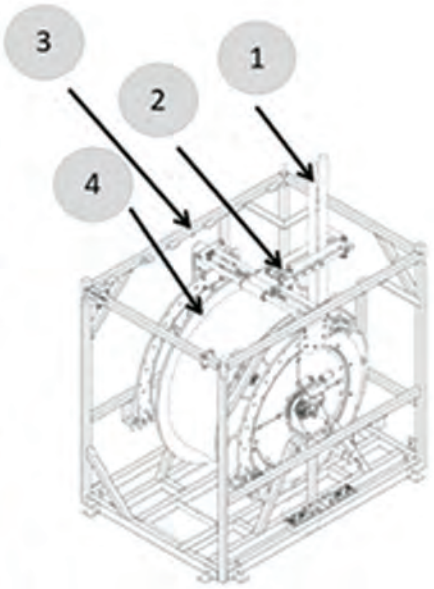
The Flow Spool is part of the of IRJ that facilitates the circulation of drilling fluids from the annulus to surface equipment. It is designed with gooseneck connections and high-pressure hydraulic valves, which play a crucial role in controlling fluid returns and ensuring pressure control throughout the MPD system. The goosenecks provide flexible hose connections, allowing for smooth flow transitions and minimizing pressure drops. The flow spool's hydraulic valves allow operators to dynamically adjust flow paths, enabling precise choke management, influx control, and pressure balancing. Additionally, integrated pressure and temperature sensors within the flow spool continuously monitor real-time well conditions, providing critical data for early detection of abnormal wellbore events.

These advancements have allowed safer and more efficient deepwater drilling operations, minimizing downtime and improving well control capabilities.

In addition to the main components of IRJ, several auxiliary components are required for the functioning of IRJ.

Choke, Kill, and Boost Line Conduits: The IRJ inte-

Figure 5. Example Integrated Umbilical System



1	Umbilical Cable
2	Adjustable Levelwind
3	Frame for Umbilical Drum and Reel
4	Drum, Umbilical Reel

grates choke, kill, and boost line conduits with the marine riser, ensuring seamless alignment, pressure integrity, and compatibility with the deepwater well control systems

Integrated Umbilical System

The umbilical cable serves as a multi-functional conduit, facilitating the operation of various subsea components by transmitting hydraulic power, electrical signals, and data communication between the surface control unit and subsea IRJ components. An example is shown in Figure 5.

The installation process begins with deploying the umbilical reeler, which ensures controlled spooling and unspooling of the umbilical cable. Once the umbilical is positioned, hydraulic and electrical lines are connected between the surface control unit and the subsea Interface connection point of the IRJ. To verify system integrity, comprehensive testing is conducted to confirm the data and signal transmission and power supply, ensuring proper communication with the surface control system.

The electro-hydraulic control system is essential for centralized management of the IRJ functioning providing, hydraulic, electric power and real-time control of the critical functions of IRJ.

Advantages of IRJ Technology in Deepwater MPD

The implementation of IRJs in MPD operations offers several advantages, as outlined in the paper below.

Benefit	Description
Enhanced Safety	Reduces the risk of well control incidents and improves personnel and environmental safety.
Real-time Monitoring	Integrated pressure sensors enable continuous monitoring of well conditions.
Operational Efficiency	Reduces rig downtime and improves wellbore pressure management.
Compatibility with Deepwater Rigs	Designed to withstand deepwater conditions up to 150 feet and 2,000 psi.

Technical Challenges and Maintenance Considerations

Despite their advantages, IRJs pose several technical and operational challenges The highly integrated system that combines fluid circulation, hydraulic controls, and electrical cables within a single unit. Its maintenance and repair require expertise across multiple disciplines, including mechanical, hydraulic, electrical, and control systems.

Their deployment in a subsea environment subjects them to extreme conditions, requiring robust maintenance strategies to ensure reliability. Some key challenges include:

- **Water Ingress and Corrosion:** Continuous exposure to seawater increases the risk of equipment degradation.
- **Complex Maintenance Procedures:** Retrieving and replacing IRJ components requires extensive rig downtime and specialized personnel.
- **Integration with Existing Rig Infrastructure:** Ensuring seamless communication between the IRJ and the surface control system demands meticulous planning and execution.

To mitigate these challenges, proactive maintenance programs, routine inspections, and collaboration with original equipment manufacturers are essential.

Future of IRJ Technology in Deepwater Operations

As deepwater exploration continues to push technological boundaries, the role of IRJs in MPD operations will only expand. Innovations in automation, digitalization, and remote monitoring are expected to enhance IRJ capabilities, making deepwater drilling even safer and more efficient. Additionally, the integration of Artificial Intelligence (AI) and machine learning algorithms could further optimize wellbore pressure control, reducing reliance on manual interventions.

MPD Engineers remain active in driving these advancements. His expertise and contributions to the field continue to shape the future of deepwater MPD, ensuring that offshore drilling operations evolve in alignment with modern safety and efficiency standards.

Conclusion

The Integrated Riser Joint (IRJ) has emerged as a cornerstone of deepwater MPD, offering significant improvements in well control, operational efficiency, and safety. As highlighted in the paper, IRJ technology represents a paradigm shift in deepwater drilling, enabling more precise pressure management and reducing operational risks.

ABOUT THE PAPER

The paper, "Review of Design and Operation of the Integrated Riser Joints Used in Deepwater MPD Operations," was presented at the IADC/SPE International Drilling Conference and Exhibition 2024 in Galveston, Texas, USA. It explores the role of Integrated Riser Joints (IRJs) in Deepwater MPD systems and discusses design considerations, operational challenges, and field applications, highlighting how IRJs enhance safety, efficiency, and well control in deepwater drilling.

https://www.researchgate.net/publication/378943856_Review_of_Design_and_Operation_of_the_Integrated_Riser_Joints_Used_in_Deepwater_MPD_Operations

https://onepetro.org/SPEDC/proceedings-abstract/24DC/24DC/D011S008R004/542905

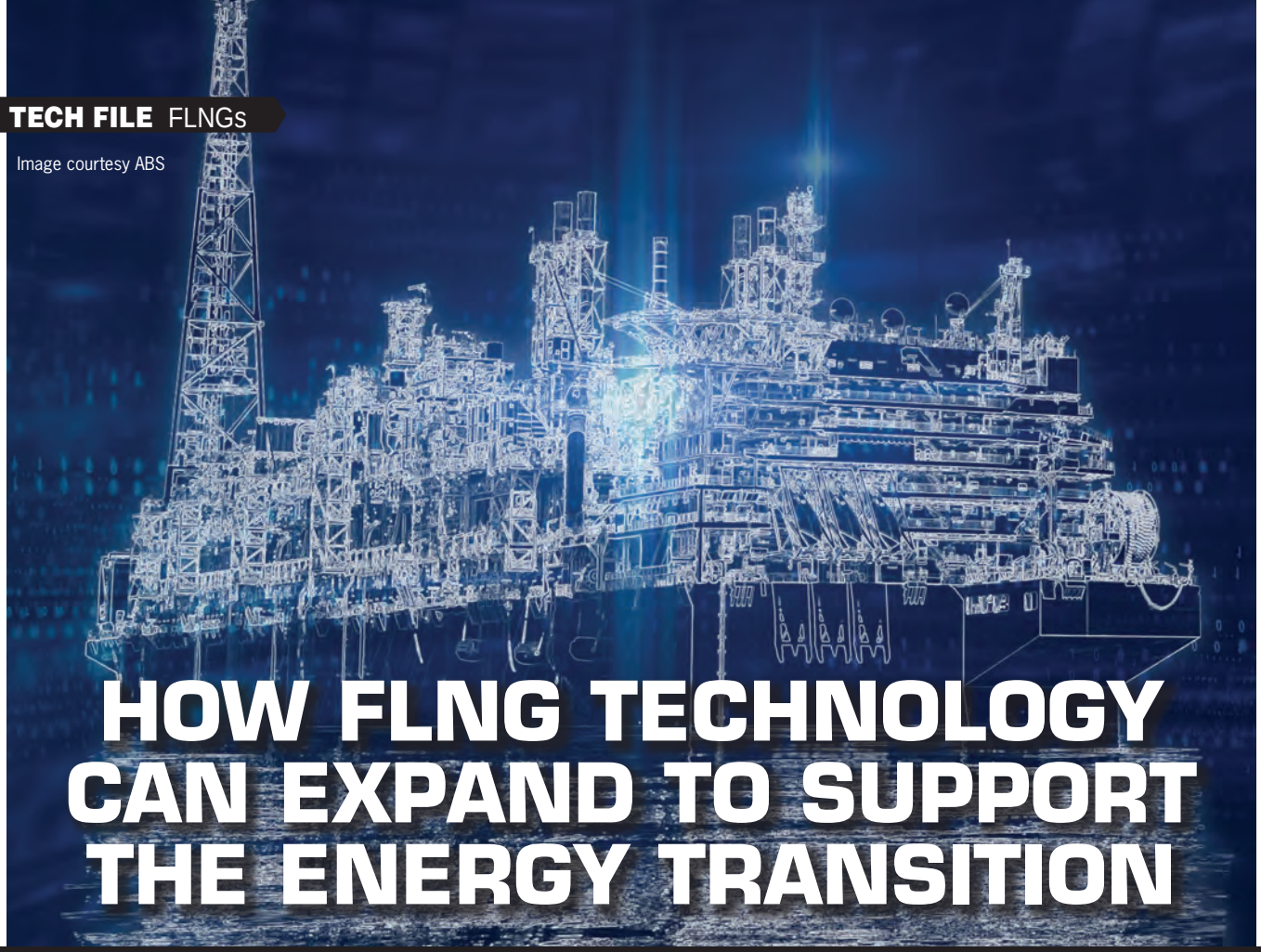


Image courtesy ABS

HOW FLNG TECHNOLOGY CAN EXPAND TO SUPPORT THE ENERGY TRANSITION

Fast-growing energy demand is driving the need for technical support and guidance in new locations, writes ***Terrance Roberts****, Manager, Global Business Development, ABS*

Surging appetite for natural gas is accelerating the development of global and regional supply chains, with established producers seeking new markets and emerging suppliers looking to meet demand from local consumers.

Long-tabled export projects are being fast-tracked for approval in North America while new facilities are under development in Canada and South America. However emerging markets in demand centres across Asia and elsewhere are also looking to rapidly increase production.

For countries seeking to access remote reserves and lacking highly developed infrastructure, demand for Floating LNG is expected to increase its market share as producers seek to capture new opportunities.

As the trend develops, the impetus will be on class societies and regulators to ensure the increase in production capacity is managed safely and efficiently.

Supply and Demand

Increasing supply of LNG in North and South America is pushing long-tabled export projects closer to final investment decision. Meanwhile demand growth spans Europe and Asia but also extends to other markets.

The need to increase supply due to geopolitical conflicts in the area has made Europe an attractive destination for LNG suppliers, encouraging project developers who want to meet this demand sooner rather than later.

This structural shift has intensified competition for LNG cargoes, impacting the dynamics of demand between Europe and Asia. A complex combination of price fluctuations, energy policies and the need for supply diversification will help shape this trajectory in future.

Extreme weather is also impacting supply and demand, exemplified by droughts in South America in 2024, which saw LNG imports spike, affecting annual imports with

a knock-on effects to global balances, helping to propel LNG prices to an all time high, according to IEA data.

As the needs of these importers continue to mature, other markets are expected to grow and others emerge as the second half of the decade progresses.

China remains the largest importer of LNG, though there is some uncertainty as to how tariffs will impact this. India is also increasing its exposure to LNG imports, with energy companies recently announcing offtake agreements.

Other potential markets that are seeing growth are in Southeast Asia, including Thailand, Vietnam and the Philippines, which are expanding their infrastructure to meet energy demands. Among the big unaddressed questions is whether Africa can emerge as a serious contender, in either regional import or export markets.

New Facilities

A combination of policy changes and expectations of an accelerated approval process has prompted established developers to talk of ramping-up LNG export projects, with facilities getting the green light as finance becomes available.

Projects will each take a unique approach to funding, relying on a combination of equity investment, bank debt and other options. The finance community backing US projects are less likely to be constrained by withdrawal of funding for LNG projects or requirements to meet strict environment, social and governance credentials.

This could lead to faster funding rounds or loans based around achieving export targets that the US government wishes to see.

Among the projects to have benefitted from this change - Venture Global CP2, Woodside LNG, Glenfarne Texas LNG and Next Decade Rio Grande Expansion - are slated for first gas production from 2026. By 2028 they could be providing an additional 63 mtpa into international markets. Current demand is around 475 mtpa, which is expected to grow to around 670 mtpa by 2028, according to the Global LNG Outlook 2024-2028, published by the Institute for Energy Economics and Financial Analysis.

However production developments in new markets will face different challenges in terms of infrastructure and project finance. Capacity remains limited in some countries, with congestion causing long wait times for LNG vessels in addition to pipeline issues and storage constraints.

Floating Advantages

Floating LNG has specific advantages in this context. First, it allows developers to access remote reserves that may be unreachable for traditional facilities and second it enables faster development. In cases where onshore gas is not present in high enough quantities to warrant a traditional onshore liquefaction facility, FLNG capacity to scale to provide an opportunity to monetise these resources.

An FLNG facility can be deployed a lot more quickly than an onshore facility. This has the potential to shorten the return on investment cycle, which could lead to accelerated funding approvals, with reduced environmental impact making it easier to get required regulatory approval, all of which make these projects potentially more attractive to investors.

The ultimate ambition would be to develop plug and play solutions and FLNG has the potential to bring LNG export capabilities to a region quickly and with the most viable business case.

Their combination of greater mobility, higher energy efficiency compared to onshore facilities and modular construction means a facility can be built and shipped from one location rather than relying on a more diverse supply chain for onshore construction.

Impacts on Safety

Of significant interest to class is the impact this rapid change may have on the evolution of rules, regulations and technology behind FLNG newbuilds and particularly on conversions.

The potential growth in new FLNG projects in developing markets places a number of first-of-their-kind projects in locations with no previous operational experience with the applicable rules and regulations for this technology.

Projects classed by ABS include innovative and novel concepts, thus prompting close attention from regulatory authorities which have not worked with these types of projects.

ABS can help project developers present their case with appropriate risk and impact mitigations which will help to streamline the project approval process. With years of experience of being ‘first-to-market’ with FLNG projects, ABS can draw on this expertise to assist project developers.

ABS has experience supporting some of the industry’s most complex FLNG projects working directly with clients and the authorities responsible for regulating these projects. In both cases we provide design approval and certification as well as providing guidance on rulemaking for regulators and training for personnel.

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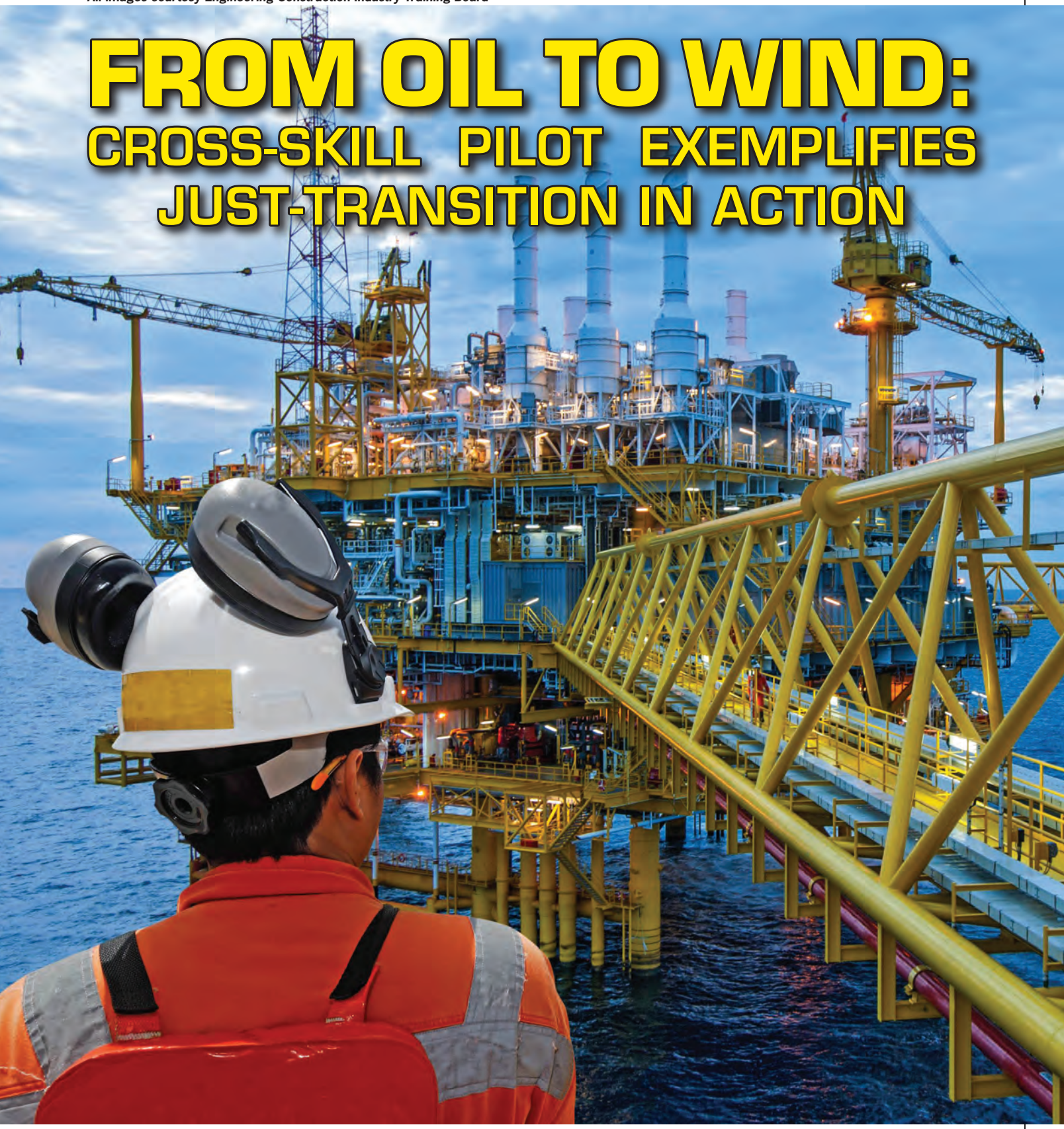
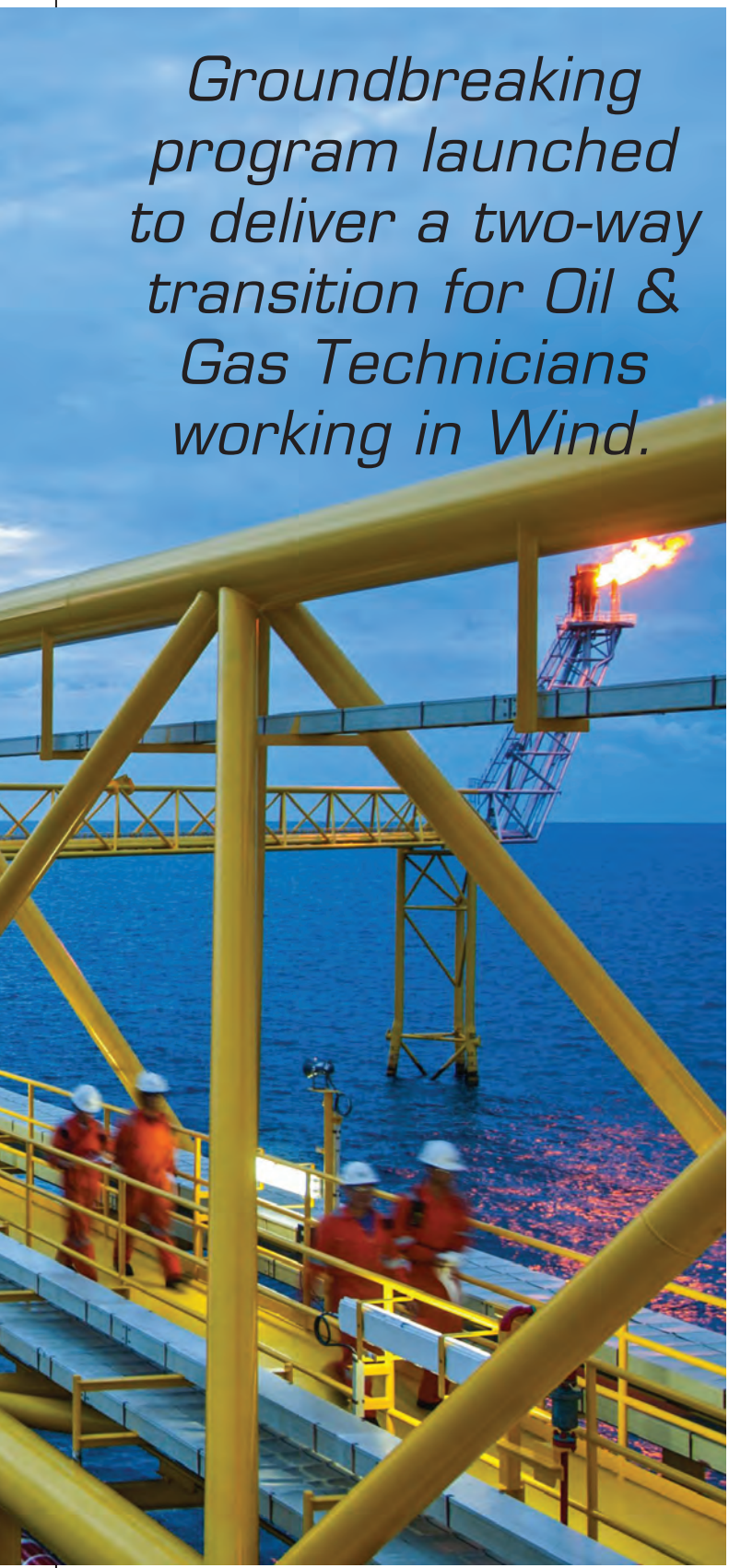
FROM OIL TO WIND:
CROSS-SKILL PILOT EXEMPLIFIES JUST-TRANSITION IN ACTION



Groundbreaking program launched to deliver a two-way transition for Oil & Gas Technicians working in Wind.



The Engineering Construction Industry Training Board (ECITB), in partnership with the Global Wind Organisation (GWO) and the Offshore Renewable Energy (ORE) Catapult, is launching a new cross-skilling program to support worker transferability between oil & gas and wind operations and maintenance in the UK.

This pilot program enables the two-way transition of qualified oil and gas technicians into onshore and offshore wind and then back again as and when maintenance activity is needed.

Current UK-installed wind capacity needs to double for both onshore and offshore wind if the UK Government targets are to be met by 2030. But the Offshore Wind Industry Council's labour forecasting suggests there is a shortfall of over 4,500 skilled operations and maintenance roles needed over the next five years.

Andrew Hockey, CEO of the ECITB, said: "Oil and gas will need to continue, certainly in the short and medium term, and we need to ensure the industry has the skilled workforce it needs to deploy to both existing oil and gas fields as well as onshore and offshore wind.

"This program can create opportunities for our UK supply chain companies to diversify their energy portfolios and ensure the continuing development of a competent and competitive wind energy supply chain. The ECITB is providing additional funding for employers to support this cross-skilling of the workforce.

"I'd like to extend thanks to the ORE Catapult for its significant contribution in allowing learners site access to its offshore wind turbine.

"It is vital we maintain the appropriate standards of technical skills and behavioural safety across the engineering construction sectors and the two-way transition of skilled workers between sectors will help improve safety, workforce mobility and the resilience of the industry."

Two cohorts will start on the pilot program in Scotland at North East Scotland College, Aberdeen, in March and Forth Valley College, Grangemouth, in May.

Based on the Connected Competence model of assuring base technical competence of common skills, the fully funded six-week program is suitable for both onshore and offshore wind operations. It will support existing Instrument & Controls, Mechanical and Electrical Technicians and provide the requisite standard of technical training across the technician pathways to enable them to work on wind assets as Wind Turbine Maintenance Technicians (WTMT).

Supply chain organisations and wind farm developers can now register for the pilot program. More information including how to register is included in the WTMT Cross-

Skill Program leaflet.

Jakob Lau Holst, CEO of the GWO, said: "GWO has been working in collaboration with the ECITB to encourage the recognition of skills and reduce the duplication of training for workers.

"This pilot program achieves alignment with industry standards through 'GWO Recognition', a service offered by certified training providers.

"When applied to industry-recognised schemes such as ECITB's Connected Competence, GWO Recognition can reduce training time for workers by up to 88% for basic technical training (BTT) certification."

Delivered through Forth Valley and North East Scotland Colleges and GWO / ECITB approved training provider, RelyOn Nutec, the program will include site access to ORE Catapult's Levenmouth demonstration turbine to contextualise the technical program content inside the nacelle of a wind turbine.

Tony Quinn, Director of Technology Development at ORE Catapult, said: "Making it as easy as possible for workers to transfer skills and knowledge from the oil & gas sector into offshore renewables is a vital piece of the jigsaw when it comes to supporting our energy transition and journey towards Net Zero.

"By enabling the use of our Levenmouth Demonstration Turbine to enrich the experience of the workers cross-skilling into offshore wind, we're able to offer a safe, controlled and realistic environment for those workers to hone the skills needed to make that transition.

"It also complements the activities of our strategic skills programs as well as initiatives like the Fit for Offshore Renewables (F4OR) which helps the entry and growth of UK supply chain organisations into the wind industry."

Paul Bradley from the Health & Safety Executive commented: "The HSE welcomes the increased focus on technical standards, Connected Competence and accreditation.

"Maintenance Technicians in the wind sector are working in hazardous and confined areas. These areas include being inside the nacelles of wind turbines, working on and around electricity, sensitive electronics, hubs and rotors - all of which pose safety risks to the individuals and wider teams."

The program is being offered to both supply chain or-

ganisations and wind farm developers against a backdrop of safety incidents in the wind sector. Research carried out by Strathclyde University in 2024 found safety incidents on offshore wind assets are four times higher than those in oil and gas.

One of the biggest drivers behind Connected Competence is to help avoid workplace incidents and accidents by assuring a base level of ongoing technical competence for all workers to create a safer, and more productive working environment for everyone.

Katy Heidenreich, Supply Chain and People Director from OEUK, said: "The pilot program is an exciting initiative that dovetails into our work on the Energy Skills Passport.

"The Connected Competence initiative and the cross-skilling program offer the essential skills required to deliver the homegrown oil and gas the UK needs for decades to come alongside renewable energy.

"This complements the Energy Skills Passport in allowing people to make informed decisions about their jobs and future and be supported in doing so.

"We encourage organisations who are considering future opportunities across the energy mix to consider this program along with Connected Competence and look forward to future inclusion within the Energy Skills Passport."

Oil and gas production in the UK is believed to have now peaked. The Government announced, as part of its goal to make the UK a 'clean energy superpower', that it will not issue any new oil and gas licences for the North Sea. Since then it confirmed it will undertake consultation on the future of oil and gas licensing to support operations of existing fields for the entirety of their lifespan.

Those existing fields will need workers to maintain and ultimately decommission North Sea assets whilst the offshore wind sector sees rapid growth.

There is a clear case to support the industry's supply chain to cross-skill existing workers to service both the operations and maintenance of late-life oil and gas assets whilst also being deployed to wind and manage an integrated transition.

For more information or to register interest in the program please contact connected@ecitb.org.uk

OTC PICKS 'BEST OF THE BEST' 2025 OFFSHORE ENERGY INNOVATIONS

The **Offshore Technology Conference** (**OTC**) has unveiled the winners of its 2025 Spotlight on New Technology Award, which honors the companies that are reshaping the offshore energy sector through their innovation and development of technologies.

This year, OTC selected 10 technologies for their demonstrated advancements in the industry, based on several criteria, including product uniqueness, degree of ingenuity, demonstrated success, commercial viability, and the ability to make a significant impact across the offshore industry.

"The technologies spotlighted this year represent the brilliance, ingenuity, and collaboration of our workforce. Together, they are leading the industry into the future and revolutionizing the field for generations to come," said Alex Martinez, chairperson, OTC Board of Directors."

Baker Hughes and SLB each received two awards for their technologies related to the oil and gas and offshore operations, followed by Deep Ocean for its diverless tool.

Several other companies and their innovations were honored, including McCoy's Global Smart Tubular Running – smarTR, Oil States' TowerLok Wind Tower Connector, Bosch Rexroth's Hägglunds Fusion The Power of One, and Fugro's Quantitative Integrated Ground Model (QIGM) Solution.

OTC also picked, HYTORC Industrial Bolting Systems' Lithium Series RX (LSRX) as 2025 Spotlight Small Business Winner.

The award recipients will be honored on May 5, 2025 at NRG Center in Houston, Texas, United States.

Baker Hughes Leucipa - Automation Done Right

Baker Hughes has developed Leucipa, a process driven software system for automated field production, which helps oil and gas operators proactively manage production and reduce carbon emissions.

Leucipa focuses first on the specific outcome an operator wants to achieve, harnessing and leveraging data to drive intelligent operations.

By automating production processes, Leucipa reduces inefficiencies, ensures more environmentally sound operations, and enables customers to help recover the millions of barrels that would have otherwise remained in the ground.

The solution leverages best-in-class Artificial Intelligence (AI)-powered automation software

"With all of your production data, tools, and existing workflows fully integrated into a single plane of glass, you can finally take control of your entire production operation with the Leucipa solution, powered by AWS," Baker Hughes claims.

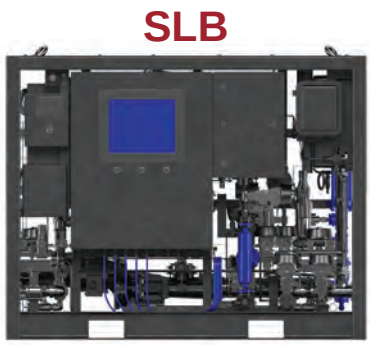
Baker Hughes' SureCONTROL Plus for Subsea and Dry Tree Wells

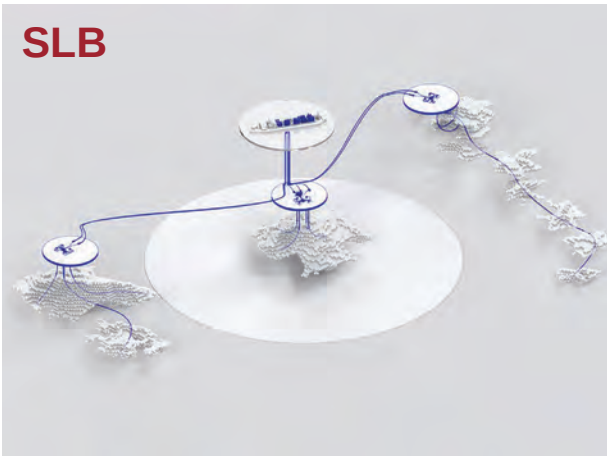
Part of Baker Hughes' intelligent completions portfolio, SureCONTROL Plus interval control valves (ICV) enable electrical remote operations for more efficient zonal control of both subsea and dry tree wells. These ICVs replace numerous hydraulic lines with a single electrical line, simplifying complex installations, reducing rig time and accelerating production while limiting the need for costly interventions.

SureCONTROL Plus can control a higher number of zones than traditional hydraulic ICVs for enhanced production. The digital telemetry system provides continuous data, which enables improved asset performance management and proactive maintenance of downhole tools.

The solution integrates with SureSENS downhole gauges and operates through a single TEC cable, allowing for precise adjustments without conventional intervention methods.

This system reduces completion deployment time and risk, increases reliability, and lowers carbon footprint by eliminating all hydraulic lines.





DeepOcean's Diverless Tie In Tool as Alternative to Saturation Diving

DeepOcean has developed a diverless flange tie-in tool (FTT) to accommodate the needs of its clients, who were seeking an alternative solution to traditional saturation diving.

Developed through DeepOcean's exclusive partnership with Design Banken, the FTT performs diverless tie-in of diver flanges on spools and risers by use of a patented hydraulic bolt. It replaces horizontal connection systems with flanges and replaces divers in both shallow and deep water.

SLB Autoprofiler for Crucial Fluid Performance Monitoring

AutoProfiler automated inline fluid testing enables the transmission of crucial fluid performance data to the digital interface, providing access to what is happening at the rig from anywhere in the world.

The integration of automated and digital workflows, combined with SLB's Performance Live digitally connected services, maximizes efficiency with real-time recommendations to improve drilling performance and minimizes HSE risk by reducing field crew staff.

AutoProfiler fluid testing is a fully computerized, rig-deployed skid that enables inline automated testing of rheological characteristics, and also atmospheric and pressurized density of aqueous and nonaqueous fluids.

Designed for installation on an exterior worksite of an active drilling rig, the unit is certified to various standards, enabling it to operate in environments that may be exposed to explosive or hazardous atmospheres.

It has two primary fluid inlet valves, enabling multiple sources of drilling fluids to be analyzed consecutively without the need for further operator intervention.

A human-machine interface (HMI) is integrated into the unit for local inspection, and the skid has provisions for remote desktop applications as well as remote data transmission to the rig's EDR or to other cloud-enabled data storage.

SLB's Electric Completions for Oil and Gas Fields

SLB sees electrification and digitalization of completions as the tools that provide the greatest opportunity to increase field recovery efficiency and reduce infrastructure.

Available as a module for the Petrel E&P software platform, Petrel advanced completion optimization (ACO) incorporates a workflow to efficiently screen multiple concepts and enable selecting designs that maximize value.

The tool enables easy identification of well inflow control designs to optimize hydrocarbon recovery with respect to a wide range of factors, including project economics, constraints, and environmental footprint.

SLB's accelerated simulation workflows can be used to evaluate designs and rapidly reevaluate and update them post-drilling.

Enabled by SLB's ESP-noise-immune, field-proven power delivery and bidirectional telemetry, active high-precision control of more than the usual two zones brings new completion opportunities to longer and deeper wells.

The company's electric intelligent completions support distributed inflow measurement and instant precision control across the sandface.

Aside from great control, the tools also enable comprehensive monitoring. Also, SLB's production optimization digital workflows for intelligent completions enable consolidation and visualization of hundreds of channels of high-frequency data from intelligent completion sensors via simple plots.

BY THE NUMBERS

RIGS

Worldwide

Rig Type	Available	Contracted	Total	Utilization
Drillship	14	74	88	84%
Jackup	204	274	478	57%
Semisub	24	45	69	65%

Africa

Rig Type	Available	Contracted	Total	Utilization
Drillship	2	11	13	85%
Jackup	12	20	32	63%
Semisub		2	2	100%

Asia

Rig Type	Available	Contracted	Total	Utilization
Drillship	5	4	9	44%
Jackup	80	78	158	49%
Semisub	18	4	22	18%

Europe

Rig Type	Available	Contracted	Total	Utilization
Drillship	3	5	8	63%
Jackup	9	32	41	78%
Semisub	3	21	24	88%

Latin America & the Caribbean

Rig Type	Available	Contracted	Total	Utilization
Drillship	1	32	33	97%
Jackup	4	4	8	50%
Semisub	1	9	10	90%

Middle East

Rig Type	Available	Contracted	Total	Utilization
Jackup	58	115	173	66%
Drillship				

North America

Rig Type	Available	Contracted	Total	Utilization
Drillship	1	21	22	95%
Jackup	31	19	50	38%
Semisub		2	2	100%

Oceania

Rig Type	Available	Contracted	Total	Utilization
Drillship				
Jackup		2	2	100%
Semisub		5	5	100%

Russia & Caspian

Rig Type	Available	Contracted	Total	Utilization
Jackup	9	1	10	10%
Semisub	1	2	3	67%

Global Average Dayrates

Floaters		Jackups	
Ultradeep water	437.9	High-spec	187.8
Deepwater	254.1	Premium	128.8
Midwater	397.3	Standard	93.3

This data focuses on the marketed rig fleet and excludes assets that are under construction, retired, destroyed, deemed noncompetitive or cold stacked.

Data as of April 2025
Source: Wood Mackenzie Offshore Rig Tracker

DISCOVERIES & RESERVES

Offshore New Discoveries

Water Depth	2020	2021	2022	2023	2024	2025
Deepwater	13	14	23	15	17	3
Shallow water	52	60	47	63	41	5
Ultra-deepwater	12	7	22	13	5	2
Grand Total	**77**	**81**	**92**	**91**	**63**	**10**

Shallow water (1-399m) Deepwater (400-1,499m) Ultra-deepwater (1,500m+)

Offshore Undeveloped Recoverable Reserves

Water Depth	Number of fields	Recoverable reserves gas mboe	Recoverable reserves liquids mbl
Deepwater	602	48,003	22,243
Shallow water	3,308	440,457	153,739
Ultra-deepwater	350	41,288	25,155
Grand Total	**4,260**	**529,748**	**201,137**

Contingent, good technical, probable development.

The total proven and probably (2P) reserves which are deemed recoverable from the reservoir.

Offshore Onstream & Under Development Remaining Reserves

Region	Number of fields	Remaining reserves gas mboe	Remaining reserves liquids mbl
Africa	584	17,587	11,937
Asia	849	15,540	7,287
Europe	716	11,533	10,684
Latin America and the Caribbean	201	7,756	41,171
Middle East	151	103,360	145,739
North America	473	2,732	13,329
Oceania	80	10,200	1,015
Russia and the Caspian	60	16,968	12,137
Grand Total	**3,114**	**185,676**	**243,299**

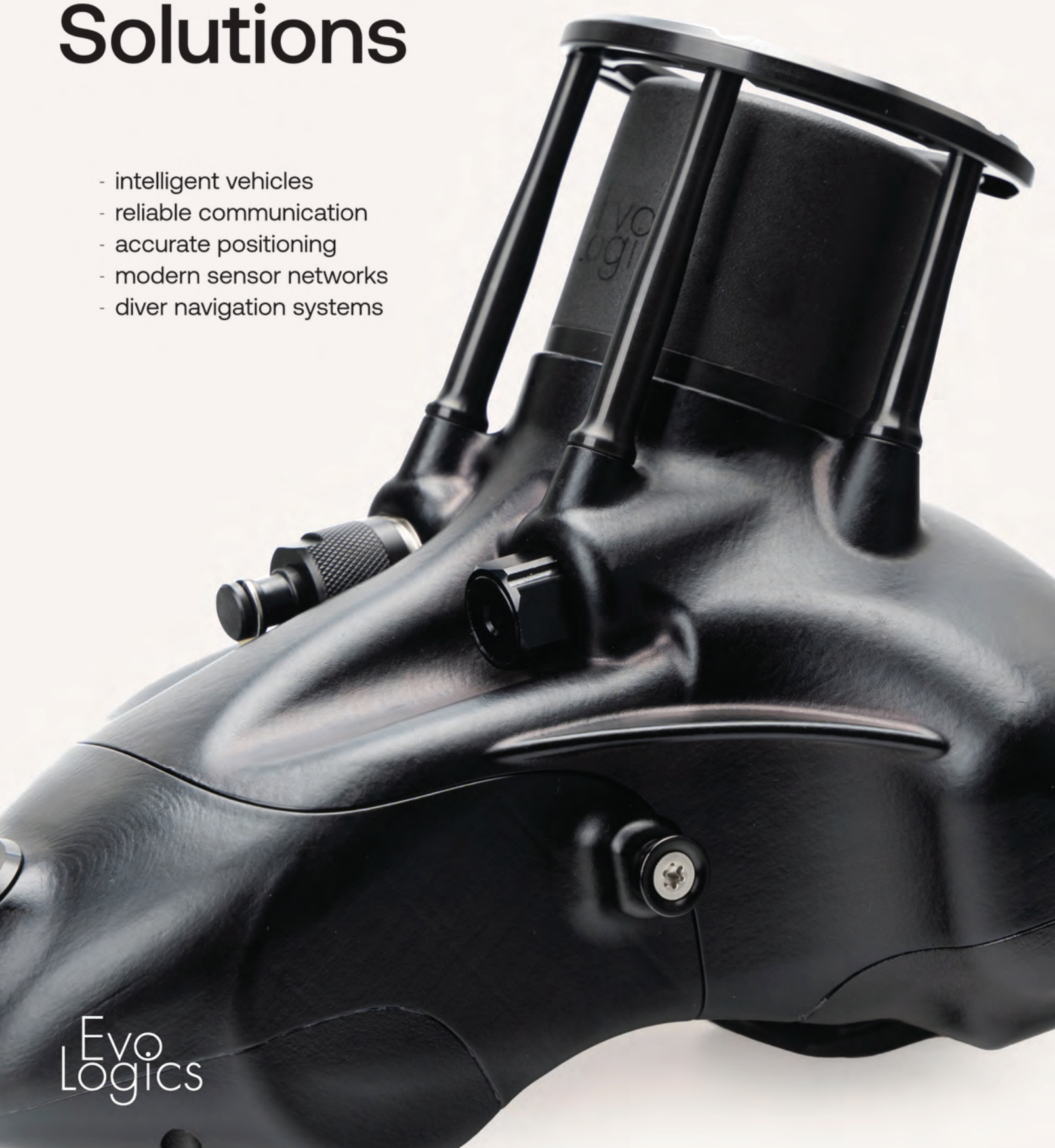
Onstream and under development.

The portion of commercially recoverable 2P reserves yet to be recovered from the reservoir.

Source: Wood Mackenzie Lens Direct

Smart Subsea Solutions

- intelligent vehicles
- reliable communication
- accurate positioning
- modern sensor networks
- diver navigation systems



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