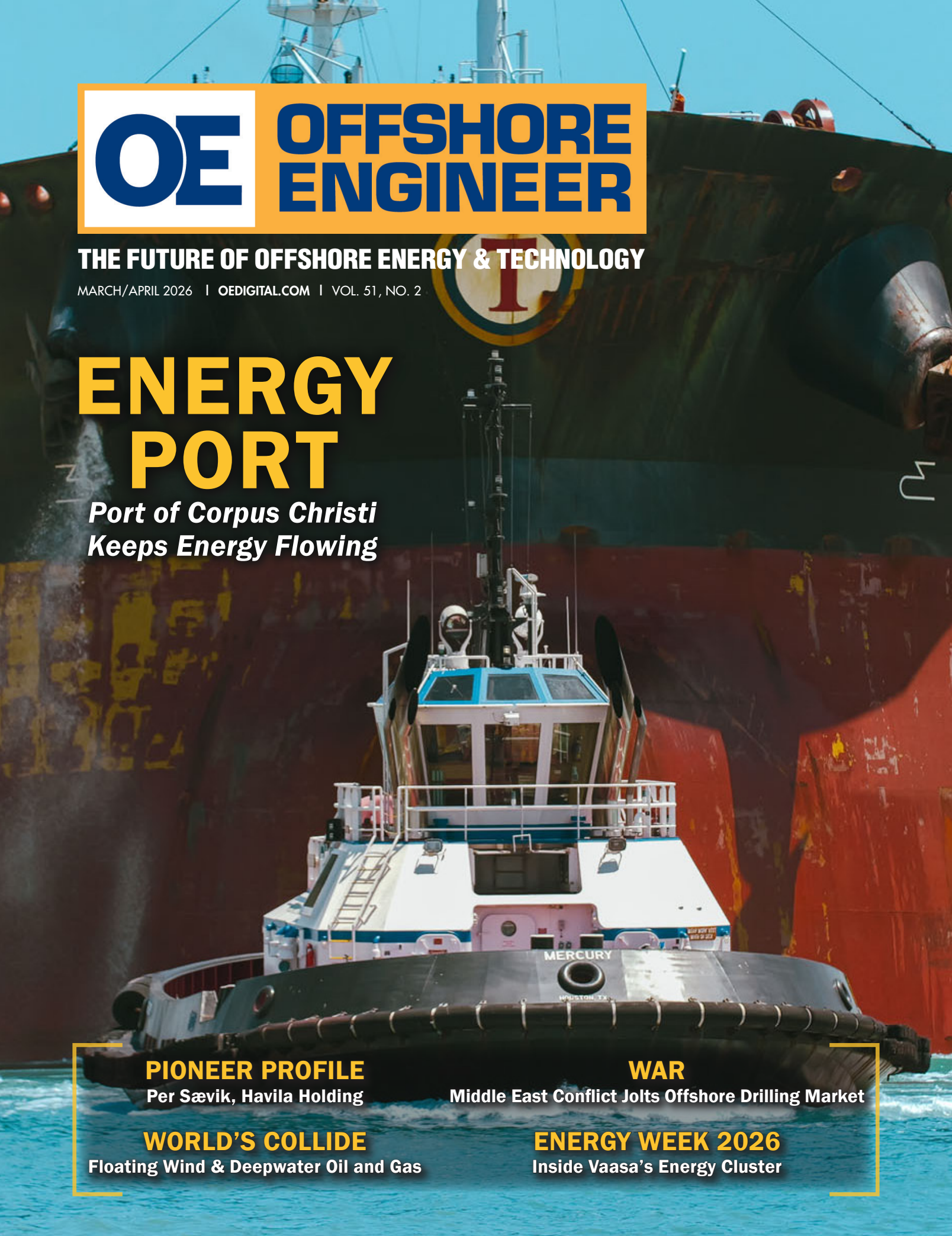

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MARCH/APRIL 2026 | OEDIGITAL.COM | VOL. 51, NO. 2

ENERGY PORT

Port of Corpus Christi Keeps Energy Flowing

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Per Sævik, Havila Holding

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Middle East Conflict Jolts Offshore Drilling Market

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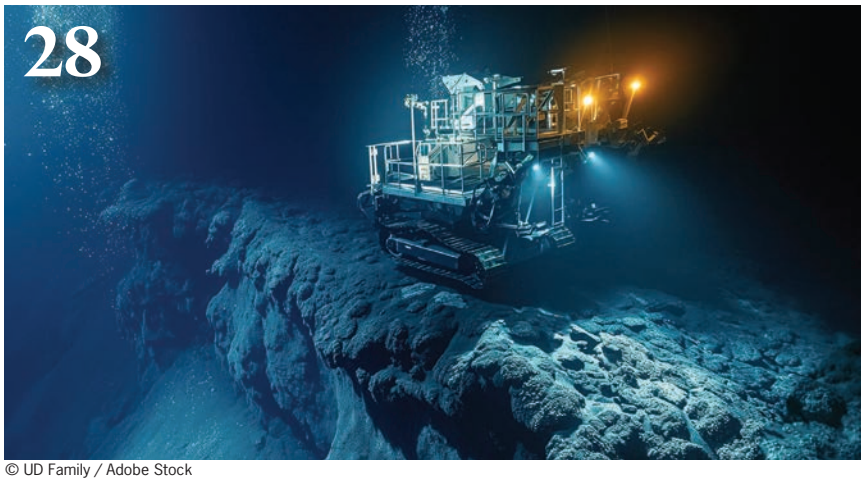

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As war continues to rage in Ukraine, Iran and across the Middle East, sitting at the heart of the situation, per usual, is energy – oil and gas – with attacks on its production, refinement and transportation a repeatedly used geopolitical lever. Drone and missile attacks have damaged refineries and as of mid-April 2026, blockades in the Strait of Hormuz have severely restricted the flow of oil into the global market writes Matthew Donovan, Head of Rig Market Research at Esgian, the world's home for 177 or 495 jack-up rigs.

As the physical damage to assets in the region continue to mount, the Wall Street Journal reported that several majors, let by Exxon Mobil and Chevron are increasing the pace of the search for new O&G fields far from the shooting in the Middle East, with Exxon reportedly mulling a plan to pump up to $24 billion into Nigeria's deep-water oil fields, while Chevron looks to grow again in Venezuela. While the war in the Middle East is a roadblock to production in the region, the resulting spike in energy prices have the industry collectively sitting on a pile of cash to help fuel new prospects areas or those that have sat idle or abandoned for years.

While the endgame for shooting in the region is murky at best, diversification of assets and focus on new regions will be a recurring them for many years to come.

Moving energy efficiently, in volume is the focus of our interview this month with Kent Britton, CEO, Port of Corpus Christi. By volume, the Port of Corpus Christi has become a central export valve for U.S. crude oil and a fast-rising platform for LNG—an industrial ecosystem that has grown at a pace few ports can match. In 2025, the Port and its customers moved 203.4 million tons through the Corpus Christi Ship Channel – a figure dominated by energy and a 1.5% decline from 2024's 206.5 million tons, as crude volumes softened modestly even while LNG continued to climb.

Read the full article on Britton and his port, with insights on how several infrastructure projects, including the recently completed deepening and widening of the Corpus Christi Ship Channel will keep energy flowing to the world even more efficiently in the future.

Check out the 2026 Media Kit via the QR Code Below

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Matthew Donovan is Head of Rig Market Research at Esgian. He has over a decade of experience covering offshore oil and gas activity, with a focus on the global drilling rig market.

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Josefine Spiro is an award-winning journalist with nearly 20 years of experience, specializing in feature journalism, business, technology, and innovation. She is based in the heart of the Norwegian maritime cluster.

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DMT Marine Equipment – 25 Years of Building More Than Deck Equipment

From a six-person office to a team of over 500 professionals and 3,500 vessels equipped.

Twenty-five years ago, DMT began its journey in a small office apartment, with just six people and a clear focus: delivering high-quality machinery design.

It was a modest beginning, but one driven by ambition and a strong belief that quality should never be left to chance.

As projects grew in complexity and expectations increased, an early realization shaped the company's future: true quality requires full control. This led to a defining step, the transition from design-only services to in-house production.

What started as a small engineering team was becoming something more.

From Local Beginnings to International Reach

DMT's growth has been steady, shaped by key milestones that expanded both its footprint and its capabilities.

In 2004, the company took an early step towards internationalization with the opening of a new office in Turkey. As demand grew, the need for production control became increasingly important, leading to the opening of the first production hall in Europe in 2011. From that moment, every stage of an order, from the first engineering concept to final testing, happened under one roof, with one team accountable for the result.

The following years brought continuous development:

- in **2014**, a modern office facility was opened, bringing together a growing team of engineers
- in **2015**, a second production facility in Europe further strengthened manufacturing capacity
- in **2016**, major investments in CNC machining capabilities enhanced precision and efficiency

At the same time, DMT expanded beyond Europe. By 2017, new service partnerships were established in North America, followed by the first deliveries to the US market in 2018.

Each step reflected a consistent direction: greater capability, closer proximity to clients, and stronger control over quality.

Strengthening Technical Know-how & Expertise

Growth continued with further investments in infrastructure and technology.

In 2020, another modern production facility was opened, supporting increased demand and more complex projects. This expansion continued globally, with the opening of a new production facility in China in 2024, marking an important step in strengthening DMT's presence in Asia.

Looking ahead, 2026 will bring the fourth production hall in Europe, further reinforcing the company's production capacity and long-term commitment to growth.

Throughout all these years, DMT has consistently invested in:

- technical capabilities
- production efficiency
- and team expansion

Because scaling a business is not only about facilities, it is about building the expertise to support them.

From Engineering to Global Impact

Today, the results of this journey are visible worldwide.

More than **3,500 vessels are equipped with DMT winches**, operating in diverse and often demanding environments. Each installation reflects not just a delivered product, but a solution designed to perform under real conditions.

Building on this experience, DMT delivers complete deck equipment solutions for all marine sectors, integrating electric, hydraulic, and pneumatic control systems. Each project is managed end-to-end, from the initial engineering phase to production and final testing ensuring full control over quality and performance.

With two core production hubs and an expanding global footprint, DMT delivers European quality, reliable equipment, and tailored engineering solutions for vessel operators around the world.

Where Partnership Becomes Real

In the marine industry, performance is not measured at delivery, but in operation.

Commissioning is often complex, timelines are tight, and conditions are unpredictable. This is where DMT has built its reputation, not only as a manufacturer, but as a reliable partner.

From the first design concept to final testing and beyond, the company remains closely involved. Its approach combines:

- custom-engineered solutions
- precision across all production stages
- rigorous testing
- and proactive, ongoing support throughout the entire lifecycle of the equipment

Supported by an international network of service partners, DMT ensures that assistance is always available — wherever its clients operate.

Because real partnership means being there when it matters most.

Built on People

In 2026, DMT is an international team of over 500 professionals, bringing together engineering expertise, production know-how, and a shared commitment to quality.

Over time, the company has built not only facilities, but a team capable of embracing complex challenges and delivering consistent results.

This combination of technical strength and human commitment is what defines DMT today.

Looking Ahead

The capabilities developed over the past 25 years are opening new perspectives.

With strong engineering foundations and advanced production capacity, DMT is now positioned to expand its portfolio and deliver custom-engineered solutions to a wider range of industries.

As the company continues to grow, its role as a key supplier in the marine industry will become even more visible, while its expertise will allow it to go beyond.

A Milestone Built on Trust

Twenty-five years represent more than time. They reflect:

- trust earned
- partnerships built
- and consistent delivery under real-world conditions

From six people in a small office to a global company present on thousands of vessels, DMT's journey has been defined by commitment, precision, and reliability.

And as the company looks ahead, one principle remains unchanged:

to build solutions that perform and partnerships that last.

"For me, engineering has always been about people as much as technology. What we build today is only the foundation for what we will achieve together in the years to come"

says Piet ter Schure, CEO of DMT Marine Equipment.

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TIGHT SUPPLY DRIVES SURGE IN HIGH-END AHTS DAYRATES

With one year since the last AHTS report, we have now started to see the effects of a tightening supply-demand balance as earlier predicted, which has translated into a significant uptick in the North Sea spot market especially.

The total global AHTS fleet totals just south of 1,700 vessels, of which roughly - 250 units still remains cold stacked. Around one quarter of the total fleet are predominantly low spec-vessels operating in the Middle East, followed by Southeast Asia with approximately 21%.

By Aleksander Gussøy Paulsen, Market Analyst at Fearnley Offshore Supply

Focusing on larger units above 200t BP, the global fleet consists of less than 10% of the total fleet with roughly 150 units in this category. Roughly one third of these units are in South America, particularly Brazil, while close to 20% are stationed in the North Sea.

Age-wise, more than 60% of this fleet is 15 years or older, with no vessels in this category in the current orderbook. However, there is a tender in Brazil for building AHTS tonnage with WROV against a long-term contract. As a result of the reduction in the supply side seen in recent years, and an increasing demand in several key regions, upward pressure on dayrates has now been evident in the North Sea spot market, as well as long-term contracts in Brazil and Australia.

Aging Fleet and Limited Newbuild Activity Tighten Supply

In contrast to most other OSV-segments such as Subsea, PSV, and C/SOVs, where there has been a significant uptick in newbuilding activity since 2022, the current AHTS market conditions does not justify new high-end AHTS vessels, mostly due to the price of the high specification equipment.

In fact, for this segment in particular, the challenge on the choice of equipment is compounded by the fact that many high-end AHTS are effectively "hybrid" designs. While they can be deployed across both oil & gas and offshore wind markets, the required equipment configuration differs materially between the two segments. This creates additional uncertainty for Owners at the ordering stage, both in terms of upfront capital expenditure and future utilization, further undermining the inherent commercial risks for new high-end AHTS newbuilds.

Furthermore, following the OSV downturn, the market remained weak for several years, driven by a large overhang of tonnage ordered in the latter part of the last upcycle, combined with efficiency gains from O&G charterers. At the same time, escalating equipment and building costs, coupled with fewer long-term contracts, have reduced building activity drastically.

In the period from 2016 to 2021, above 20 vessels surpassing 200t BP were either scrapped, retired or converted for government use, primarily vessels built in the late 1990s and early 2000s. In parallel, several high-end tonnage have been sold to Chinese operators, where the vessels have predominantly been deployed domestically in China within O&G and the offshore wind segment.

Brazil, Subsea Work and Offshore Wind Drive Demand Growth

Another important demand driver for the overall high-end AHTS market has been the growing rig and FPSO activity in South America, particularly Brazil, which has absorbed a large amount of North Sea tonnage on healthy long-term contracts. Last year alone, there were six high-end AHTS vessels fixed on such long-term contracts in Brazil, which has thus reduced the supply side in the North Sea. Furthermore, regions such as Australia and the Canadian East Coast have continued to absorb North Sea tonnage.

Moreover, we are starting to see more high-end AHTS vessels deployed with crane and WROV capacity, achieving significant contracts with high dayrate coupled with longer contract durations than typically achieved in the spot market. This has effectively reduced available supply for the remaining vessels in the North Sea and also creates an incentive for shipowners to invest in additional equipment such as the aforementioned. For instance, Viking Supply ordered four 100t AHC subsea cranes for installation across its fleet, which is planned to be installed in 2026.

Beyond traditional work scopes such as rig moves, prelay, heading control, and ROV operations, demand from subsea EPC contractors has continued to strengthen materially. Several of the contractors such as TechnipFMC, Saipem, and Subsea 7 have increasingly chartered high-end AHTS vessels for EPCI campaigns.

With a growing subsea project pipeline, this trend is expected to be a material part of the demand driver moving forward. Additional workscopes that have booked up AHTS tonnage in the last summer seasons have been floating offshore wind, trenching for offshore wind and bundle towing.

In sum, the increasing demand shift to subsea contractors, coupled with reduced supply and regional vessel flow out of the North Sea, have driven a notable improvement in North Sea dayrates. In the UKCS, only two months in 2024 recorded average spot rates above GBP 60,000. In 2025, this increased to four months, three of which occurred in Q4 after several AHTS vessels had left the North Sea for healthy long-term contracts in Brazil.

© Arild / Adobe Stock

Since then, the spot market has remained volatile, but extremely strong compared to historical levels. In January, the average rate in the UK was at GBP 100,000, increasing to GBP 108,000 in February. Since then, the average dayrate has stabilized at roughly GBP 75,000.

The same trend is clearly evident at the NCS, where the year 2024 only saw two months with an average dayrate above NOK 800,000. In 2025, the number of months above this threshold rose to six months. So far in 2026, every month has averaged above NOK 1,000,000. In fact, the past seven months have all exceeded this dayrate level. Furthermore, we are seeing seasonal project fixtures for the largest units currently trading above NOK 1,000,000.

Despite record-high dayrates however, utilization levels are still lagging to a degree as most Owners prioritize price over utilization. In fact, several shipowners seem to intentionally avoid some of the requirements to capture the upside premium of being the only Owner with available tonnage to drive the dayrate above NOK 3,000,000.

In 2025, the average utilization level in the North Sea was around 60%. However, even with a reduced supply side, the utilization level softened in Q1 down to only 53%, highly impacted by harsh weather in February and March.

While dayrate momentum is clear, the current market fundamentals still do not support the current newbuild prices. Consequently, we believe that it is likely that the supply side will be squeezed even more going forward. High maintenance CAPEX, rising OPEX and low utilization for some of the ageing tonnage could see a few vessels retired, placed in cold stacked or sold out of the commercial market, which would benefit the active fleet.

And while we expect the market to push the previous commercial age limitations, we are starting to see a growing number of breakdowns and a higher number of maintenance days for the older units, which is effectively

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reducing the supply. Also, due to the reduced newbuilding activity in the last ten years, the lead time for spare parts and equipment has risen significantly, which could increase the time of maintenance even more.

On the demand side, charter efficiency gains persist, with fewer vessel days per campaign and an increasing number of floating rigs drilling on DP. However, seasonal demand for anchoring up floating rigs has so far remained stable, while we see an increasing number of rigs drilling on DP during the summer months during benign weather.

FPSO Activity and Asset Moves Point to Strong Long-Term Demand

Looking ahead, the demand for high-end tonnage will be dependent on rig activity, demand from EPC contractors, Offshore Wind and FPSO activity. FPSO activity has been one of the key drivers for Brazil absorbing tonnage. After a stable number of new FPSO awards between 2021 and 2023, the activity level was reduced in 2024 and 2025, with only five awards last year.

As of April 2026, four FPSOs have already been awarded, and eight more could be awarded during the year. With the current pipeline of projects, 26 FPSOs could be awarded by 2028, securing demand for AHTS vessels in the long run.

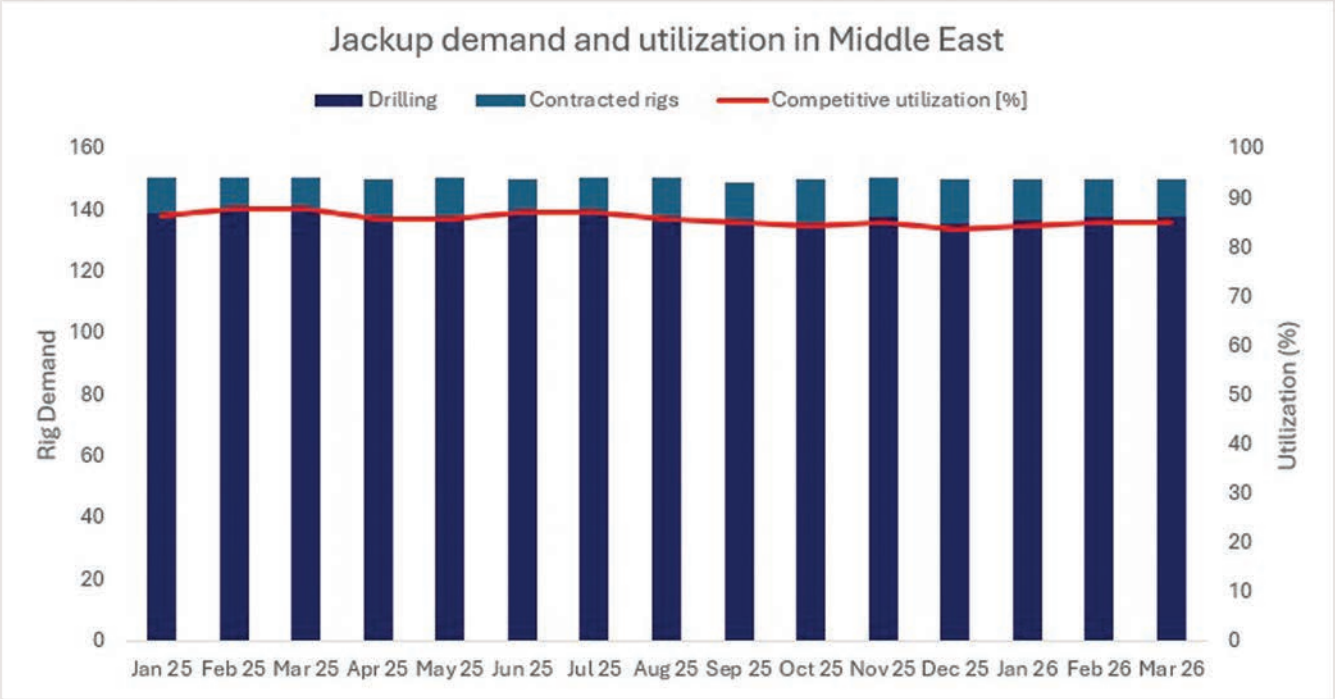
As dayrate pressure in the North Sea has increased amid persistently limited supply, S&P activity picked up over recent months. Recent transactions include DOF's acquisition of Aurora Salfjord and Sandefjord, along side the sale of Skandi Laser by the same owner, as well as Viking Supply's purchase of Maerks Maker. In total, six vessels with bollard pull above 180t have changed hands in recent months. With no new vessels above 200t BP on order, an aging high-end fleet, and increasing demand, the market fundamentals are set to strengthen even more in the coming years.

MIDDLE EAST CONFLICT JOLTS OFFSHORE DRILLING MARKET

Conflict between Iran, The United States, Israel and allies throughout the Gulf region has had an immediate effect on the oil and gas industry, both upstream and downstream. Drone and missile attacks have damaged refineries and as of mid-April 2026, blockades in the Strait of Hormuz have severely restricted the flow of oil into the global market.

The war has also affected drilling in the area. The Middle East houses 177 of the world's 495 jack-ups and drilling by national oil companies in Saudi Arabia, the UAE and other countries in the areas makes it the largest market for these rigs.

By Matthew Donovan, Head of Rig Market Research at Esgian



Jack-up Suspensions Weigh on Near-Term Activity

After Iran was hit with missiles in late February and Iran began responding with strikes in the UAE, Qatar and Saudi Arabia, a number of jack-ups were manned down and some drilling activity was halted due to safety concerns, particularly in Qatar.

As of mid-April, a significant number of these rigs have returned to work. However, Saudi Aramco, the largest operator in terms of jack-ups under contract, has been issuing notices of temporary suspension, affecting jack-ups managed by ADES, Arabian Drilling and other contractors.

Market sources suggest that around 20 jack-ups could be affected. The length of suspensions is undetermined; in previous rounds of suspensions some rigs have remained suspended by Aramco for over a year but drilling contractors have stressed the temporary nature of the suspensions this time. Regional rig demand in the near term is also expected to be curtailed by delays in the start of previously fixed contracts.

Jack-Up Market Faces Short-Term Pressure

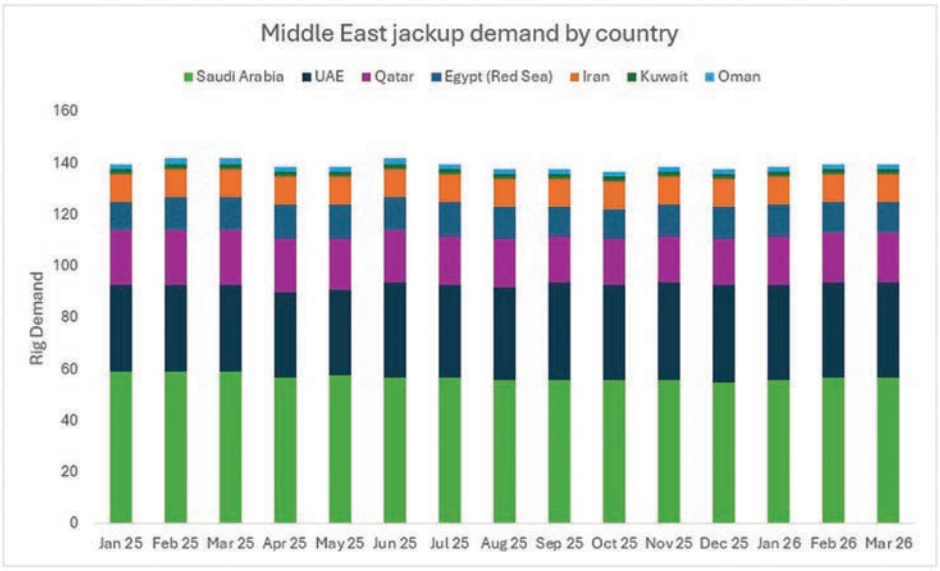
Despite these setbacks, tendering processes have continued for new jackup contracts in the region; albeit with some delays in the deadlines for ongoing tenders.

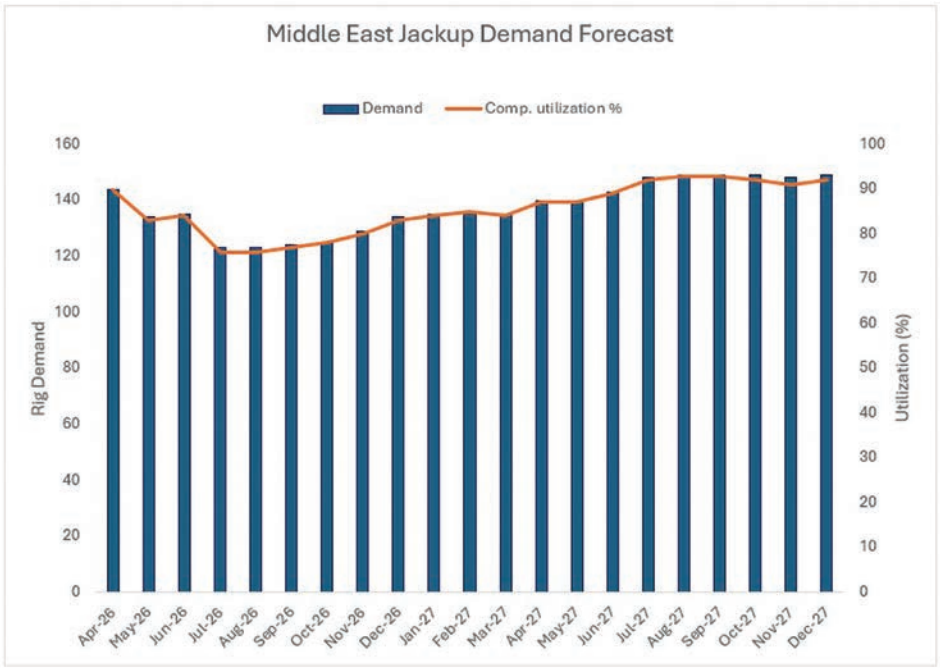
Jack-up demand in the Middle East is expected to trend downwards slightly over the next several months due to a combination of the suspensions, jack-ups rolling off contracts, and delays to contract start dates. However, in contrast with Aramco's previous suspensions, jack-ups are not expected to leave the Middle East in large numbers.

Regional jack-up demand is currently projected to trend back upwards to previous levels after the near-term lull as rigs return to work and operators work to reestablish normal operations. However, this return is predicated on open hostilities in the region resolving over the next few months. Extended fighting and blockades would likely result in a further decline in activity due to safety concerns and issues with selling and transporting produced hydrocarbons. However in the longer term, high oil prices stemming from the war could boost rig demand globally.

Even before the recent outbreak of hostilities in the Middle East, global offshore rig demand was already expected to trend upwards from 2026 to 2027.

Floating rig activity worldwide had been showing signs of increased activity in 2027 following the relative lull of 2025, with drillships securing new contracts beginning in late 2026 and beyond. Demand that was previously delayed due to supply chain bottlenecks or fiscal discipline has been firming and new tenders have been released, pointing to increased demand for floating rigs in the Indian Ocean, Southeast Asia and West Africa, alongside stable demand in South America and the US Gulf. For the jack-up market, demand was forecast to rise over 2026, with rigs returning to work in the Middle East and Mexico as contract suspensions came to an end and new tenders were issued globally.





Price Surge Lifts Outlook for Rig Demand

Looking forward now, high commodity prices in the near term caused by the conflict support continued activity on floating rig and jack-up projects that were commissioned under lower oil price scenarios.

While operators remain cautious about high oil prices linked to a regional conflict, the longer oil prices remain high and supply disruptions to the global market are evident, the more impetus there will be for increased rig demand ahead. Even if the Middle East situation is resolved in the near term, interest may remain in boosting drilling and production in areas like Asia Pacific that have seen their energy supplies disrupted as a hedge against future issues.

Evidence of this is already beginning. In a recent statement, Borr Drilling CEO Bruno Morand said that recent discussions with customers had confirmed "the early signs" of a trend towards accelerated rig activity, noting "an increased sense of urgency in awarding existing tenders and bringing forward certain drilling programs."

On the operator side, Valeura Energy, which has offshore operations centered in Thailand, said that it is pursuing options to accelerate projects "in light of the substantially higher recent oil prices" and looking to increase the amount of drilling activity it can do in 2026. This has resulted in "advanced discussions with drilling rig contractors."

DEEPWATER'S PLAYBOOK FOR DELIVERING GROWTH

Deepwater production continues to remain a core part of the long-term energy supply mix. While production from conventional onshore and shallow-water assets is expected to remain broadly flat under our base case, Welligence estimates that global deepwater oil production will grow from its current level of around 8 million bbl/d to close to 10 million bbl/d by the early-2030s.

By Gordon Hardie, Head of Sub-Saharan Africa Research at Welligence

However, post-2035, deepwater production is set to enter decline unless the hopper of pre-FID deepwater projects is replenished in the medium to long term. But this will require a tangible step up in exploration investment.

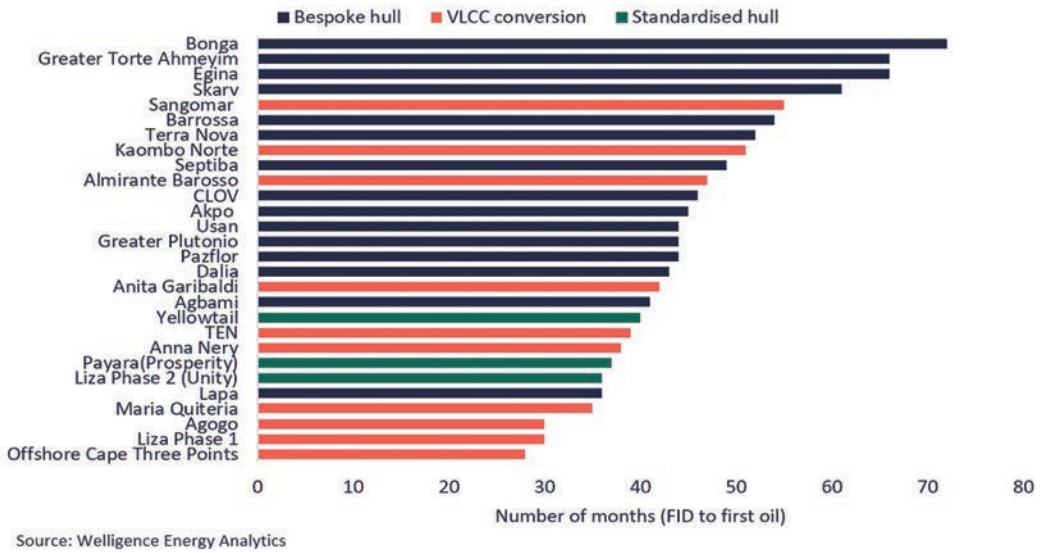
With IOCs maintaining a strong focus on capital discipline and applying strict criteria to new investment, only the most resilient and commercially attractive deepwater projects are progressing to FID. Operators are now leveraging on new technologies and contracting solutions to cut costs, shorten cycle time and improve project economics.

Standardisation and Consolidation

Standardisation is playing a key role in cutting project cycle times and costs and Welligence data highlights a clear correlation between improved project delivery and the deployment of standardised solutions. Both the Payara and Yellowtail deepwater projects in Guyana are based on SBM Offshore's Fast4Ward standardised hull design and TechnipFMC's standardised subsea trees — and both projects were delivered ahead of schedule, a remarkable achievement for deepwater developments of this scale and complexity.

Building on the standardised approach, several IOCs are increasingly embracing the subsea integrated Engineering, Procurement, Construction and Installation (iEPCI) model, which drives stronger contractor engagement and collaboration during the early project phases. Projects such as Shell's Gato do Mato (Brazil), TotalEnergies' Gran Morgu (Suriname), and Equinor's Bacalhau (Brazil) are all leveraging this approach, with schedule compression being

Lead time from FID to first oil for select deepwater projects



Source: Welligence Energy Analytics

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the primary commercial driver. The merger of FMC Technologies, a subsea production specialist, with Technip, a leading SURF contractor, was key in enabling the iEPCI model. The proposed merger of Saipem and Subsea7 will also be looking to deliver integrated solutions.

Emissions Reductions Now Embedded in New Projects

New developments are now being assessed through a carbon lens as part of project screening, with emissions reductions built in, not just bolted on. However, while deepwater production can offer some of the lowest-carbon barrels in an operator's portfolio, commercial viability remains a challenge.

In the ultra-deep water of Brazil's Santos Basin, the Equinor-operated Bacalhau FPSO is the first to feature combined-cycle gas turbines. The technology generates more power using the same amount of gas, increasing energy efficiency and reducing CO2 emissions. While forecast emissions are set to be more than half that of the industry average, the topside weight requirement (around 50,000 tonnes) is a lot heavier than the conventional FPSO with a processing capacity of over 150,000 bbl/d (average topside weight of 30,000 to 40,000 tonnes). With FPSO topside costs estimated to cost between US$50,000 and US$60,000 per tonne, the incremental capital required can be in the hundreds of millions of dollars.

One emerging technology involves moving processing equipment subsea, which could ultimately reduce the operational footprint on the FPSO topsides. This solution could lead to overall reduction in emissions, while at the same time also cutting the topside weight requirement for the FPSO. But the potential costs and system reliability will be critical to adoption and for long-term operation.

Designing for Late-Life Operations Offers Long-Term Opex Savings

With late-life operations come integrity challenges, equipment reliability concerns and processing constraints. As the onstream batch of global deepwater projects mature – over 30 deepwater assets have been producing for over 25 years – life extension has become increasingly central to operator strategies. Designing for late life is now critical for long-term opex reduction, especially as decisions made at the early stages of a development will adversely impact the cost of operating an asset across its full lifecycle. But the recent trend has focused on disciplined capital spending, fast track and standardisation.

However, with the growing comfort of new technology, especially digitisation and artificial intelligence (AI), IOCs are looking at adoption of technologies like digital twins for real-time monitoring to enable early risk identification. With predictive analytics, operators can pre-emptively intervene rather than reactively fix. This new approach reduces process downtime by up to 30% in some deployments. AI can also streamline and eliminate waste. Logistics, spares management, optimised maintenance and inspection routines, and reduced specialist interventions can significantly reduce opex. Savings of between 10-20% have been projected and with early adoption by operators including bp and Shell in GoM, the industry will be watching closely.

As companies push the deepwater envelope and projects become increasingly more challenging, designing systems for remote operations not only reduces safety risk but can materially reduce the cost of crewed interventions over field life. While high initial costs have muted early implementation, with continual improvement in data processing and AI, tangible savings are likely and with that, a new addition to the deepwater playbook.

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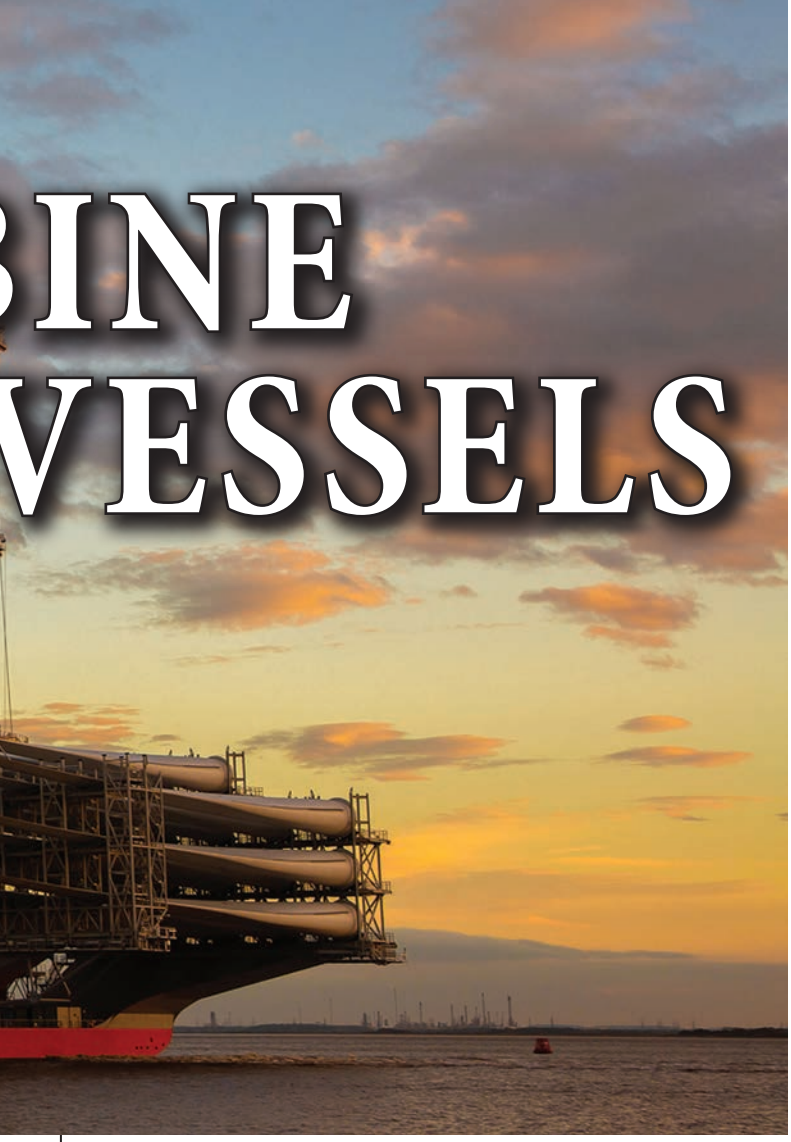
WIND TURB INSTALLATION

THE CHANGING GLOBAL BOTTOM-FIXED OFFSHORE WIND TURBINE AND FOUNDATION INSTALLATION MARKET

By Philip Lewis, Research Director, Intelatus Global Partners



BINE VESSELS

The last two or three years have seen a change in the underlying stakeholder support for the energy transition, resulting in the energy trilemma being focused more on energy security and affordability than transition, which means a pivot away from renewables to increased support for oil & gas. At the same time, inflation and interest rates have impacted project economics. Needless to say, these factors have impacted the global offshore wind forecast and the supply and demand balance for wind turbine installation and major component exchange (MCE) and foundation installation.

It is not all bad news. The UK and North Seas European countries are planning to increase offshore wind capacity (to increase energy security and affordability through scale) and advance grid integration (to manage localized offshore wind farm intermittency and stabilize the grid). Poland is advancing its offshore wind agenda. Mediterranean countries will enter the market. The big three EAPAC players (Japan, South Korea and Taiwan) will continue to advance offshore wind auctions and capacity development and will soon be joined by Australia and the Philippines. In North America (NAM) Atlantic Canada is looking to fill some of the hole left by the withdrawal of the USA from offshore wind, South America (SAM) is moving through the gears to establish offshore wind markets, and India (ISC) may soon turn plans into auctions.

This ever-changing market has an impact on the wind turbine and foundation installation market, where investment decisions for the latest generation vessels were generally made in more stable and promising times. As a result, utilization could be challenging, impacting day rates and financial returns.

These are some of the findings from a new bottom-up analysis and report by Intelatus Global Partners of the bottom-fixed turbine and foundation installation and maintenance market.

Changing demand has impacted the wind turbine and foundation installation supply & demand balance, resulting in tight to over-supply during the forecast period.

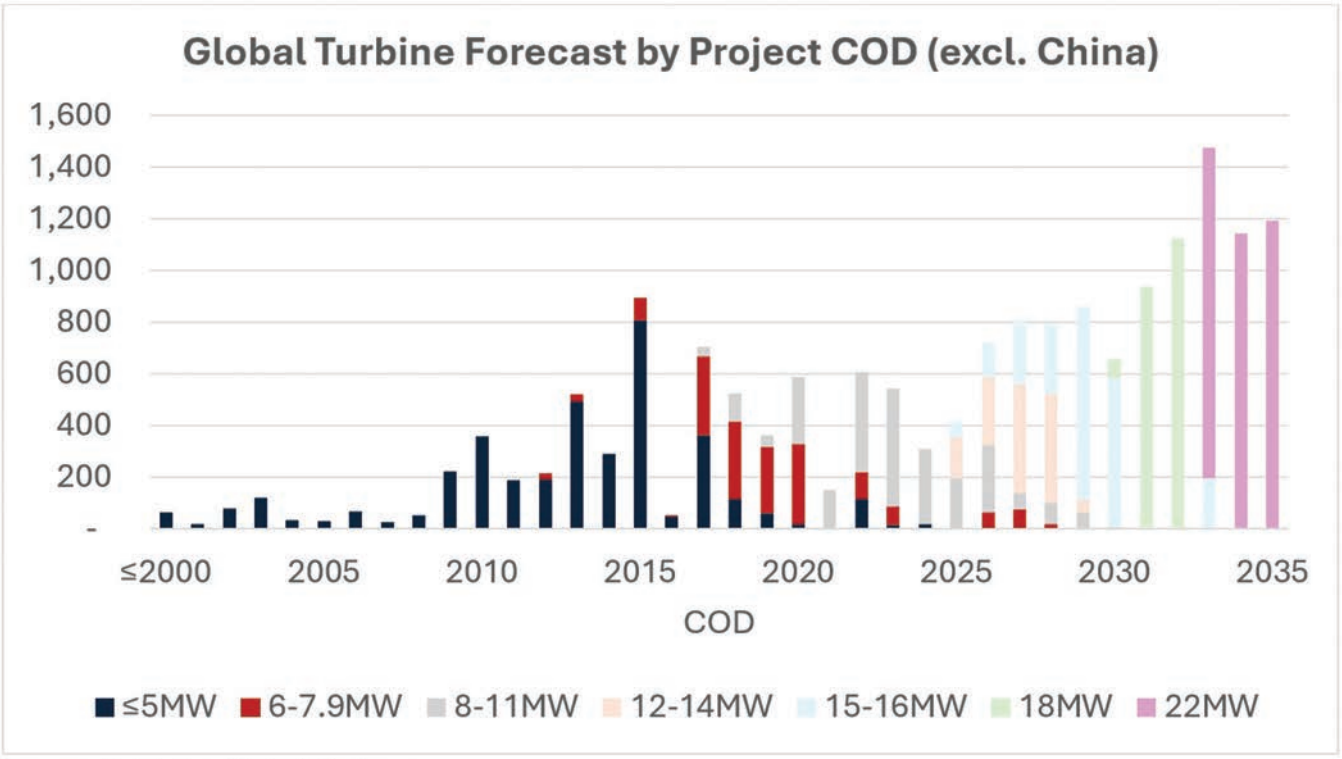
The global offshore wind forecast (excl. China) has "moved to the right" over the last year or so due to cancelled projects, disappointing auctions, cost increases and political headwinds.

The 2035 commissioned capacity forecast is ~230GW, of which over 90% features bottom-fixed technology. Europe accounts for over 70% of capacity additions and EAPAC 20%. In NAM, the project pipeline has been severely impacted by the current federal administration's campaign against offshore wind projects and Canada looks to make a market entry in the next decade. Other new demand is forecast to emerge in SAM and ISC towards the middle of the next decade.

The 2035 forecast is ~17,900 commissioned turbines. Over 70% of turbines commissioned in 2025-2035 are forecast to be bottom-fixed. Europe accounts for ~70% of capacity additions and EAPAC ~20%. Forecast sensitivities include the speed of adoption of larger turbines and the speed of project capacity development.

The specialist FFIV segment (≥DP2 crane vessel with deck to carry several monopiles or jackets) excl. China will grow from 8 vessels to 9 by 2028 and is insufficient to meet global demand (excl. China) throughout the forecast.

Foundation vessel supply remains tight over several years of the forecast period when adding in foundation support from WTIVs. The FFIV and WTIV fleet is supported by 5 HLCVs and 4 HLSSs (≥DP2 crane vessel with a smaller or no monopile carrying capacity, often fed by barges, and also working in the oil & gas sector). Most can install XXXL monopiles and large jackets. At a granular level, the European FFIV and WTIV supply will struggle



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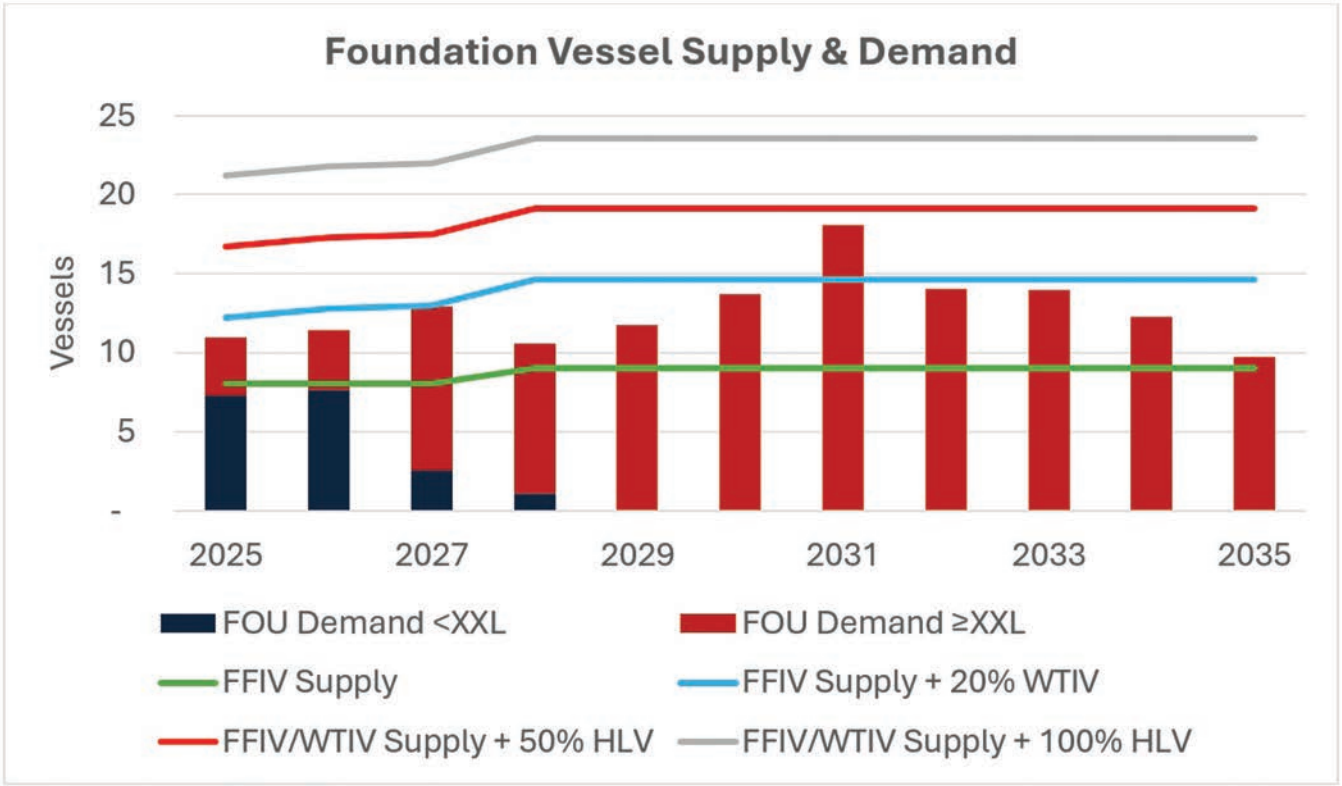

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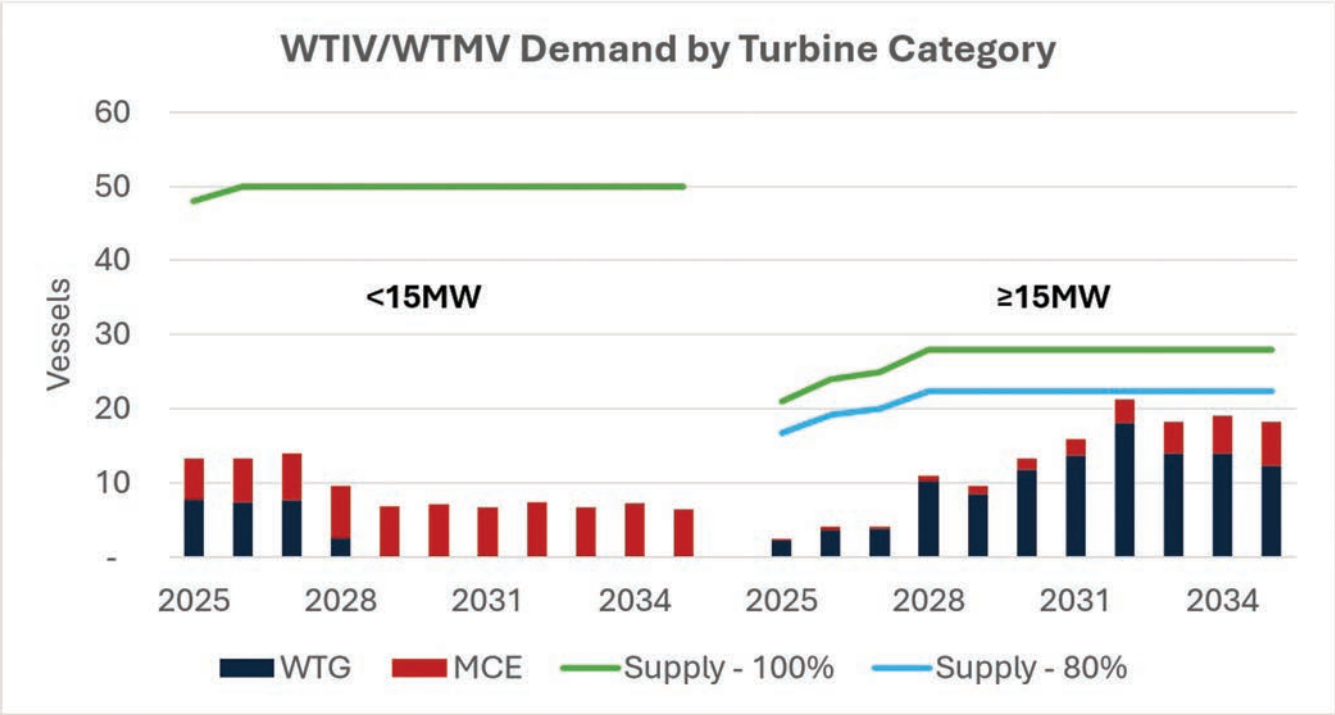

to meet all European foundation demand in the forecast period and requires HLCV and HLSS support. EAPAC is largely oversupplied with FFIVs throughout the forecast period, and both NAM and other markets are undersupplied throughout the forecast period.

As bottom-fixed turbine and foundation sizes are forecast to continue to increase, available WTIV supply (excl. China) capable of installing ≥15MW turbines is growing from none in 2020 to over 25 by 2028, made up of new generation high-spec vessels, designed to service larger wind farms built further offshore, and upgrades of earlier generation vessels. Supply is forecast to be able to meet global demand (excl. China) through the forecast period, although Europe is forecast to see tight supply in the ≥15MW segment from 2032 and from 2030 for other markets. EAPAC and NAM are oversupplied through the forecast.

The bottom-fixed WTMV fleet, both early generation WTIVs and oil & gas maintenance and intervention jack-ups, is forecast to stand at ~40 by end 2026 and is largely sufficient to meet major component exchange (MCE) requiring a jack-up intervention, subject to activity in the oil & gas market.

There are many sensitivities to the forecast, which can both increase and reduce vessel oversupply.

There are many sensitives impacting the forecast, including:

- Timing and amounts of auctions of currently active markets and new players. For example, Germany has recently delayed its 2026 auction to 2027.
- Grid connection availability.
- Speed of adoption of larger turbines. The two leading western OEMs are currently focusing on turbines of ≤15MW, although Siemens is reported to be discussing commercializing its 20MW+ model for projects under construction in the next decade. Several Chinese OEMs are developing 16-25MW offshore turbines and a couple of discussing factories in the UK and Europe.
- Acceptance of Chinese OEMs and scale of entry of Chinese installation and maintenance vessels to global the market. Chinese foundations, subsea cables and, to a lesser extent, turbines already feature in the European and EAPAC markets. Wide scale adoption of Chines turbines including planned European factories is still subject to significant political debate.
- Cabotage/preference to build & operate domestic vessels, particularly in EAPAC and NAM.
- Vessel productivity through technical capabilities of older/smaller vessels and newer/more capable vessels. New generation vessels achieve productivity of up to more than 40% compared to upgraded earlier generation vessels.
- Changing economic returns (inflation, exchange rates, etc.).
- Changing political support for offshore wind, as seen in the USA but it also witnessed in several other offshore wind markets.
- Oil & gas demand for WTMVs, HLCVs and HLSSs for construction, intervention and maintenance.
- Timing of industrialization of floating wind, which has generally moved further into the 2030s.
- Black swans.

OCEAN MINERALS ARE BECOMING A REAL US OPPORTUNITY

Momentum around critical minerals in Washington is no longer hypothetical. Policymakers are now focused on practical steps to expand domestic access to the raw materials that underpin national security, advanced manufacturing, and modern energy systems. Ocean minerals are front and center of this conversation and the offshore industry is prepared to play a central role. Congressional attention is growing fast.

By Erik Milito, President, National Ocean Industries Association (NOIA)

A House Natural Resources Subcommittee hearing recently examined regulatory barriers to deep-sea mining and how to position American companies to lead, while a March 26 House Science, Space, and Technology Subcommittee hearing focused on the strategic and economic stakes of U.S. seabed mineral development and reducing dependence on Chinese supply chains. Both hearings draw the same conclusion: offshore minerals are now a genuine Congressional priority.

Cobalt, nickel, manganese, copper, and rare earth elements are embedded in the technologies modern life depends on, including batteries, power systems, semiconductors, aircraft, ships, and data centers. Demand is rising as fast as electrification and AI-integration accelerate. Geopolitical competitors – China above all – dominate large portions of the global supply chain, giving the U.S. strong reason to develop reliable domestic and allied sources. We have already seen these same competitors move aggressively to expand their influence over international seabed governance and deepen their strategic presence in critical ocean corridors, making U.S. action more urgent than ever.

The United States has real offshore potential here. In both the high seas and areas falling within U.S. domestic waters and those of its allies, significant deposits of poly-

metallic nodules, crust, copper-rich sulfides, other seabed resources rich in critical minerals can be found. Developing them does not require building a new industry from scratch. It requires applying existing offshore expertise to a new resource opportunity.

America's offshore sector already responsibly brings the tools ocean mineral exploration and commercial recovery requires: advanced geophysical surveying, subsea robotics, remotely operated systems, real-time monitoring, and a deeply ingrained culture of safety and environmental performance. That technical overlap gives the United States a clear advantage in a sector where operational experience will matter as much as policy ambition.

Federal Policy to Help US Move into Action

Federal policy is beginning to match that potential. The Trump administration recently announced Project Vault, a public-private partnership backed by $10 billion in Export-Import Bank financing to build a U.S. Strategic Critical Minerals Reserve covering all 60 minerals on the U.S. Geological Survey's Critical Minerals List.

Unlike traditional government stockpiles, Project Vault is demand-led: manufacturers identify which materials they need, at what volumes, and make long-term financial commitments to ensure availability during supply disruptions.

On the regulatory side, the National Oceanic and Atmospheric Administration (NOAA) recently finalized revisions to its regulations under the Deep Seabed Hard Mineral Resources Act, creating a consolidated application process for exploration licenses and commercial recovery permits. The updated framework streamlines a regulatory structure to reflect scientific and technological progress, while maintaining environmental review and oversight.

NOAA also announced a major offshore mapping initiative near American Samoa, covering more than 30,000 square nautical miles of federal waters. Beginning in early 2026, the effort will generate rich publicly accessible data on seabed geology, environmental conditions, and mineral prospectivity, supplementing decades of prior research by NOAA in international waters. Good data is the foundation of responsible development and of sound regulation.

Together, these steps signal a shift from conceptual interest to practical engagement. As global competition for critical minerals intensifies, the U.S. is uniquely positioned to lead, having led technology development, pioneered scientific research and environmental impact assessments, and with the only fully developed regulatory framework for ocean mineral exploration and development in national waters and the high seas.

Deep sea mineral development also fits naturally alongside traditional offshore energy activity. The vessels, ports, fabrication facilities, skilled workforce and breakthrough innovations that support oil and gas and emerging sectors, like offshore wind and carbon capture, can support mineral exploration too, not only extending the value of infrastructure already in place but accelerating our offshore economy.

The U.S. is no longer asking whether ocean minerals matter, it's moving to action. Sustaining that momentum requires regulatory agencies to keep frameworks predictable, science-based, and adaptable as technology evolves.

The offshore sector already has what it takes to lead responsibly, the vessels, subsea technologies, geophysical expertise, and safety culture built over decades in the Gulf and beyond. That foundation, combined with Washington's recent policy moves, gives industry the confidence to invest in a frontier the U.S. helped pioneer. Early leadership here means shaping the operational standards, environmental safeguards, and international norms that will govern the sector for years. Done right, ocean mineral development strengthens domestic supply chains, reduces dependence on foreign sources, supports high-value jobs, and reinforces the industrial base on which U.S. economic and national security depend.

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GULF NOCs AND MODU OPERATORS LOOK TO CONTRACTUAL RESILIENCE TO RIDE OUT DISRUPTION

Continued idling of assets should the conflict persist would see wider MODU market tightening as drillers and NOCs manage capacity.

By Todd Jensen, Associate Director, MSI

The impact of the war in the Middle East on the offshore energy sector has so far received less attention than the attacks on ships and oil storage and loading facilities. Nonetheless, the violence has already directly impacted MODU owners with at least one operator announcing it had evacuated workers from four drilling rigs in the Middle East but confirming the rigs were still under contract and insured.

In its Q1 2026 MODU Market Report, MSI has constructed three scenarios to put the potential impact into context for OSV and MODU owners.

- ***Quick resolution (<1 month)***

Limited impact on OSV and MODU owners, the North Field being under force majeure would have seen OSV and MODU activity in Qatar reduced to a minimal role thus reducing utilization. However, the duration of the impact would have been brief enough to allow for a quick recovery, crews would be reduced to skeleton crews to allow essential work to be carried out but contract cancellations would not be expected. OSV owners may be requested to accept standby rates as operators look to cut costs.

- ***Mid-term conflict (~6 months)***

A significant reduction in OSV and MODU demand in the Middle East as fields are shut-in. OSVs and MODUs would also be unlikely to be able to leave the Gulf with the Strait of Hormuz (SoH) closed to vessels. This would result in a significant impact on OSV and MODU owners with the contracts in the Middle East having quite aggressive convenience clauses, leaving many of the vessels subject to the 30-day convenience clause and thus without pay for a majority of this period.

- ***Long-term conflict (>6months)***

Long-term this Scenario would see a similar impact to that outlined in Scenario 2, however, once the SoH reopened, activity would increase again. Delays would be likely for some oil & gas projects in the region, as oil production will be restored from shut-in fields first. The short- to mid-term impact on OSV and MODU owners would be significant, with the impact easing as the conflict plateaus, provided the SoH re-opens.

The structure of the Middle East MODU market, where roughly one-third of the global jack-up fleet is concentrated and where activity is anchored by national drilling champions such as ADES Holding, Arabian Drilling, ARO Drilling and ADNOC Drilling, creates a contractual environment that is structurally more resilient to short-term geopolitical disruption.

Long-duration drilling programs tied to NOCs including Saudi Aramco, ADNOC, and QatarEnergy tend to incorporate strong termination and operational continuity clauses. As a result, we believe outright contract cancellations in the early stages of a regional escalation are improbable.

Operators typically prioritize maintaining reservoir management and development drilling continuity, meaning contractual remedies would more likely manifest through temporary suspensions, force majeure interpreta-

tions, or negotiated rate adjustments rather than full termination of drilling agreements.

Offshore drilling agreements with the NOCs typically include clauses allowing operators to temporarily suspend rigs while maintaining a reduced standby rate.

In a heightened security environment, particularly if maritime risks persist in the SoH for a sustained period, operators could be forced to use temporary suspension mechanisms to defer non-essential drilling campaigns without triggering formal contract termination.

The practical impact would therefore appear first through rising suspended-rig counts and precautionary operational measures, such as the recent decision by Borr Drilling to recall offshore personnel.

Operational exposure would also be uneven across drilling categories. Rigs deployed in short-cycle exploration, appraisal wells, or installation campaigns retain greater scheduling flexibility and therefore represent the first layer of activity that could be deferred.

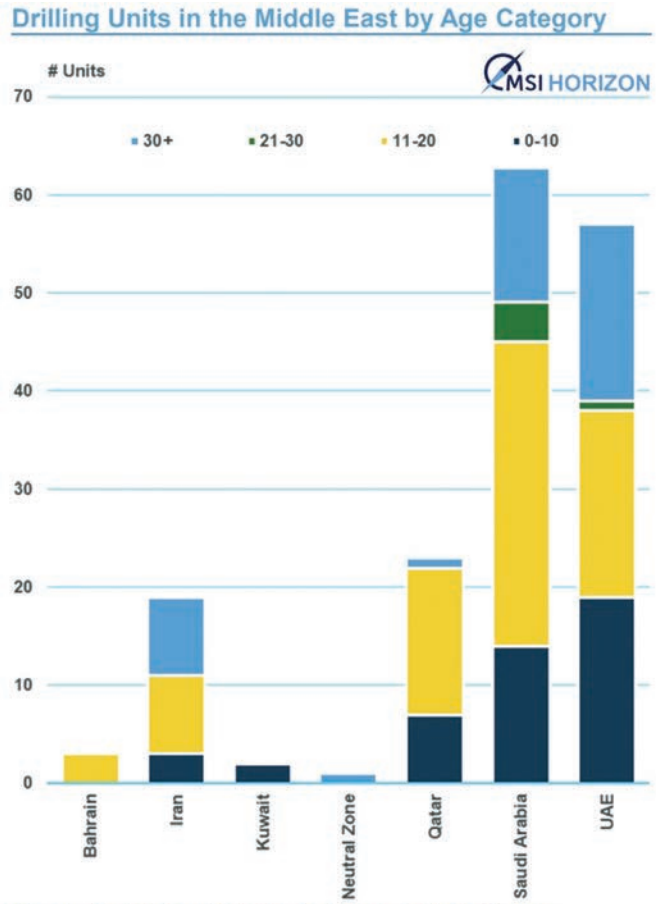
Development drilling tied to mature producing assets is considerably less discretionary, particularly in fields operated by Saudi Aramco and ADNOC, where drilling programs are embedded within long-term production management strategies.

Consequently, any near-term demand softening would likely emerge through delays in new jack-up mobilizations or exploration campaigns, rather than through abrupt contract termination. This sequencing reflects the contractual hierarchy within offshore drilling programs, where exploration budgets are typically the most flexible component of upstream capital allocation.

If export disruptions were to persist, particularly through constrained tanker movements via the SoH, the use of suspension clauses could broaden across drilling programs. As storage capacity tightens and export volumes become constrained, NOCs may recalibrate upstream activity to match logistical limits on crude flows.

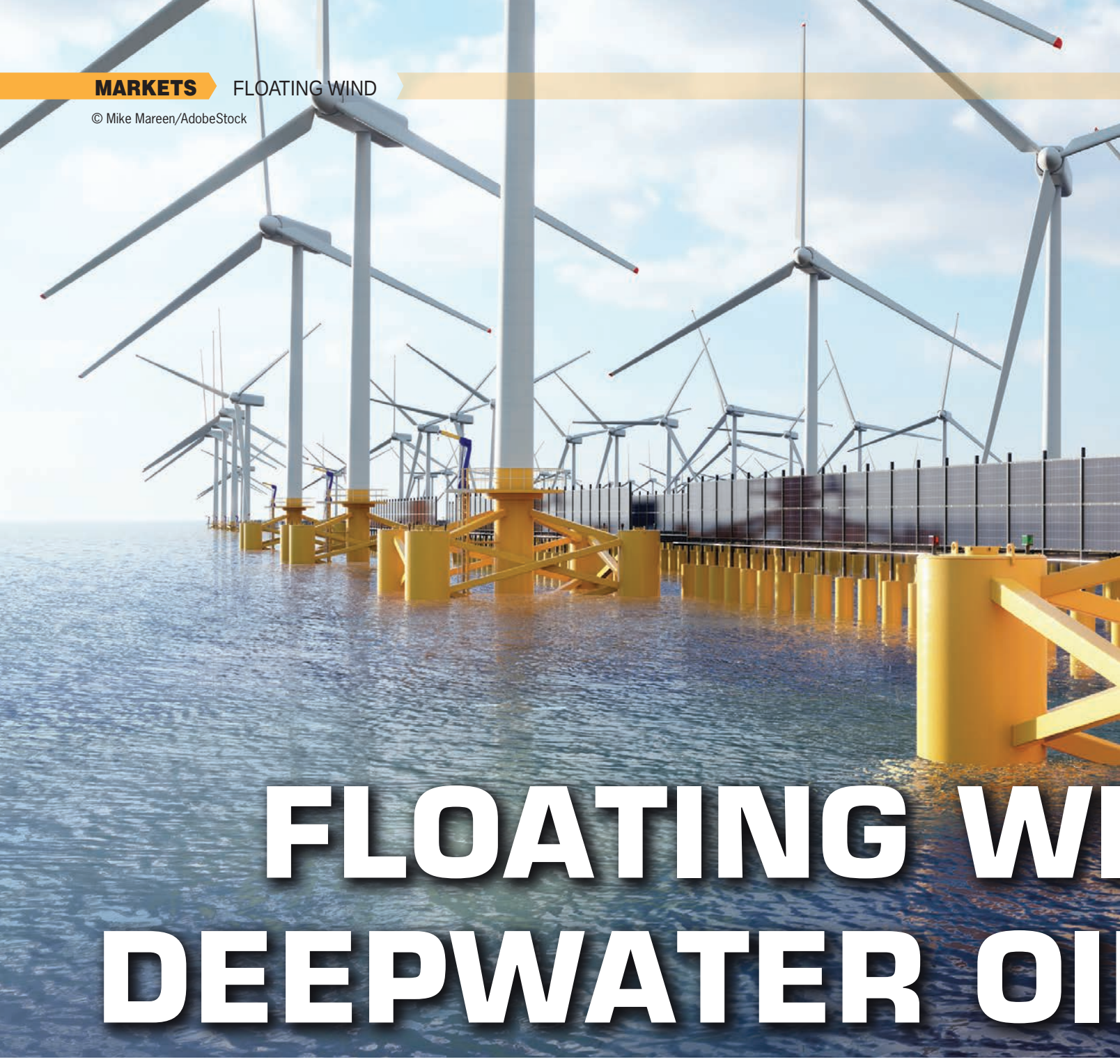
Under these conditions, discretionary drilling, especially exploration or incremental development wells, would likely be deferred first, leading to a wider pool of rigs temporarily idled under standby arrangements. This staged adjustment reflects the typical drilling-cycle response during downturns, where operators initially suspend flexible programs before considering contract non-renewals or early terminations if disruptions prove prolonged.

At the same time, any suspension-driven softening in the Gulf would likely have counterbalancing implications for the global MODU market. The Middle East has functioned as the primary sink for jack-up supply over the past decade; if part of that fleet becomes temporarily idle but remains contractually tied to regional operators, those units are effectively removed from the internationally mobile supply pool.



Based on the latest AIS rig signals for February 2026

This could tighten availability in other offshore basins at a time when higher oil prices may stimulate incremental drilling demand in markets such as Brazil, West Africa, and Southeast Asia. Under such conditions, regional suspensions in the Gulf would not necessarily translate into a global oversupply of rigs with units not able to exit the Middle East Gulf. Instead, they could reinforce tighter utilization and stronger day-rate momentum in markets outside the Middle East while the region itself experiences a period of operational pause rather than structural demand collapse.



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FLOATING W
DEEPWATER OI

Two Worlds

ND & L & GAS Collide

By Philip Lewis, Research Director, Intelatus Global Partners

Over the last few years, the energy trilemma has pivoted away from energy transition to energy security and affordability. As a result, offshore oil & gas exploration and production activity, including deepwater activity, has been relatively healthy. Construction, operational support and decommissioning activity has supported the deployment of large anchor handlers and MSVs.

At the same time, the global floating offshore wind forecast has "moved to the right" due to cancelled projects, disappointing auctions, cost increases and political headwinds. Within the offshore wind sector, floating wind remains an emerging technology. The 2035 commissioned floating wind capacity forecast is ~5GW, rising to ~14GW by 2040.

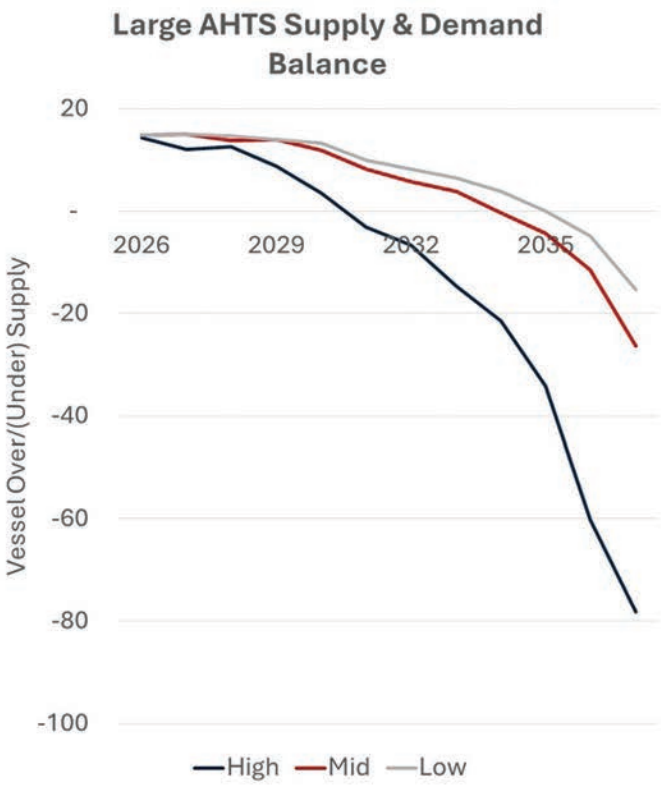
Despite this less positive floating wind forecast than previously presented, floating wind projects will drive demand (and shortages) for the largest AHTSs and MSVs.

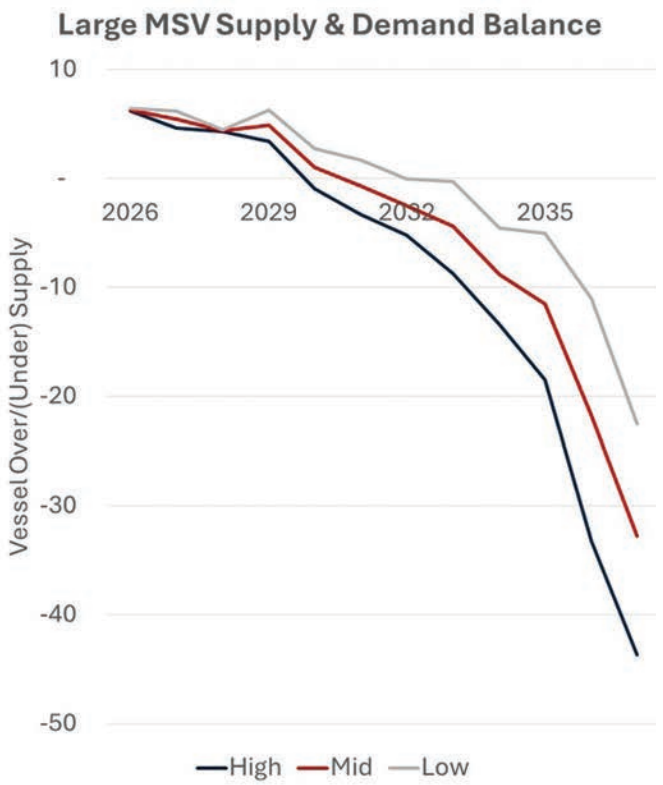
Depending on oil & gas demand for large AHTSs, shortages could appear by 2029-2031 and shortages in large MSV supply could emerge as early as 2030-2031. These are the finding of a new floating wind vessel forecast by Intelatus global partners.

THE VARIABILITY OF FLOATING WIND PROJECTS

A commercial scale floating wind farm will be made up of a group of turbines supported by floating structures, moored to the seabed by a station keeping system, with generated electricity passed along dynamic array cables, often to a bottom-fixed offshore substation. On the face of it, this sounds simple. It is not – there are many challenges to address, including:

- ***What turbine to use:*** The western OEMs are currently favoring 15MW turbines for bottom-fixed projects, although Siemens is likely to release a 20MW+ turbine in the next decade (again for bottom-fixed projects). Chinese OEMs are pushing the boundaries with 16-25MW turbines, some of which are designed specifi-





Source: Intelatus Global Partners

cally for floating wind. Turbine size will drive the size of array cable to be used, which we anticipate being predominantly installed by large MSVs.

• ***What structure to deploy:*** There are over 100 floater concepts, loosely grouped as semi-subs, barges, spars and TLPs. All four concepts have been demonstrated with semi-submersibles being the most popular. Structures can be built from steel (plate structures suited to shipyards or tubular structures suited to bottom-fixed wind monopile factories) or concrete. Large waterfront sites, such as those used to build large offshore oil & gas structures, are needed to construct or assemble these huge structures. Deepwater quays and ultra large cranes are required for mating the turbine to the floating structure and wet storage is needed to marshal assembled turbines featuring 220-300m diameter rotors. Facility size and throughput is an issue, with floating offshore wind installation campaigns calling for 20-30 floaters delivered per year.

• ***What permanent mooring system to deploy:*** Water depth and soil type are the first factors to consider. A large concentration of operational and planned floating wind farms is in ≤140m of water, although the future U.S. Pacific and western Mediterranean sites are expected to see much deeper water.

Conventional catenary, buoyant semi-taut and taut mooring systems featuring combinations of chain and fiber rope are forecast to be deployed at scale in floating wind, and to a lesser extent some single point mooring systems.

Assuming a three-point mooring system, redundancy calculations generally offer three choices: (1) a 3 x

1 mooring line featuring large diameter chains and fiber ropes, generally bigger than those seen on oil & gas projects, which constrain the number of vessels that can technically lay these mooring lines; (2) a 3 x 2 mooring line, featuring smaller diameter chain and rope than the 3 x 1 scenario, opening up the number of vessels that can lay the mooring line; and a 3 x 3 mooring line featuring even smaller diameter chain and rope and making more vessels technically capable of laying the mooring line. The anchor handlers required to lay these moorings are also those involved in deepwater oil& gas projects.

Another engineering decision is whether to anchor each mooring line with an individual anchor or share/mutualize anchors, as has been demonstrated at the Hywind Tampen project in Norway, currently the world largest floating wind array.

Anchor choice is another variable, with the focus to date on suction anchors installed by MSVs or AHTSs equipped with large subsea cranes and drag embedment anchors installed by anchor handlers.

Floating wind projects will rely on vessels built predominantly for oil & gas projects.

As noted above, floating wind projects will rely on large AHTSs and MSVs to pre-lay moorings, tow & hook-up the floating turbines and lay array cables.

The large MSV segment is relatively simple to group in terms of AHC crane size and back deck. To meet the offshore construction schedules of commercial floating projects, Vessels with large back decks, of 2,000 square meters and more, equipped with AHC cranes with capacities of 400 tonnes or more will be required to ensure offshore productivity.

Large AHTSs are more complicated. Not only are high bollard pull vessels required (those with 300 tonnes and more bollard pull) but vessels with large back decks, large chain lockers, large capacity fiber rope winches and high-capacity chain handling equipment. The latter point is often under-looked, but many of today's anchor handlers are equipped with chain haulers, gypsies, etc. that can handle 76-165mm chain seen in most oil & gas projects, but not the 175-220mm chain anticipated for many floating wind projects.

In addition to large MSVs and AHTSs, floating wind projects will also require smaller support MSVs and AHTSs, where supply is greater.

IS ANYONE BUILDING?

Whereas there is new building in the 250t AHC crane MSV segment, there are no 400t AHC conventional MSVs under construction. The same goes for large AHTS. Without a specific long-term charter to back an investment, the economics required to build such vessels are generally missing. Without investment, as floating wind demand grows, vessel supply will become tighter, which will push rates up.

However, there are some moves to build new large anchor handlers.

In Brazil's deep waters, the world's largest floating production system market, Petrobras was considering long-term chartering two new build 140m 300t bollard pull mooring pre-lay vessels with larger capabilities than its current 120t torpedo anchors connected by 120mm chain and fiber rope systems. There was talk that the vessels were being specified with both oil & gas and floating projects in mind. The original specification called for vessels capable of carrying 8x160t torpedo anchors (1,500sqm deck) with 150t AHC crane and ≥2,500cbm chain lockers. After industry feedback, the design has now been revised to 4x120t torpedo anchors (840sqm back deck), 4 chain lockers that can store ≥142mm chain, and a 20t crane. The revised specification is suited to oil & gas projects but sub-optimal for commercial scale floating wind projects.

In an interesting move, South Korea's Hana Shipping recently announced that it is building the world's first purpose built floating wind installation vessel at China's Jiangsu Dajin Heavy Industry Co., Ltd. The 127m vessel features a Kongsberg deck machinery package, including a 500t towing/anchor handling winch with three drums and chain handling equipment for 220mm chain, and a MacGregor 400t AHC crane. The vessel will be delivered in 2028 and is intended to be deployed for mooring and cable laying for floating wind projects offshore Ulsan in South Korea.

It is to be seen whether more owners will follow Hana's example. However, without new vessel investment (and the conditions to support an investment), suitable large AHTS and MSV supply will become an increasingly rare commodity.

"In the financial world, it can be tempting to take the easy way out—to invest smartly and let the money work for you. But you don't build a country on capital gains alone".

Image courtesy Josefine Spiro

MARITIME INDUSTRY PIONEER PER SÆVIK:

"I Hope to Be Remembered as a Decent Man"

By Josefine Spiro

Image courtesy Havila Shipping ASA

The Offshore Adventure: Through Havila Shipping, Per Sævik navigated the PSV and subsea markets through several industry crises. Pictured: the PSV *Havila Charisma.*

If you were invited to lunch at the home of 85-year-old Per Sævik without knowing his history, your first impression would likely be shaped by three things. First, his modest house — a traditional Norwegian home on a small, weather-beaten island on the northwest coast — has remained largely unchanged since he and his wife built it in 1971. Second, his simple taste in food; Per prefers a basic lunch of sliced bread with butter and jam. Finally, his conversation. He enjoys discussing sports, culture, and community development, showing little interest in personal status. As he puts it: "I grew up as one of nine children in a time that was rich in most things, except money. That shaped my life, and I have a very grounded relationship with material wealth."

Knowing this, it might come as a surprise to learn that this man — who has never been a bon vivant, but rather a dedicated community builder — is one of the most successful figures in the Norwegian maritime industry. Through Havila Holding, which he owns with his children, he has built an empire spanning fisheries, offshore energy, ship technology, real estate, and tourism.

The latest addition, Havila Voyages, operates four coastal cruise ships on the historic Norwegian Coastal Route between Bergen and Kirkenes. This venture stands as perhaps the greatest achievement of his career—and undoubtedly the most challenging.

Representing Norway's largest tourism initiative in 30 years, Havila Voyages faced a highly turbulent launch. First, the Spanish shipyard contracted to build two of the vessels went bankrupt, forcing the order to be moved to the Tersan Shipyard in Turkey. Subsequently, the COVID-19 pandemic caused severe delays throughout 2020 and 2021. As if that weren't enough, the project's financial backer was Russian-owned; when the war in Ukraine broke out in 2022, the ships were hit by international sanctions. Under immense time pressure, the company had to execute a massive rescue operation to secure new solutions.

"It culminated on a day we were docked in Bergen at four in the afternoon, scheduled to sail at eight that evening with a nearly full ship—only to receive a message that our insurance coverage had been canceled," Per recalls. "At that point, I had just about had enough. But we knew that if we just gritted our teeth and kept pushing, things would eventually work out. And they did. Today, Havila Voyages doesn't look half bad."

(For the record: In Per's world of humble understatement, "not half bad" translates to "very promising.")

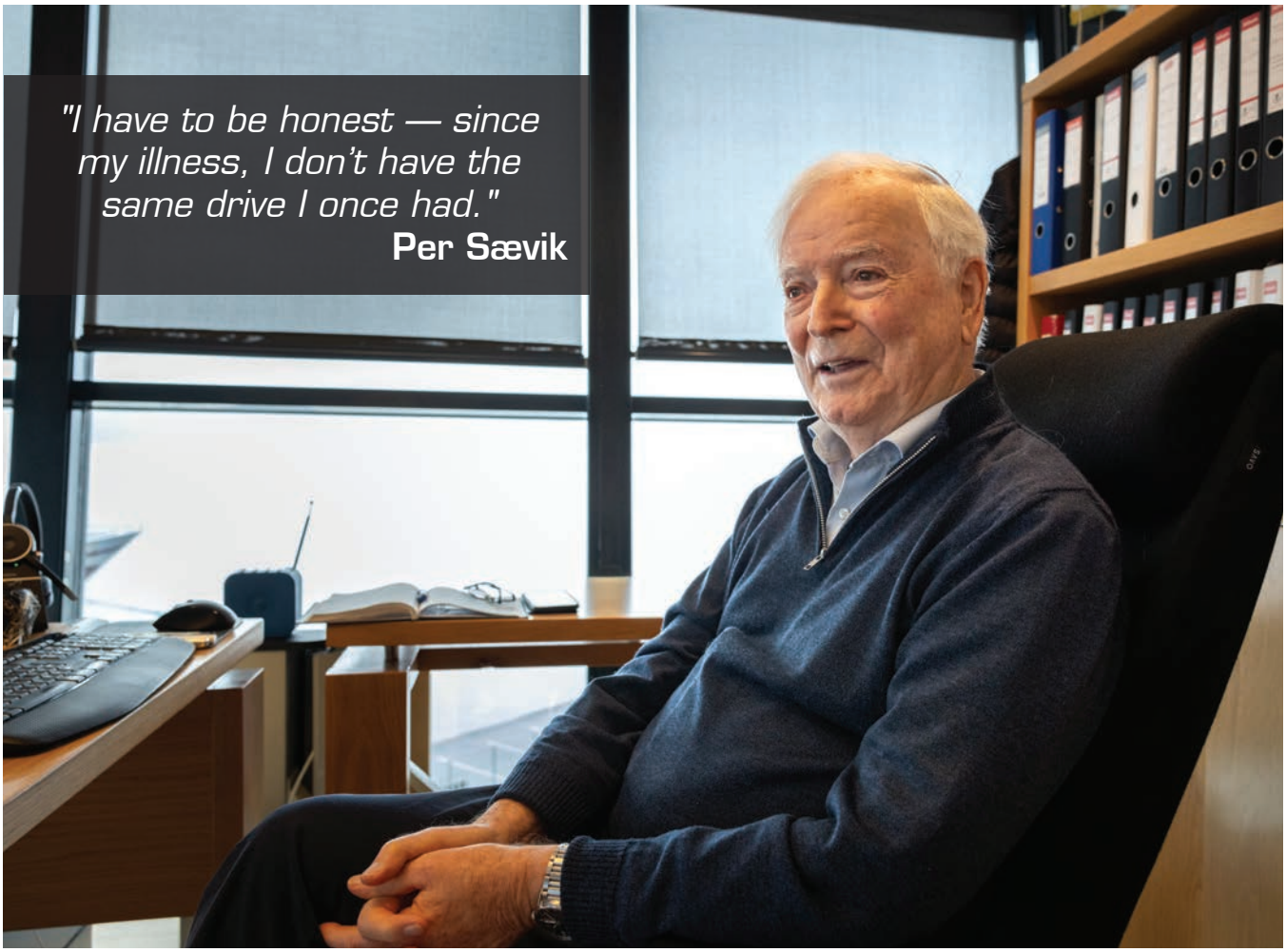


Image courtesy Josefine Spiro

"I JUST WANTED TO SEE IF I COULD DO IT"

I meet him in the polar opposite of his home residence: a spacious corner office on the fourth floor of an architectural landmark. Constructed of glass and stone with panoramic views of the fjord, the Havila building is known locally as "The Diamond."

If you bypass the elevator and take the stairs from the ground floor up to Havila Holding—climbing past the headquarters of Havila Voyages and Havila Shipping—you are met at the very first step by a wall adorned with an old photograph of a young fisherman in a rowboat. Beside it is the famous quote: "I just wanted to see if I could do it."

That was six-year-old Per's answer when his horrified mother asked what on earth he had been thinking, taking the rowboat out alone and rowing a full nautical mile from home, straight across the fjord to the town of Fosnavåg.

Since then, it has become something of a life rule: the more challenging a task, the more exciting it is to attempt.

"Now that I've turned 85, I reflect on the fact that I really have initiated a lot of things I perhaps lacked the prerequisites for," Per admits. "If I had made fewer ill-considered investments, we would certainly be sitting quite comfortably today."

He has spoken before about the times the family business teetered on the brink of bankruptcy during the oil crisis, entangled in debt negotiations with eleven different banks, shareholders, and bondholders.

"But all in all," Per continues with a smile, "the good decisions have outnumbered the bad."

BUILDING A COMMUNITY

When Per speaks of "good decisions," he doesn't primarily measure the return by the bottom line. His driving force is the joy of creation; it is the belief that one should be of "use and benefit" to others. Per views business leaders as community builders with a responsibility that extends far beyond the workplace.

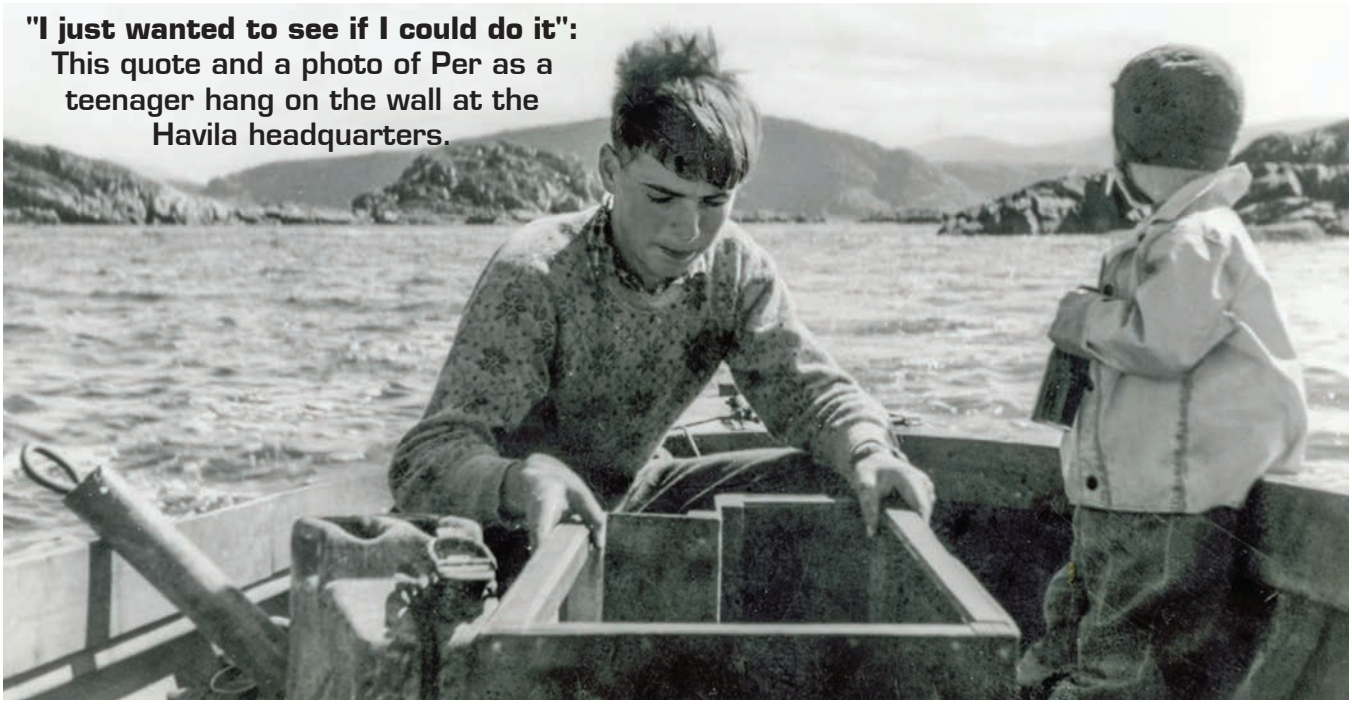
"In the financial world, it can be tempting to take the easy way out—to invest smartly and let the money work

Passing the torch: Per Sævik with his children, who are now taking the helm of his life's work. From left: Vegard Sævik, Hege Sævik Rabben, Per Sævik, and Njål Sævik.

Image courtesy Elias Reite

The "Diamond": The Havila headquarters in Fosnavåg, with *Havila Capella* in the background.

Image courtesy Josefine Spiro



"I just wanted to see if I could do it": This quote and a photo of Per as a teenager hang on the wall at the Havila headquarters.

Source: Private

Havila Voyages: The sister ships *Havila Capella* and *Havila Castor* in Lofoten. Despite a string of devastating setbacks prior to launch, the 85-year-old notes that Norway's largest tourism initiative in 30 years "doesn't look half bad.

Source: Oclin for Havila Voyages

for you," Per says. "But you don't build a country on capital gains alone. If anything is to happen in a small coastal community like ours, it is our responsibility as business leaders to ensure that employees have a meaningful life outside of working hours. We want to help build a community so attractive that it draws in the best talent."

Today, the coastal town of Fosnavåg boasts a world-class concert hall, a four-star hotel with modern conference facilities, a water park, and a vibrant sports and cultural scene. All of this was made possible by Per and other civic-minded business leaders who have injected significant capital—and a burning dedication—into the community.

"LIKE DRIVING A SCREW INTO CARDBOARD," THE DOCTOR SAID

Per is in his usual spot behind the desk, a fixture of his daily life since the Havila Group moved into "The Diamond" in 2011. Today, however, the computer monitor in front of him sits dark and disconnected. His hours here are a fraction of what they were only a few years ago. In 2023, he underwent surgery for colon cancer, but a post-operative complication forced him back onto the operating table.

"The cancer itself was successfully treated, I think. But because it took too long to catch the complication, a secondary back injury set in that I still struggle with today. The doctors won't operate; they say it would be like trying to drive a screw into cardboard," Per says bluntly. "I have to be honest—since my illness, I don't have the same drive I once had. It is only fitting that I 'sign out' now."

This realization led him to hand over the reins of his life's work to the next generation in December 2025. By the spring of 2026, he will have stepped back completely. When asked if it will be easy to refrain from interfering in operations, Per replies: "The risk is definitely there. At the same time, I am well aware that I must try to live up to the expectation that I'll let my children make the decisions from now on."

"But I'd still like to know what's going on," he adds wryly.

ON PEOPLE AND PRINCIPLES

Per has no hobbies; for as long as he can remember, his work has been all-consuming. His course was set at the age of twelve when he took his first job as a small-boat fisherman, spending his youth alternating daily between the classroom and the sea. With his earnings, he bought his first boat—and create further value.

Today, the empire he has built is worth billions. How did he actually achieve it—beyond a willpower like few others, a relentless drive, and an exceptional resilience in the face of adversity?

"With my limited formal education, I have always relied on having people around me who are smarter and more capable than myself. That is a prerequisite for the success of the team," Per says. "A leader who is afraid of having more skilled people in the system will always be a poor leader."

He adds: "Beyond that, you must have a moral standard that ensures people can trust your word. You must never fall for the temptation of shortcuts for quick gains."

AND MOST IMPORTANTLY: BEING A FELLOW HUMAN

"It is a law of life that the people you meet on the way up are the same ones you meet on the way down," Per says. He falls silent for a moment, his gaze fixed on the pale morning light beyond the panoramic window. "Being human is perhaps the most important foundation for leadership, but it is also one of the greatest challenges in the rush of daily life. When my time is up, I hope people are left with the impression that I behaved decently and with integrity. I hope they know I appreciated my employees and that there was no hierarchy—that we were all on the same level."

ONE LAST THING...

The interview is winding down. Per will soon be heading home to his wife and his traditional lunch of butter and jam sandwiches, but before we say our goodbyes, we ask: "Is there anything else you would like to share?"

He thinks for a moment, smiles, and says: "No, I think you've covered the essentials of my working life"

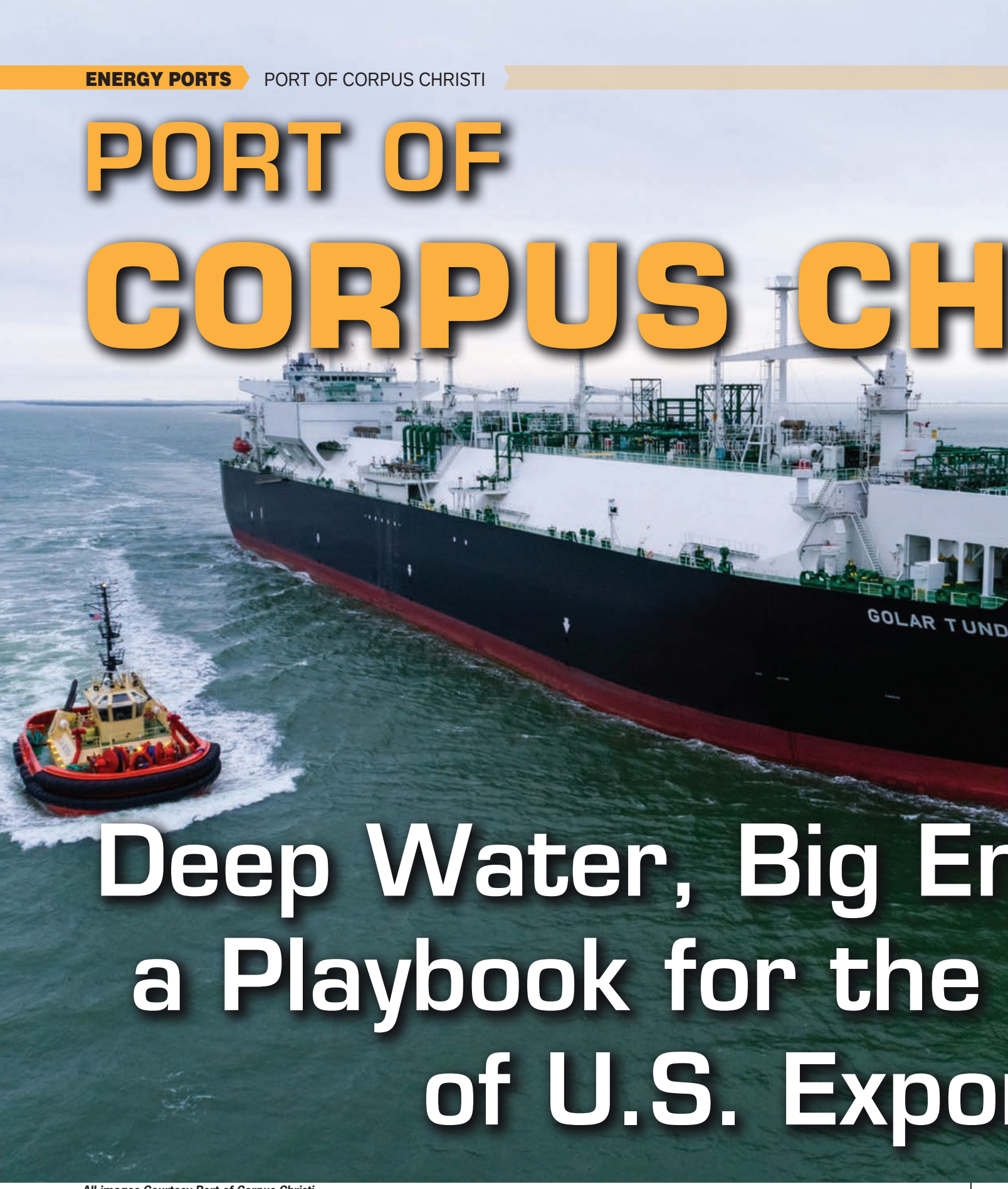
"What about your personal life?" we venture.

"No, not really, because..." He catches himself. "It is, of course, a great joy to have become a great-grandfather."

He smiles broadly. "To a little girl named Lydia. They are in New Zealand at the moment. We just got a picture of her — she's already got two teeth and everything."

Per laughs now — he is the type of person who laughs out of pure joy — before proudly adding that he is also blessed with eight grandchildren, most of whom live nearby. As I leave his office, it strikes us that we now know exactly how Per intends to spend his retirement.

PORT OF CORPUS CH



Deep Water, Big Er a Playbook for the of U.S. Expo

All images Courtesy Port of Corpus Christi

RISTI:

nergy, and Next Era rts

Drive into Corpus Christi and you can feel the paradox that defines many port cities: the waterfront is everywhere, yet the maritime business that powers the place is easy to miss — until you look past the horizon of tanks, docks, and ship traffic and realize you're staring at one of the world's most consequential energy gateways.

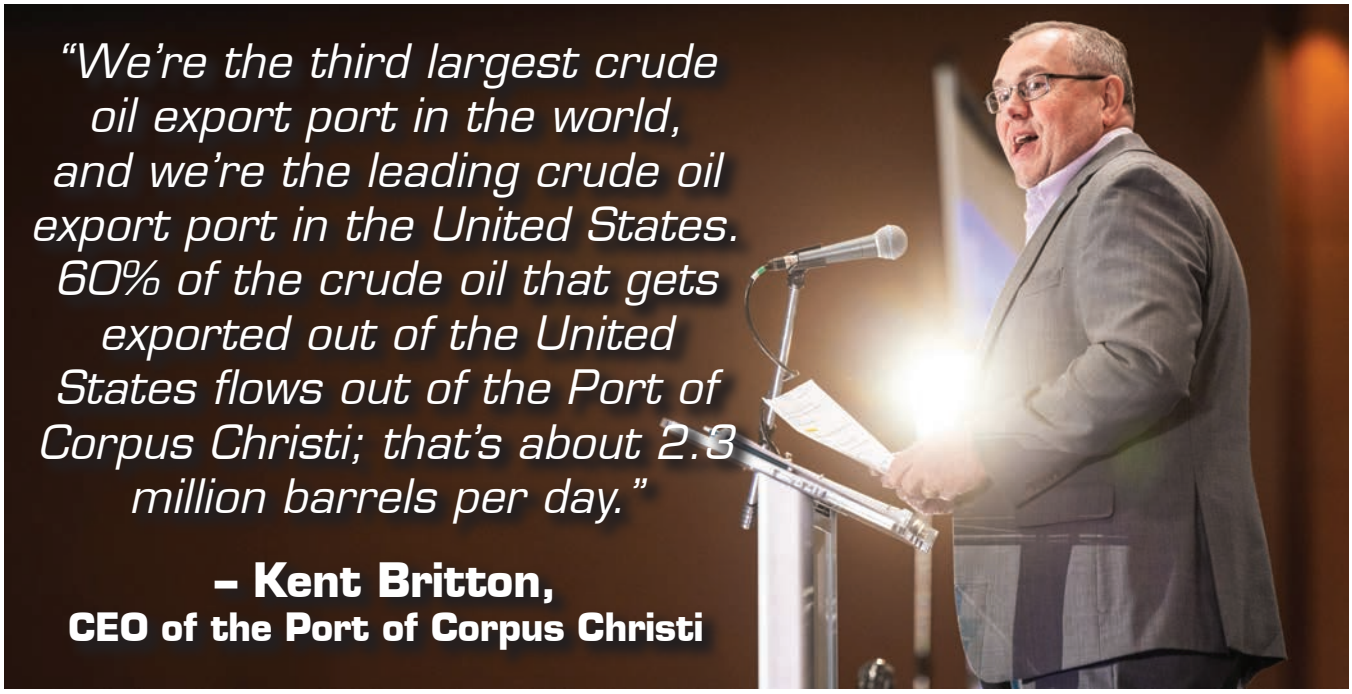
By Greg Trauthwein

By volume, the Port of Corpus Christi has become a central export valve for U.S. crude oil and a fast-rising platform for LNG—an industrial ecosystem that has grown at a pace few ports can match. In 2025, the Port and its customers moved 203.4 million tons through the Corpus Christi Ship Channel, a 1.5% decline from 2024's 206.5 million tons, as crude volumes softened modestly even while LNG continued to climb.

And in the background—quietly shaping everything from vessel size to berth productivity—Corpus Christi completed the kind of infrastructure program that changes a port's trajectory for decades: the Corpus Christi Ship Channel Improvement Project, deepening the channel from 47 feet to 54 feet (MLLW) and widening it from 400 feet to 530 feet, with additional barge shelves built in for safety and operational fluidity.

For Kent Britton, CEO of the Port of Corpus Christi, the growth is real—but so is the responsibility that comes with being a key node in the energy supply chain.

"People sometimes don't understand maritime even in port cities," Britton told me. "So I try to do the same thing in one little speech after another."



FROM INDUSTRIAL CUSTOMER TO PORT CEO

Britton didn't grow up through the traditional port authority ranks. Nine years ago, he wasn't "in the port space" at all. His background runs through large industrial manufacturers—Glencore and Alcoa — followed by a move to Corpus Christi where he served as CFO at Sherwin Alumina, a plant with deep roots in the region's heavy industry.

In other words: Britton arrived as a customer. He understood how industrial operators think about costs, reliability, and throughput — how a few hours saved on a berth window can ripple across a refinery schedule, a pipeline nomination, or a charter party.

He joined the Port of Corpus Christi in 2017 as director of finance — right before Hurricane Harvey — became CFO in 2019, and moved into the CEO role about two and a half years ago. His leadership style reflects that "customer-led" view of port investment: don't build shiny things to admire; build what improves efficiency and competitiveness for the companies actually moving product.

POCC: PUNCHING ABOVE ITS WEIGHT

When Britton talks to locals, he leads with a statistic that's hard to ignore: Corpus Christi is now one of the world's major crude export gateways. The Port has been widely cited as the largest U.S. crude oil export gateway and among the top crude export ports globally, moving roughly 2.3 million barrels per day in crude exports in recent years.

The tonnage story is equally striking. Over roughly a decade, Corpus Christi's throughput has climbed from about 85 million tons to more than 200 million tons, driven largely by crude oil exports and supporting energy flows.

Yet the Port authority itself remains relatively lean. Britton puts headcount around 270 employees — a small number, considering the scale of cargo value moving through the channel every day.

And the economic gravity extends well beyond the Port's payroll. Texas Comptroller reporting has highlighted the Port of Corpus Christi's role in statewide trade and economic activity, including the Port's substantial share of Texas seaport trade value.

Britton's framing goes one step further: this isn't only an economic story.

"It's not just an economic driver," he said. "Think about the energy that we're supplying around the world… almost exclusively to our allies and trading partners… It's a matter of national security as well."

2025 VOLUMES: A SLIGHT DIP—DRIVEN BY CRUDE

The Port's 2025 tonnage of 203.4 million tons came in slightly below 2024, and Britton doesn't sugarcoat how much the crude number drives the narrative. When crude is the dominant commodity, even small percentage moves can swing the whole annual result.

Here's what the Port reported for 2025:

• Liquefied natural gas exports rose 15.4% to 18.6 million tons

- Crude oil shipments fell 2.3% to 127.4 million tons
- Dry bulk declined 2.5%
- Agricultural goods fell 54%

In Q4 2025, Port customers moved 50.1 million tons, compared with 54.0 million tons in Q4 2024 (a record quarter). Leading commodities were crude, refined products, and LNG.

Britton's "behind the numbers" explanation is rooted in the post-2015 U.S. crude export era: the export ban was lifted, shale production expanded, and pipelines converged on Corpus Christi. That surge matured into the 2019–2020 period when major crude pipelines arrived and positioned the gateway for scale.

In the last three years, he characterizes growth as relatively flat—up slightly, up slightly, then down slightly—driven mostly by crude export variability rather than a change in the Port's underlying capability.

Meanwhile, the LNG runway is clearer. The Port's LNG story is closely linked to existing and expanding liquefaction capacity, and Port-reported data show LNG tonnage rising meaningfully year over year in 2025.

"THE BIGGEST THING WE'VE EVER DONE"

If you want to understand why Corpus Christi is positioned for the next cycle—whatever oil markets do next—start with dredging, width, and geometry. The channel improvement project is the kind of infrastructure work that's easy to summarize and hard to execute:

- Depth increased from 47 feet to 54 feet (MLLW)
- Width expanded from 400 feet to 530 feet
- Barge shelves added for safety and traffic management

USACE and the Port marked completion in mid-2025.

Britton puts the project in historical context: other than the original opening of the Port, it's the most important capital program the channel has ever seen. And the benefits aren't theoretical; they show up in cargo economics, vessel loading, and reduced friction in daily operations.

With 54 feet, customers can more fully load larger tankers. Britton explained that the Port can now fully load Suezmax-class tankers and more fully load VLCCs — still not to absolute maximum, but materially higher — reducing the need for inefficient workarounds and improving the competitiveness of the gateway.

The channel isn't just deeper, it's more efficient. Britton points to a telling indicator: more crude moved with fewer ships, reflecting improved transit fluidity and less congestion.

And with capability comes optionality. With improved navigation infrastructure, the Port can credibly evaluate cargo and vessel classes that previously sat outside its sweet spot — container services, cruise calls, and additional industrial flows — while still being anchored in energy.

CAPITAL PRIORITIES: CUSTOMER-LED AND FOCUSED ON THROUGHPUT

After you complete a generational channel project, the next question is always: what's next?

Britton's answer is practical and disciplined. Corpus Christi is a landlord port — its customers operate the terminals — and the Port authority's job is to provide the infrastructure and waterway reliability that makes those operators more productive.

So the metrics that matter aren't abstract port KPIs; they're operational outcomes:

- Reduced dwell time in the overall transit
- Faster turns at berth
- Less demurrage from waiting offshore
- More vessel calls handled per dock per year (through productivity and reliability)

Britton's "customer-led" approach means the Port watches for clear demand signals before committing major capital — particularly for projects that would be difficult to repurpose. That conservative posture doesn't mean slow; it means intentional.

Looking out five to ten years, he sees priorities like dock upgrades (to fully "commercialize" the deeper channel), potential rail improvements and yard capacity, and the possibility of a new turning basin to handle longer vessels that can now enter the channel but may not be able to turn efficiently in the inner harbor without additional geometry.

FUNDING RESILIENCE: GRANTS AS ACCELERANT, NOT OXYGEN

Ports love grants, but ports also know grants can disappear. Britton's view: build a capital plan that remains viable without state or federal funding, and treat grants as accelerant — helping projects move faster or be built more robustly.

Corpus Christi has funded major work through a mix of user fees (including fees tied to the energy volumes moving through the system) and access to bond markets. The point isn't the instrument; it's maintaining the ability to execute even when funding cycles tighten.

AUTOMATION AND AI: A "FORCE MULTIPLIER"

When people talk "port automation," they often jump straight to container terminals — automated stacking cranes, autonomous yard tractors, AI-optimized gate appointment systems.

Corpus Christi doesn't operate a container terminal, but Britton is clear-eyed about where automation can matter for a landlord port: use technology to make the waterway more reliable, predictable, and efficient.

That includes:

- Tools that reduce fog-related delays (Britton cites roughly 30+ fog delay days per year)
- Better coordination among the many parties involved in a vessel movement: pilots, tugs, agents, line handlers, Coast Guard, harbormaster
- Back-office automation to keep the Port authority itself lean and responsive

The most intriguing thread is predictive analytics—particularly around shoaling and dredging cycles. If you can use sensor data and models to forecast where shoaling will occur and how fast, you can prioritize dredging resources more efficiently and reduce the risk of operational con-

"[Clients of the port] all want the same thing. They want ease in and out of the waterway, quick time to their dock, as little time on their dock as possible, and then getting back out of here because shipping is incredibly expensive right now. We heard numbers to the tune of $13 million to charter a VLCC, for example, from here going to the far east. That's an astronomical number. So quick in, efficient loading, quick out is important to them."

– Kent Britton, CEO of the Port of Corpus Christi

straints emerging unexpectedly.

Britton described the Port's push toward a digital twin—a model that can integrate weather, resilience, shoaling, and operational data into a decision-support layer. For a gateway moving energy cargo at scale, shaving uncertainty is often as valuable as shaving minutes.

ENVIRONMENT, RESILIENCE, AND THE REALITY OF THE GULF COAST

Corpus Christi sits in a hurricane zone and operates in a regulatory environment where air quality, water quality, and habitat are not optional considerations.

Britton rejects the idea that doing things "the right way" environmentally must be in conflict with competitiveness. In his view, strong standards and smart planning reduce risk, protect the community, and help sustain the operating license that ports ultimately depend on.

Resilience also has an operational dimension: if the Port can anticipate disruptions and plan maintenance and capital improvements proactively, it becomes a more dependable link in global supply chains—especially in energy, where reliability translates to strategic value.

MEASURING SUCCESS

Britton's definition of success is both operational and strategic:

1. **Fully commercialize the deeper channel** by upgrading docks and associated infrastructure so customers can consistently capture the benefits of 54 feet.
2. **Attract new business** that diversifies the portfolio—without losing focus on what the Port does best.
3. **Keep existing customers moving faster and cheaper,** reducing friction that costs real money at today's charter and demurrage rates.
4. **Build the systems and maintenance discipline** to make infrastructure last not just decades, but a century.

That last point is easy to overlook. Growth makes headlines. But ports, at their best, are built for longevity—assets maintained, modernized, and made resilient enough to serve industries that will evolve in ways nobody can perfectly predict.

In Corpus Christi, the channel is deeper, the pathway is wider, and the Port has positioned itself to be more than a beneficiary of the last decade's energy boom. The next chapter will be written in how well it converts that new waterway capability into sustained industrial competitiveness—through disciplined capital, smart technology, and a relentless focus on the customers who turn a ship channel into an engine of national economic and strategic power.

If you want a simple takeaway, Britton offered it in his own way: stay in the lane—or, in Corpus Christi terms, stay in the channel—and make the channel the best, safest, most efficient route possible. Because when you do that at scale, everything else follows.

Image courtesy HOS

A MEASURED RECOVERY FOR THE OSV MARKET

By Barry Parker

The outlook for the offshore support vessel (OSV) business has brightened considerably since the dark days of the previous decade and is possibly in a "Goldilocks moment" — not too weak and not too strong. While strengthening, it has not yet reached the point of significant new vessel ordering. Paradoxically, across maritime markets, observers are often concerned when exuberance gets out of hand. For now, newbuild activity remains limited.

On the Q3 2025 earnings call for listed company Tidewater (NYSE: TDW), which operates more than 200 vessels across worldwide markets — including 34 in the Americas, with charterers such as Exxon Mobil, Total and Pemex — Piers Dayer Middleton, executive vice president and chief operating officer, told listeners:

"OSV supply growth is expected to remain very moderate, supporting market dynamics overall, with the OSV order book of 134 units according to Clarksons Research still representing roughly 3% of the current fleet, reflecting limited capacity for supply growth. Newbuilding activity in the OSV space continues to be subdued, and we see no signs of significant new supply entering the market in the foreseeable future."

CAPITAL RETURNS — CAREFULLY

At the late 2025 Marine Money event in New Orleans, on a panel devoted to OSVs, Morten Arntzen, senior shipping advisor at Macquarie, described how the Australia-based infrastructure and equipment financing giant has navigated the sector. He explained that Macquarie entered ship finance beginning in 2016 "at a time that a number of banks were either exiting or reducing their exposure — many because they lost hundreds of millions in the offshore sector."

The brighter prospects for OSVs alluded to by Arntzen come with the potential cost of greater volatility on the horizon. In 2025, geopolitics — and potential shifts in the energy supply landscape — have loomed large. As oil supply has increased, with greater output from existing resources among OPEC+ producers, prices have slid downward toward the $60 to $65 per barrel range for benchmark Brent crude. At that price, new investment in offshore drilling — and in supporting equipment, including OSVs — may be limited.

HEADWINDS IN THE GULF

The view from one highly informed insider was outlined in an online posting by Matthew Rigdon, chief operating officer of New Orleans-based OSV operator Jackson Offshore. In a January 2026 assessment of the marketplace published on Jackson's website, Rigdon wrote:

"There are emerging headwinds in the offshore oil and gas industry in the Gulf of America that many operators are citing as challenges to growth in activity in the region. Among these challenges are the rising costs associated with drilling wells in the GOA."

Rigdon suggested that this trend is prompting clients to reevaluate whether and how they can achieve the required rates of return to justify new drilling activity and production growth. As a result, vessel demand could soften over time, although the supply dynamics of deepwater OSVs must also be considered.

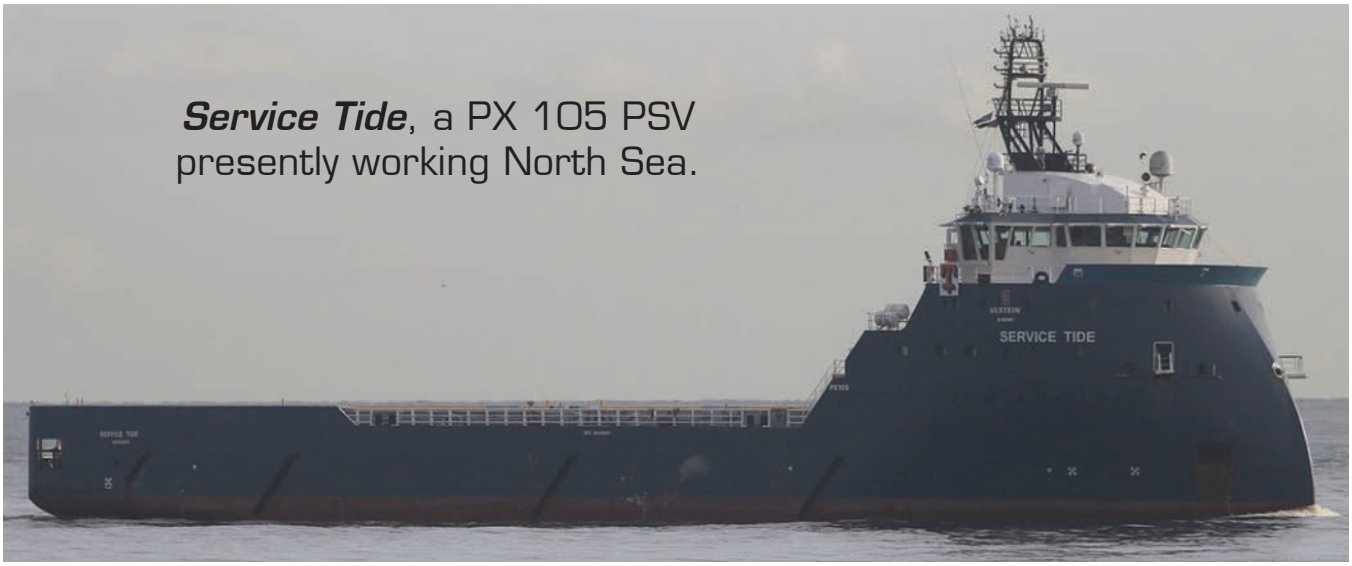
In a previous posting, Rigdon described one workaround in play — vessel sharing — "where one vessel serves multiple client locations," calling it a game-changer for efficiency and cost savings across the Gulf of America. "Vessel sharing not only reduces fuel use and operational costs but could also play a pivotal role in making the next generation of OSVs financially viable," he wrote.

TIMING THE MARKET

Back at Marine Money, Arntzen explained that Macquarie has roughly $1 billion in loans outstanding in the offshore sector, with no losses on its books. The secret, he revealed, was timing.

"We did not lend any money until 2022 to the offshore sector," he said — a time when crude oil prices had peaked and turned downward, with Brent pricing averaging above $100 per barrel — adding that "we are growing and looking for business in the sector."

Arntzen said Macquarie is looking to expand its presence in the U.S. marketplace, following successes inter-



Service Tide, a PX 105 PSV presently working North Sea.

Iain Cameron

Marine Money 2025 OSV Panel: Peter Laborde, William Baldwin (moderator) and Morten Arntzen.

Marine Money

nationally. Highlighting the bank's decision on timing its market entry, he said, "The world has re-discovered that they're going to need the offshore sector."

Importantly, he also alluded to periods of caution — as opposed to times of extreme optimism — in asset markets as being opportune moments for lenders to step into sectors.

FINANCING THE NEXT MOVES

While Macquarie seeks to leverage its experience in other geographies as it enters the U.S. market, another active player is CSG Investments, focused on secured lending across multiple sectors, including domestic maritime. CSG is linked to Beal Bank, based in Plano, Texas.

In a press release, CSG revealed that it was lending $450 million to vessel owner Otto Candies Ltd. for "general corporate purposes, including refinancing of existing indebtedness and paying for the acquisition of the four MPSVs from Harvey Gulf." The deal was widely discussed at the New Orleans event.

The Marine Money panel — coinciding with the annual WorkBoat event — also included shipowner J. Peter Laborde Jr., managing member of the family-owned Laborde Marine, which operates 25 vessels. Laborde referenced a key market characteristic: its ups and downs.

Referring to the 2010-15 period, Laborde — whose father founded Tidewater — said, "We were all building boats during those years." He lamented that in 2015-16, "the market just shifted overnight … and the oil companies pulled the plug on the offshore business."

He cited his firm's decision to limit building activities several years before the pullback, pay off debt and avoid the wave of bankruptcy filings that ultimately followed. "Today we have no debt," he said.

STRATEGIC SHIFTS AND CONSOLIDATION

Laborde was asked about the recent deal in which Otto Candies acquired four vessels from Harvey Gulf. He explained that Candies, an entity dating back to the 1940s, had gravitated toward offshore construction support — in contrast to offshore towing and traditional support — over the last two decades.

This evolution came at a time when industry stalwarts

Seacor Ohio, a PSV working presently in the North Sea.

Iain Cameron

HOS CORAL, 240 class OSV presently working offshore Mexico.

such as Harvey Gulf and Hornbeck Offshore Services needed to pivot following oil company pullbacks in the mid-2010s, shifting from standard OSVs toward multi-purpose support vessels (MPSVs), often placed on long-term charters. Laborde said Harvey Gulf decided to exit the MPSV market, while Otto Candies, "with a very strong balance sheet" and broadening its reach, including into offshore wind, was a logical buyer.

The four-vessel acquisition was financed by Beal Bank's CSG Investments, with Laborde suggesting the deal was completed entirely with debt. In CSG's press release, banker Longhurst was quoted as saying:

"Acquiring four high-quality, high-demand vessels represents a pivotal moment for Otto Candies. These funds will help the company further develop their existing first-class platform in the Jones Act offshore markets, supporting both oil and gas and wind development and production."

Potential consolidation in the OSV sector — a topic raised at Marine Money — also received attention. Longhurst noted that his institution tends to look for larger lending deals, greater than $200 million, and said, "There are a lot of small guys in the industry still, and I would love to see real growth in consolidation. I think that the industry needs to have large, sophisticated sponsors to take it to the next level."

Laborde agreed. "I think that consolidation is inevitable," he said, noting that some players are relatively new to ownership following bankruptcy filings, with former bondholders now serving as stockholders and no clear exit path. "Those guys have got to find a way out."

He pointed to the lack of an IPO market — which would allow equity holders to monetize their positions — as pushing firms toward consolidation. Recent presentations by AMA Capital and Evercore have suggested a trend toward privatization, or "going private" deals, rather than new public offerings across maritime segments.

POLICY, SECURITY AND THE BROADER LANDSCAPE

Where might the market be heading?

Rigdon wrote that despite headwinds, "the OSV sector should remain fundamentally solid." Most importantly, there are currently no oil and gas OSVs under construction, and it is highly unlikely that new OSVs will be built in the next several years. The supply of deepwater-capable OSVs serving the Gulf of America will therefore remain static.

At the same time, he noted strong demand for U.S. Jones Act OSVs outside the Gulf, further reducing the number of vessels available to service traditional oil and gas operations in the region.

Beyond fossil fuel exploration and production, two additional facets of the 2026 landscape are worth watching: offshore wind and maritime security.

In late 2025, the Trump administration halted offshore wind projects underway. By February 2026, after developers successfully challenged the administration's stop-work directives in federal court, construction resumed at five projects. Later that month, the administration filed another challenge in the U.S. Court of Appeals, appealing a December ruling striking down the wind permitting freeze issued when the president took office in January 2025.

Meanwhile, a long-awaited Maritime Action Plan was released in mid-February. While offshore vessels have figured in the dialogue, implementation would likely span many years.

OSVs are also emerging in a more immediate initiative. A December 2025 solicitation by the U.S. Coast Guard — part of the Department of Homeland Security and active in enforcement actions involving sanctioned and "dark fleet" tankers — sought commercial vessels to expand its capabilities.

In a recently published op-ed, Aaron Smith, president of the Offshore Marine Service Association, wrote:

"The U.S. vessels that construct and support offshore energy are technological triumphs. These vessels are built for long-duration operations, crane operations and modular mission profiles. The offshore energy fleet already meets or exceeds many of the performance requirements outlined in the Coast Guard's solicitation and can be further improved and customized to a multitude of roles quickly via containerized equipment. The same capabilities that allow them to service offshore energy infrastructure make them ideal platforms for logistics, surveillance support and specialized mission execution in support of federal agencies."

A LARGER ROLE AHEAD

As geopolitical developments continue to unfold, market volatility is likely. Still, observers should be watching for an increasing role for the U.S.-controlled OSV fleet — whether close to home or in geographies across the globe.

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POWERING HAPPINESS – HOW VAASA'S ENERGY CLUSTER DRIVES FINLAND'S GLOBAL REACH

Finland's status as the world's happiest country has become almost routine. The nation once again ranked first in the 2026 World Happiness Report, extending a streak that dates back to 2018. Yet in Vaasa, on Finland's west coast, that title feels less like a branding exercise and more like a by-product of something deeper - a tightly integrated industrial ecosystem built around energy innovation.

By Amir Garanovic, Managing Editor at *Offshore Engineer* Magazine

Vaasa is not a capital city, nor is it large by European standards. But it is one of the most concentrated energy technology hubs in the Nordics. The EnergyVaasa cluster comprises more than 180 companies, employs around 13,000 people, generates over $7 billion (€ 6 billion) in annual turnover and exports roughly 80% of its output. Annual R&D spending in the cluster stands at around $295 million (€ 250 million), with further infrastructure investments expected to reach $2.23 billion (€1.9 billion) by 2030.

That industrial base shapes the city's identity, explaining also why EnergyWeek, held in Vaasa in mid-March, has become more than a conference. The event reflects the breadth of the city's industrial ecosystem, bringing together stakeholders across wind, renewables, energy storage, clean gas, and system-level innovation.

EnergyWeek was structured around thematic days - including wind and renewable energy, energy storage, and clean gas energy - mirroring the key pillars of the energy transition. This year's edition drew more than 11,000 participants from 50 countries, underlining Vaasa's position as a meeting point for the global energy sector.

The opening sessions also highlighted the international dimension of the event, with keynote contributions from multiple ambassador delegations, reinforcing how Vaasa's energy cluster connects not only to European markets but to a broader global dialogue on energy security, resilience and decarbonization.

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VAASA - WHERE THE ENERGY TRANSITION IS INDUSTRIAL, NOT ABSTRACT

What stands out in Vaasa is how seamlessly industry, research and policy intersect. Within a short distance, it is possible to move from conference discussions on grid resilience, circular economy and hydrogen markets to large-scale industrial facilities where those ideas are being tested and deployed.

At Wärtsilä's Sustainable Technology Hub, considered a 'crown jewel' of the industrial area, the focus is firmly on decarbonization of both marine and energy systems. The facility operates as a collaborative platform, bringing together engineers, customers, partners and researchers to develop and test solutions, including engines designed for sustainable fuels. It is a reminder that the transition is not only about new technologies, but also about adapting existing industrial capabilities to new energy realities.

Elsewhere in the city, Vaasan Voima's Vaskiluoto site offers a striking example of how legacy infrastructure can be repurposed. What was once a combined heat and power and oil-storage site has been transformed into a high-temperature thermal energy storage system, designed to integrate renewable electricity into district heating. With a planned capacity of 17 GWh and supported by electric boilers totaling 220 MW, the system demonstrates how surplus renewable power can be converted into long-duration heat, reducing reliance on combustion even during peak Nordic winter demand.

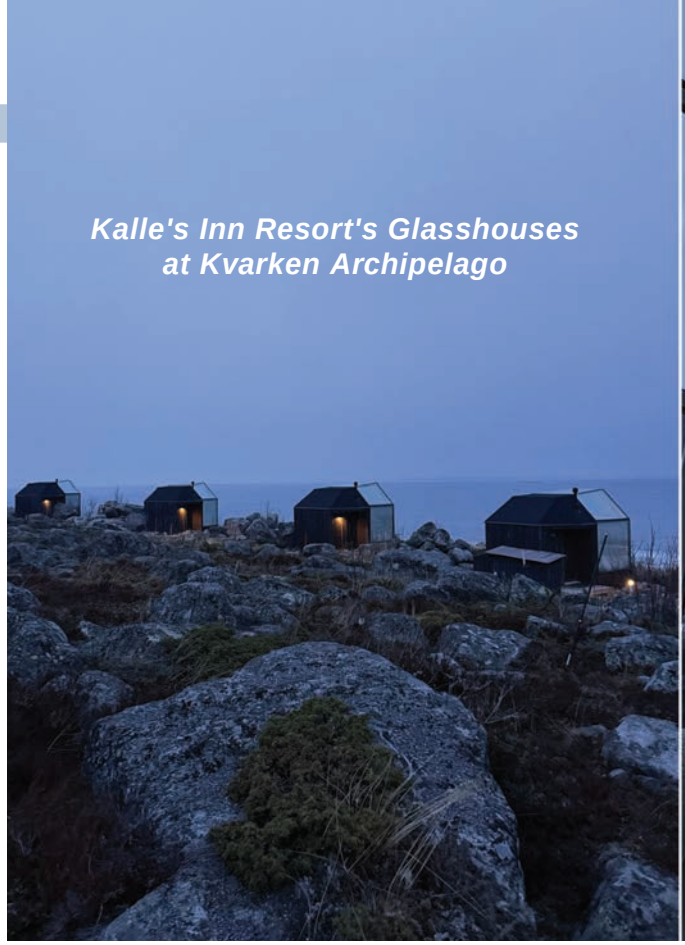
The approach reflects a broader mindset visible across the region - rather than discarding existing assets, Vaasa's energy companies are finding ways to adapt them into flexible, low-carbon systems. It is a pragmatic path that may resonate with other industrial regions facing similar challenges.

The same system-wide thinking is evident at companies such as Danfoss Drives and VEO. In Vaasa, Danfoss develops and manufactures high-power AC drives and power conversion modules used across energy, marine and industrial applications, helping customers improve efficiency and reduce emissions. VEO, meanwhile, delivers electrification and automation solutions across renewable energy, power generation and industrial processes, with more than three-quarters of its projects directly tied to the energy transition.

Alongside industrial visits, the discussions at Energy-Week reinforced how these technologies fit into a broader systems shift. Sessions covered not only generation and storage, but also energy system flexibility, resilience, digitalization and the integration of renewables into existing grids - areas increasingly critical for offshore wind expansion and electrification of industry.

A HAPPIER COUNTRY - BUILT TO ENDURE, ADAPT AND OVERCOME

What makes Vaasa distinct is not just the scale of its en-



Kalle's Inn Resort's Glasshouses at Kvarken Archipelago

ergy industry, but how deeply it is embedded in everyday life. The link between technology, education and society is visible from an early stage. In Vaasa, energy-related learning begins as early as preschool and continues through all levels of education, creating a steady pipeline of future engineers, researchers and industry professionals.

At the University of Vaasa, this connection becomes more explicit. The institution works closely with the surrounding energy cluster, combining expertise in energy technology with business, investment and societal transformation. The joint 'Energy Transition Valley' initiative aims to strengthen research infrastructure and deepen collaboration between academia and industry, reinforcing the region's role as a hub for innovation.

At the same time, Vaasa is positioning itself as a model for sustainable urban development. The city has been named a European Green Leaf City for 2026, recognizing its progress in climate action and environmental policy. The city's theme for the year - 'Making a Difference Makes Us Happy in Vaasa' - may sound light, but it is attached to a very practical idea - that climate policy, industrial competitiveness and quality of life should reinforce one another rather than compete.

EnergyWeek discussions also reflected this urban dimension, with dedicated sessions on 'Leading Urban Energy Transition' and the role of cities in bridging competitiveness and climate action - highlighting how local policy frameworks are becoming increasingly central to delivering large-scale energy transformation.

There is also a human dimension that is harder to quantify but difficult to ignore. Outside the conference halls and industrial sites, life in Vaasa moves at a measured pace. The nearby Kvarken Archipelago, a UNESCO World Heritage site shaped by post-glacial land uplift, offers a stark contrast to the high-tech facilities just a short drive away. Sauna, cold-water swimming and time spent in nature are not treated as luxuries, but as part of a balanced routine.

That balance may help explain why Finland consistently ranks at the top of global happiness indices. In Vaasa, the drivers of that outcome appear closely tied to the same factors underpinning its energy success - long-term thinking, trust in institutions, investment in education, and a willingness to adapt rather than disrupt for its own sake.

For the energy industry, the lesson is not that happiness can be engineered. It is that resilient, future-oriented systems - whether in energy, infrastructure or society - tend to produce more stable and sustainable outcomes.

Finland may once again be the world's happiest country. In Vaasa, that result seems less like a coincidence and more like a consequence of how the energy transition is being built - methodically, collaboratively, and with a clear sense of purpose.

HARD-TO-ABATE REALITY CHECK:

DNV on CCS Growth, Costs, and the Policy Gap

Carbon capture and storage (CCS) has moved beyond theoretical climate modelling into the realm of infrastructure planning, capital allocation, and regulatory design. DNV's latest Energy Transition Outlook for CCS characterizes 2025 as a critical year, highlighting that global capture and storage capacity has reached a turning point, driven by near-term expansion in North America and Europe.

By Amir Garanovic, Managing Editor at *Offshore Engineer* Magazine

Yet the same outlook makes clear that, even with this acceleration, CCS remains far below the level required to deliver net zero by mid-century.

For **Jamie Burrows**, Global Segment Lead, Carbon Capture, Utilization, and Storage (CCUS) at **DNV** and one of the report's authors, the central issue is no longer whether CCS has a role in the energy transition - it is whether the industry can deploy it at sufficient speed, in the right sectors, under the right policy frameworks.

A Necessary Technology in a Hydrocarbon-Heavy System

Burrows places CCS within the structural realities of the global energy mix.

"If you look at credible forecasts of how the world's energy systems will change from here, it's very clear that we will continue to use hydrocarbons in our primary energy supply through to 2050 and potentially beyond. Hydrocarbons are definitely going to be part of our energy systems," he said.

Today, hydrocarbons account for roughly 80% of primary energy supply. DNV expects that share to fall to around 50% by 2050 - but not disappear. Consequently, CCS should not be thought of as a substitute for renewables, but as a complementary mechanism to address residual emissions, according to Burrows.

"In that context, you can see that a technology like carbon capture and storage becomes really important because, fundamentally, it is helping us to tackle the CO2 emissions that remain in our energy systems," he explains. We know that it's a technology that will be very much needed for energy transition."

According to the DNV report, CCS is forecast to grow from 41 MtCO2 per year today to 1,300 MtCO2 per year by 2050, representing around 6% of global emissions at that point.

However, the report also stresses that this remains significantly short of what is required to reach net-zero emissions.

Hard-to-Abate Industry: Where CCS Delivers Maximum Impact

Burrows is careful to distinguish between where CCS is essential and where other solutions may be more appropriate.

"It's not a technology that should be used for every emission source – it's a technology that should be used for specific hard-to-abate emission sources," he says.

Cement is the most frequently cited example – and for good reason.

"The cement industry generates around 7% of global anthropogenic CO2 emissions. There really isn't a good alternative to carbon capture to decarbonize cement manufacture today," Burrows explains, adding that fuel switching alone cannot solve the problem.

"If you look at the cement manufacturing process, most of

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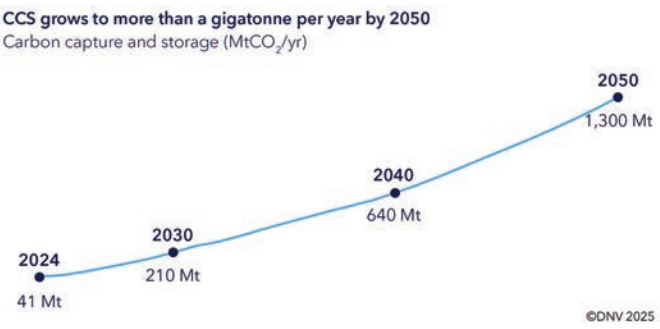
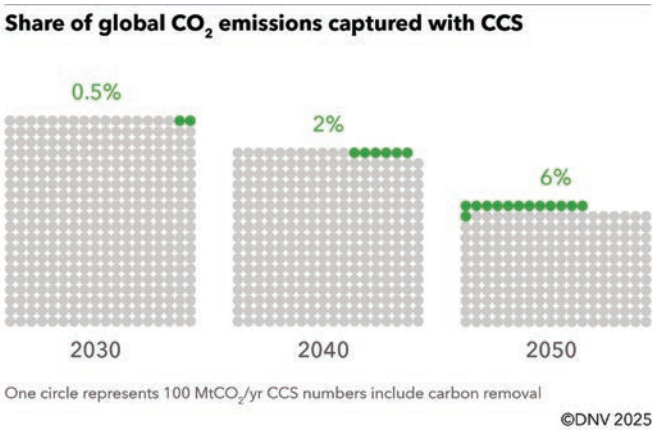
Jamie Burrows,
Global Segment Lead, CCUS at DNV





the CO2 emissions come from the chemical reaction itself. About 60% of emissions there are not from combustion – they come from the chemical reaction. If we switch fuel, electrify, or use hydrogen, at best we'll tackle 40% of the emissions. If we wish to decarbonize that industry, CCS is a much better technology to use. We can capture 95% of the emissions."

Steel and certain chemical processes fall into a similar category. According to the report, manufacturing sectors are expected to account for 41% of annual CO2 captured by mid-century, becoming the main growth driver from 2030 onward.

The power sector also retains a role for CCS, particularly in systems with significant adoption of renewables.

"If we look at very high penetrations of renewables, we know we will need dispatchable power alongside. It's not always sunny, it's not always windy. In jurisdictions like the UK, renewables are intermittent," Burrows says. "Gas-fired power with CCS can provide the low-carbon dispatchable power that we know will be needed."

Technically, capture rates can exceed 95%, but cost considerations remain decisive. "If we're looking at post-combustion capture – capturing CO2 from an existing emission source – we can capture in excess of 95%. It becomes a question of economics. Chasing the final few percent is typically more expensive."

Offshore Storage, Infrastructure Reuse – and the Timing Constraint

Offshore oil and gas are increasingly intertwined with CCS deployment. Burrows points to fields with high CO2 content that is currently vented, as well as integrated energy companies assessing capture and storage across their value chains.

"A good example is Kasawari in Malaysia, where hydrocarbons containing high CO2 content are produced. Petronas has developed a CO2 store into which it will inject the separated CO2. We are also seeing integrated oil and gas companies examining CO2 capture opportunities elsewhere in their value chains. This includes onshore opportunities such as natural gas processing, refineries and blue hydrogen production.

"The industry also sees opportunity in transporting and storing CO2 for emitters – particularly around the North Sea.

"Beyond commercial drivers, there can be regulatory drivers. For example, through the EU Net Zero Industry Act, certain operators are obligated to contribute to developing a collective 50 million tonnes per annum of CO2 storage capacity," Burrows says.

On storage availability, his assessment is unequivocal.

"Globally, we know that there is more than enough storage for our needs, both onshore and offshore," he says. "When it comes to identifying and developing a storage site, we go through a very robust procedure. We select sites that are lowest risk and where we can be confident the CO2 will be contained."

Burrows points out, however, that the bottleneck lies not in geology.

"So yes, there is enough storage. Where developed correctly, I'm confident there will be no problems around containment. The challenge is timing. It can take several years to develop a storage site, and we must ensure that capture, transport, and storage all become available at the same time."

Public perception has influenced geographic choices for storage, particularly in Europe, where early onshore storage projects encountered opposition, resulting in most European CO2 stores now being developed offshore. "Today, globally, the majority of CO2 is being stored in onshore sites. In Europe and parts of Asia, offshore storage is prominent. We expect other regions to make greater use of offshore storage as the industry matures."

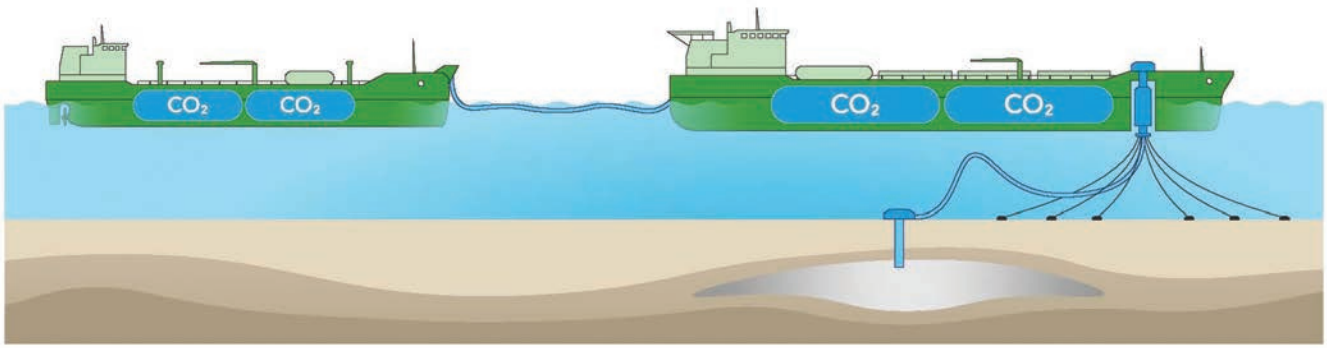
Transport and infrastructure economics also play a critical role.

"The economics of CCS are challenging. If it is possible to repurpose infrastructure like pipelines, that can improve project economics," Burrows says. At the same time, he stresses that reuse must follow strict qualification processes to ensure design integrity and safety compliance.

Transport modes are diversifying.

While pipelines remain dominant, projects such as Northern Lights have introduced ship-based CO2 transport. Rail and truck solutions are also emerging for specific use cases.

Looking ahead, Burrows notes growing interest in floating CO2 storage and injection concepts.



Concept 2 – FSIU

"We are starting to see interest in floating storage and injection units," he says. "Rather than a fixed offshore facility, a floating vessel could receive shipments of CO2 and inject them into storage. Once the store is full, the vessel could relocate to another storage site. There are still technical questions around operations and equipment for such floating facilities, such as the use of flexibles for CO2. Such challenges have been examined in detail through DNV's recent CO2 Offshore Injection Joint Industry Project".

Maritime, Hydrogen and Carbon Removal: Extending the Value Chain

Beyond industrial applications, carbon capture concepts are extending offshore and into the decarbonization of the maritime industry.

"We are seeing more interest in capturing CO2 on floating production, storage, and offloading (FPSO) units.

For example, DNV performed a technology qualification for SBM to assess capturing CO2 from gas turbines on one of its FPSO designs. Petrobras separates CO2 from produced gas and reinjects it in the Santos Basin. In such cases, it may be cost-effective to also capture CO2 from power production onboard," Burrows says.

Onboard carbon capture for ships is also gaining attention.

"Onboard carbon capture could be one of the more cost-effective means to decarbonize maritime vessels," he notes. "Technical challenges remain, such as power requirements for capture, storage in high-pressure tanks, and offloading infrastructure in ports."

According to DNV's outlook, onboard carbon capture is expected to scale beyond 2040 and could capture a significant portion of maritime emissions by mid-century, assuming supporting infrastructure develops accordingly.

Hydrogen production further reinforces the need for CCS infrastructure, with carbon dioxide removal (CDR) adding another layer.

"Blue hydrogen involves producing hydrogen from natural gas, generating CO2 that must be transported and stored. Similarly, if we are going to remove CO2 from the atmosphere at scale, we will rely on CCS infrastructure to store it permanently," Burrows explains.

The report forecasts that CDR could reach 330 MtCO2 in 2050, about one-quarter of total captured emissions, with bioenergy with CCS generally offering lower costs than direct air capture.

Policy as the Decisive Lever

DNV recognizes the importance of CCS technology for energy transition, recognizing it must scale significantly. DNV sees its role as helping to ensure early CCS projects are deployed successfully, which will enable the scaling up the technology, by delivering advisory and verification services to reduce risk and ensure projects succeed.

"For example, on the Greensands project in Denmark, we have performed CO2 storage certification considering the requirements of ISO 27914 – reviewing the work performed to develop the storage site and confirming it conforms to the standard using service specification DNV-SE-0473," Burrows said.

Ultimately, Burrows point outs, the policy remains the determinant of scale.

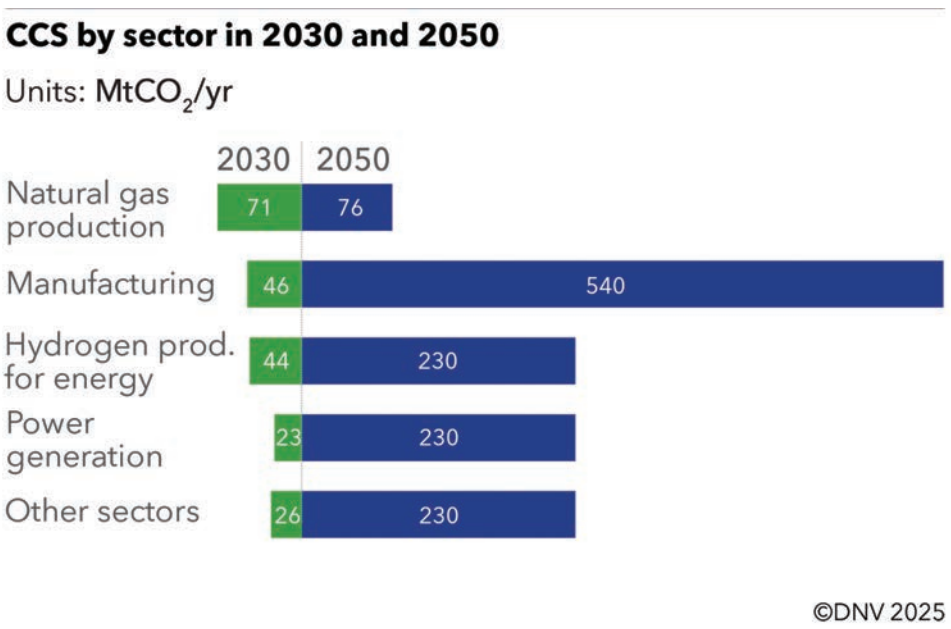
"CCS deployment is entirely dependent on policy support. Generally, for projects to move ahead, the cost of emitting CO2 must be greater than the cost of capturing and storing it." he said. "In North America, deployment is primarily driven by the 45Q tax credit. In Europe, it is driven by the EU ETS carbon price and supporting national policy.

Despite clear progress and what the report describes as a pivotal decade ahead, Burrows emphasizes that no single technology will deliver the transition alone.

"The reality is, if we look at energy transition, we need all solutions. There's no one correct solution. We'll need everything and lots of it."

In his view, CCS is not a silver bullet, but without it, the arithmetic of decarbonization simply does not add up.

Further details of DNV's CCUS activities, including access to DNV's Energy Transition Outlook: CCUS to 2050 can be found on DNV's website - ***https://www.dnv.com/focus-areas/ccs/***



TECHNOLOGY AS ENABLER OF ENERGY SECURITY IN OFFSHORE ASIA

In recent years, Asia's offshore sector has regained strategic importance, particularly in countries such as Malaysia, Indonesia and Vietnam, as operators pursue new upstream opportunities while governments seek to strengthen domestic and regional energy security. Ongoing geopolitical developments and potential exposure to supply disruptions have sharpened focus on the role offshore projects can play in delivering stable and resilient energy supply. In this context, technology - particularly the way offshore assets are designed, powered and integrated - is becoming a critical enabler of execution certainty, reliability and long-term system resilience.

By Khaleef Khan, Vice President, Offshore Solutions, Energy Industries, Asia

Offshore Development Takes on Strategic Importance

Offshore developments are now expected to deliver predictable, resilient supply, making reliability, schedule confidence and execution discipline more important than ever. At the same time, projects are moving forward in a more challenging environment, from mitigating potential supply chain constraints, limited yard and manufacturing capacity, longer equipment lead times and rising cost influencing delivery schedules.

With capital investment becoming more selective, operators are prioritizing projects that demonstrate strong execution credibility, lower risk and greater long-term resilience, alongside faster asset monetization at optimal technical specifications.

Southeast Asia has a steady offshore pipeline - with a significant number of gas developments expected to reach FID by 2028 - and in a more competitive landscape, suc-

cess is increasingly defined by resource potential, and the ability to engineer and deliver projects with confidence.

Structural Challenges Influencing FIDs and Project Timelines

Delivering on this pipeline requires careful navigation of evolving market conditions, with cost inflation across materials, equipment and offshore services continuing to shape project economics, while supply chain dynamics - including extended lead times for critical systems and availability of yard capacity for FPSOs and large infrastructure - are influencing schedules.

Manpower availability also remains an important consideration, with a tight pool of experienced offshore engineering and construction talent affecting timelines and overall project planning.

At the same time, project demands are also evolving. Developments are moving into deeper waters and more technically demanding reservoirs, with greater integration required across power, control, marine and process systems.

Together, these factors can extend development timelines and increase execution risk – reinforcing the importance of early engineering decisions, integrated design and greater delivery discipline.

FPSOs and the Shift to Integrated, Hybrid Systems

Alongside these dynamics, operators are turning to flexible development models. FPSOs continue to play a critical role in offshore development across Asia. Their flexibility, suitability for deepwater environments and ability to support phased development strategies make them a preferred solution for many operators.

Therefore, FPSOs are increasingly serving as primary production hubs, particularly for gas-led developments in Southeast Asia, reducing reliance on fixed export infrastructure.

FPSOs are becoming significantly more complex and power-intensive assets. Higher processing capacity, increased compression requirements, and expanded electrification, automation and digital systems are now being embedded and integrated from the design stage.

Our experience with modern large FPSO developments in recent years shows that early integration of power, automation and control architecture at the design stage is critical in reducing interface risk and improving commissioning certainty. As FPSO scale and power demand grow, coordinated engineering across disciplines becomes essential to successful delivery.

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Hybrid Power Sources and Low-Carbon Integration at FEED Stage

Meanwhile, offshore power generation is a major driver of both operating costs and emissions for offshore assets – bringing hybridization into sharper focus in system design.

Several hybrid power sources are being staged, engineered for grid stability, and designed from front-end engineering design (FEED) phase. This early-stage approach allows hybrid solutions to be engineered for stability, performance and cost efficiency. Even partial integration can deliver meaningful emissions reductions without requiring full replacement of conventional systems.

Power system architecture decisions made at this stage - including grid stability, power management, storage integration and digital and automation solutions to balance supply and demand - ultimately determine how effectively hybridisation can be achieved economically.

Brownfield Optimisation and Digitalisation as Immediate Levers

As new developments advance through extended approval cycles, operators are unlocking significant value through strategic brownfield optimisation. By upgrading electrical and control systems, implementing advanced monitoring and diagnostics, and removing production bottlenecks, asset owners are delivering tangible results: extended asset life, improved availability, and accelerated production efficiency.

These proven approaches deliver lower implementation risk, faster return on investments, and sustained improvements in uptime, reliability, and operational efficiency. For today's operators, brownfield optimisation represents a strategic opportunity to maximise value from existing assets.

Collaboration, Standardisation and Lifecycle Thinking

As these trends converge, successful delivery also depends not just on technology, but on how projects are coordinated across the value chain, including operators, engineering, procurement and construction companies (EPCs), yards, technology providers and regulators.

Interface complexity tends to increase on technically demanding FPSO and hybrid offshore projects, particularly where coordination spans multiple stakeholders and systems. In this context, greater standardisation and shared infrastructure concepts can help support more efficient integration, improve execution alignment, and enable the more effective adoption of hybrid and digital solutions.

At the same time, an integrated lifecycle approach is becoming essential. This involves bridging CAPEX and OPEX considerations and accounting for reliability, emissions and operating cost over multi-decade asset lifecycles.

Execution Capability Defines Offshore Winners in Asia

Southeast Asia's offshore sector remains central to regional energy security and continues to offer strong long-term growth. In today's dynamic environment, the real differentiator lies in execution capability – delivering projects reliably, safely, and on schedule.

As offshore developments become larger, more power-intensive and increasingly constrained by cost, schedule and supply chain pressures, resilience is being determined much earlier in the value chain. Projects that embed system integration, power architecture, hybridisation and lifecycle performance from FEED are better positioned to manage complexity, reduce delivery risk and sustain long-term operational value. At the same time, standardised architectures and early collaboration across the project ecosystem are becoming critical to execution certainty.

FPSOs, hybrid power systems and electrified offshore concepts are shaping the region's next phase of development. In this context, resilience is not achieved at the end of a project – it is engineered in from the start.

All images courtesy Aquaterra Energy

INTERVENTION, NOT EXPLORATION:
HOW JACK-UPS HELP UNLOCK VALUE

By Ben Cannell, Innovation Director at Aquaterra Energy

Talking about untapped value in offshore energy typically brings exploration, new wells and new developments to mind. But in today's mature basins, the greatest source of opportunity is often neither new nor undiscovered.

Many offshore regions are defined less by exploration potential and more by declining production and ageing infrastructure. APAC is one clear example where, according to Offshore Network, the region is experiencing annual recovery declines of around 10%, with approximately 80% of basin fields now in the brownfield phase and an estimated 40–50% of well stock currently shut in, representing a striking degree of unrealised potential.

This picture has many similarities with the UK North Sea, where ageing infrastructure, rising operating costs and complex late-life economics have steadily pushed more wells into shut in status. The proportion of non-producing wells now exceeds the North Sea Transition Authority's (NSTA) 10% target, while Wood Mackenzie estimates that around £10 billion of pre-tax value remains locked within existing wells.

Staging an Intervention

Against this backdrop, well intervention offers the fastest and lowest-cost route to restoring production from existing wells. Where production cannot be recovered, intervention also provides the only practical means of delivering permanent abandonment and removing long-term liability from the balance sheet.

In the UK, the NSTA has reported that well interventions can return hydrocarbons to production at operational costs as low as $16 per barrel of oil equivalent. Compared

with new greenfield developments or complex drilling campaigns, this represents a fraction of the cost, giving operators an efficient route to value.

While this opportunity applies globally, the level of intervention activity currently being seen does not reflect its scale. For example, in the UK Continental Shelf, reported well intervention activity declined from 443 operations in 2023 to 425 in 2024, and in APAC, intervention activity and market growth remain modest relative to the scale of shut-in well inventories and basin maturity.

Offshore operators are rarely slow to pursue economically attractive opportunities, so the fact that intervention has not scaled in line with its apparent value points to deeper technical and execution challenges that merit closer examination.

Why Intervention Uptake Remains Low

The good news is that many of the technical factors constraining well intervention uptake are understood and eminently addressable with the right application of intelligent engineering. In APAC, for example, intervention has historically relied on light well intervention vessels (LWIVs) equipped with riserless, wire-through-water systems. The convenience of these LWIVs, where available, should not be underestimated. Their popularity stems from the integrated support they provide, including intervention engineering, project planning and a complete well-access solution that allows operators to focus on the downhole work. However, these vessels are generally suited to basic diagnostics and light intervention work, with limitations on the complexity of downhole operations they can support, applicable water depths and regional availability.

This mismatch is most visible in shallow, mature basins across the region. In China's Bohai Bay, Malaysia's Malay Basin, and areas such as the Gulf of Thailand, Bass Strait and the Natuna Sea, many mature wells in shallow water settings share common characteristics. Downhole conditions are often uncertain, wellheads have limited load capacity and older subsea trees were not designed to support modern intervention packages, particularly riser-based well access systems, which offer the broadest range of intervention services and contingencies.

These challenges are compounded in shallow water by the limits of dynamically positioned vessels, where the allowable operating window reduces rapidly as water depth decreases. Mobilising a light well intervention vessel involves significant cost, yet there remains a real risk that the vessel will not be capable of completing the work if more complex or riser-based intervention is required. Faced with that uncertainty, many wells with recoverable reserves remain shut in.

Fixed-to-Bottom Platforms as the Intervention Solution

The offshore industry does not need to look far for a solution to this challenge as the tools required are already in daily use at another stage in the well lifecycle. In APAC, jack-up rigs remain the dominant platform for shallow water drilling across the region, while lift boats are similarly in demand in support of offshore construction, maintenance and well servicing.

Fixed to the seabed, jack-ups and lift boats remove reliance on dynamic positioning and allow operations to be planned around a fixed geometry, removing one of the most significant execution risks associated with intervention. A riser-based well-access setup can be vastly simplified, as it does not require an emergency disconnection package or complex subsea pressure-control equipment. This, in turn, reduces loading on the tree and wellhead through the use of a top-tensioned lightweight riser system.

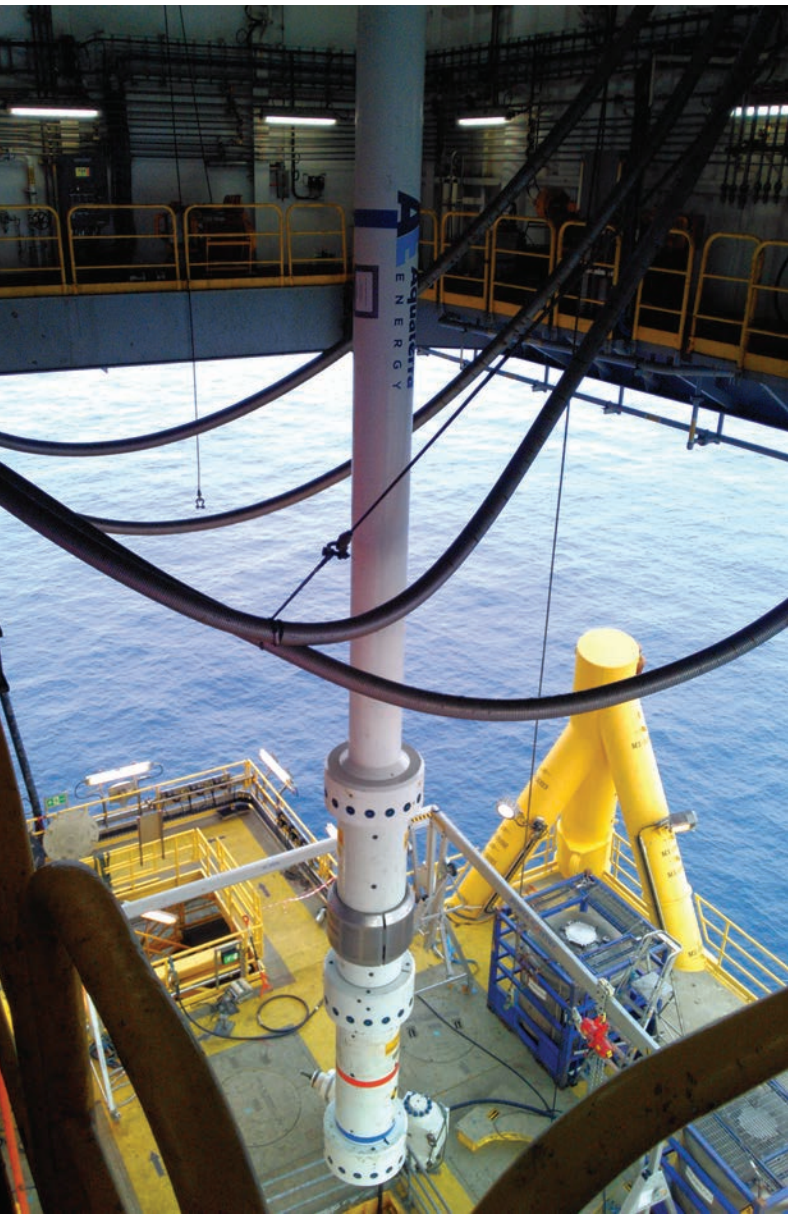
The practical outcome is a wider intervention window and the ability to execute more demanding work reliably, as the well access solution between seabed and surface is riser-based, supporting a complete range of light and heavy intervention services. Modern riser systems incorporating quick-connection technology, offline handling, and compatibility with a range of wellhead and BOP configurations now provide effective well access for intervention and abandonment campaigns. When deployed from fixed-to-bottom platforms, these systems directly address the stability and access constraints that have historically limited intervention in shallow water.

Putting it into Practice

Crucially, they are available today and already being deployed in live offshore operations. In West Africa, for example, we are working with Intrepid Energy Limited (IEL) offshore Nigeria to deploy a riser-based intervention system from jack-ups or lift boats to restore production from mature shallow water subsea wells. By providing a full seabed-to-surface riser-based well access solution without reliance on floating intervention vessels, the programme enables repeatable intervention across multiple wells and unlocks production that would otherwise remain stranded.

A different application of the same approach can be seen in the Middle East, where we are supporting a major offshore operator with riser-based well access to enable late-life well management and permanent abandonment of subsea wells. In this case, a turnkey well access solution was provided that allows a single rig to complete the intervention and removal of the subsea tree, followed by deployment of a subsea drilling riser onto the subsea wellhead to allow the complete abandonment and removal of the wellhead restoring cap rock integrity and a clean seabed. This demonstrates that the same fixed-to-bottom, riser-based delivery model applies whether the objective is production recovery or the removal of long-term liability from an operator's balance sheet.

Jack-up deployed subsea intervention hardware is only one part of what is required to increase intervention activity in shallow water. As discussed, a key driver behind the success and appeal of LWIV campaigns is the con-



venience of a complete well access solution, with a fully subsea-ready setup delivered under one roof. The same principle underpins fixed-to-bottom, riser-based intervention delivered from jack-ups or lift boats, and applying this integrated approach more widely is essential to increasing intervention activity, allowing operators to shift their focus away from interface management and instead concentrate on the downhole objectives of the project.

Commercials Done Cleverly

There is also a clear commercial advantage to aligning intervention delivery with platforms already active in shallow water operations. Mobilising a LWIV can be difficult to justify for small or geographically dispersed opportunities, particularly where there is a risk that riser-based intervention will ultimately be required. Jack-ups and lift boats, by contrast, are already prevalent and often already under contract.

This creates opportunities to integrate intervention activity into existing offshore programmes. A jack-up engaged on a multi-well drilling campaign, for example, can complete a targeted intervention between wells before returning to drilling, improving asset utilisation and allowing operators to capture incremental value without committing to a standalone intervention campaign.

Early engineering and analysis play a critical role in realising these commercial benefits. Mature wells often present uncertainties around structural integrity, fatigue life and downhole condition. By undertaking upfront assessment of wellheads, riser loads and operational envelopes, operators can define intervention scopes with greater confidence and avoid costly escalation or mid-campaign changes. This reduces contingency spend, shortens offshore execution time and improves the overall predictability of intervention costs.

Taken together, the combination of fixed-to-bottom platforms and rigorous upfront analysis shifts intervention economics in favour of action rather than deferral. Instead of requiring a large, discrete investment, intervention can be planned as a lower-risk, incremental activity that fits within existing operational programmes. For operators managing late-life assets, this approach offers a practical route to unlocking stranded value while maintaining cost discipline.

Intelligent engineering, not divine intervention

The key takeaway is that maintaining cost discipline for shallow water intervention does not require new technology or new delivery models. A significant amount of value already sits in shut-in wells across mature offshore basins, and the tools needed to access it are already in routine use elsewhere in the well lifecycle.

Jack-ups, lift boats and modern riser-based well access are proven, available and well understood. With the right well access partner, these assets can be deployed confidently for intervention, driving production recovery and enhancing returns from existing developments. The opportunity now is not to invent something new, but to apply what already works more consistently, and unlock value that is already accessible and waiting.

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WELL DECOMMISSIONING EXPANDING HORIZONS FOR INNOVATORS WITH PROVEN EXPERIENCE

The changing shape of the oil and gas landscape presents both an opportunity and a challenge for well decommissioning. Well decommissioning, particularly the safe execution of plug and abandonment (P&A) operations, represents a significant opportunity for companies capable of managing and permanently securing late-life wells. For operators, it is no longer simply an end-of-life obligation, but a complex engineering challenge requiring the right combination of technology, experience and operational capability.

By Eirik Enerstvedt, PLM Remedial and Abandonment Services with Odfjell Technology

Portfolio economics, regulatory requirements and ageing infrastructure will continue to drive well decommissioning activity for years to come. According to Offshore Energies UK, well decommissioning is forecast to account for 47% of overall decommissioning expenditure between 2025 and 2034, and the UK Continental Shelf's cumulative cost estimate has increased by £1 billion since 2023 and is expected to reach £12 billion by 2032 .

However, the scale of this activity highlights a wider point. Well decommissioning is about far more than fulfilling regulatory requirements or deploying established technologies.

Crucially, the next phase of activity represents a new arena for engineering and logistics. Delivering safe and efficient P&A programmes requires technical precision, operational experience and sustained investment — all underpinned by rigorous safety standards.

Scenario Planning

Growth in well decommissioning is being driven primarily by mature basins, led by the North Sea but also including the Gulf of Mexico and parts of Asia-Pacific.

Many wells in these regions were drilled several decades ago. Over time, numerous assets have been granted lifetime extensions beyond their original design parameters, introducing additional complexity when planning well decommissioning programmes.

Downhole unknowns, historic well data gaps, legacy completion designs and varying levels of degradation can all create challenges when preparing wells for plug and abandonment and verifying permanent well barriers.

But well decommissioning is not limited to ageing infrastructure alone. Increasingly, wells are also being retired where production is no longer economically viable, where field redevelopment offers greater long-term value, or where regulatory and policy considerations influence operational decisions.

Each scenario introduces technical challenges, from understanding historic well design and casing configurations to ensuring permanent barriers meet modern standards.

Operators and contractors must therefore navigate a range of considerations including safety, structural integrity, project complexity, financial and personnel constraints, emissions targets and evolving timelines.

At the same time, emerging technologies are playing an important role in helping the industry address these challenges. Field redevelopments, extended asset lifetimes and low-carbon initiatives such as carbon capture and storage all depend on safe, verified well barrier solutions.

Meanwhile, contracting models are increasingly shifting toward integrated approaches, with operators often adopting EPC-style frameworks for end-of-life projects. This trend further emphasises the importance of technical expertise and close collaboration between operators, contractors and specialist service providers.

ODFJELL TECHNOLOGY - SAVR-CUT & PULL SYSTEM

Keys to Success

Successful well decommissioning programmes depend on the right combination of tools, teams and operational mindset.

Downhole technologies and well services play a central role in delivering safe, verifiable plug and abandonment operations and establishing permanent well barriers to protect long-term well integrity. Achieving this often requires safely accessing and intervening in wells that may have been drilled decades ago and modified over time.

Well intervention techniques including tubing and casing recovery tools, mills and section milling system, jetting systems and well bore cleanouts tool including hands-free tubular running services can play an important role in enabling wellbore clean-up, barrier placement and the preparation required to verify permanent well barriers.

These technical capabilities must be complemented by flexible operational delivery models. Rigless solutions, for example, enable operators to reduce costs, enhance efficiency, and minimise operational emissions—while still maintaining the highest safety standards. Likewise, an integrated operations model is a key enabler for cost reduction through headcount optimisation, such as deploying a multiskilled drill crew for P&A operations

Leveraging in-house capabilities across engineering, equipment and service delivery can further strengthen performance by improving tool availability, reducing lead times and supporting more efficient project execution.

Ultimately, however, successful well decommissioning depends as much on people and mindset as it does on technology.

A collaborative partnership approach, working closely with operators to understand the specific requirements of each well, remains essential to delivering technically robust, cost-efficient P&A programmes.

Investing in Solutions

The continued growth of well decommissioning activity is already driving investment in infrastructure, specialist tooling and operational capability across the supply chain.

Companies across the sector are expanding facilities and strengthening technical expertise to support increasing demand for plug and abandonment, fishing, remedial services and barrier verification work.

For example, Odfjell Technology has recently invested in a new workshop near Aberdeen, designed to support fishing, remedial and P&A operations. Located in Portlethen, the facility provides modern, purpose-built infrastructure that improves accessibility, strengthens operational capacity and supports closer collaboration between contractors and project partners involved in well decommissioning campaigns.

Odfjell Technology has further accelerated its growth journey with the acquisition of McGarian TDC and recent majority stake in Kaseum Holdings and Razor Oil Tools. This has significantly expanded its development capacity and enhanced its ability to engineer new tools, refine intervention methodologies and deliver fully integrated P&A campaigns tailored to modern well challenges.

Investments such as these reflect growing recognition that well decommissioning is a specialised engineering discipline requiring dedicated facilities, advanced tools and highly experienced personnel.

Lifecycle Skills

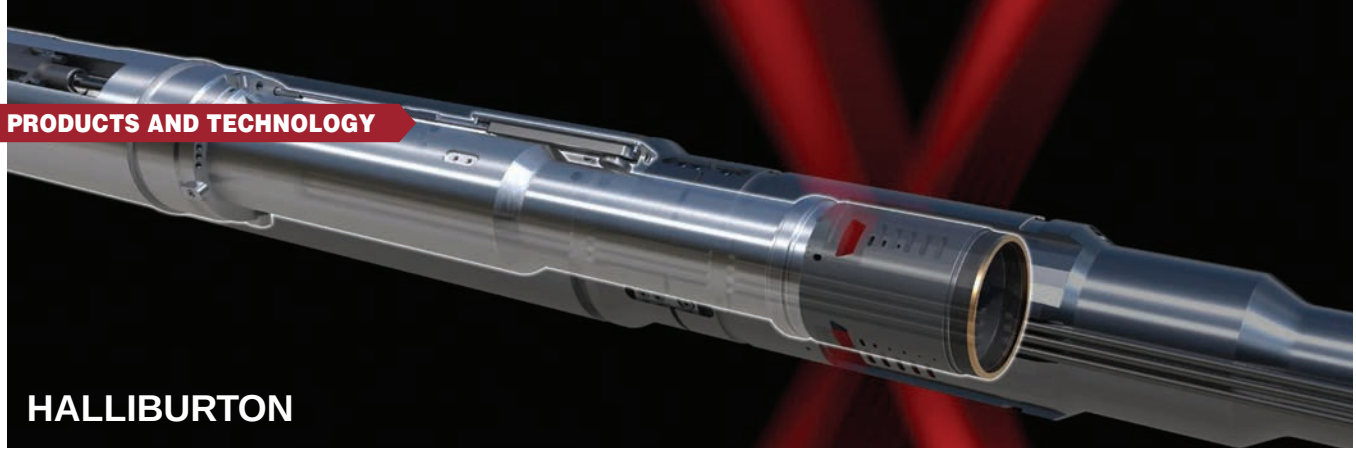
From plug and abandonment to advanced well intervention and repurposing technologies, the next chapter for existing wells presents both challenges and opportunities for companies capable of delivering safe, cost-efficient and low-carbon solutions.

Preparing for the future of the oil and gas industry increasingly means focusing on the opportunities created by the sector's ongoing evolution. Well decommissioning should therefore be viewed not simply as the closure of ageing wells, but as a specialised discipline centred on safe P&A operations and long-term well integrity.

Success depends on combining the right equipment with the right expertise and experience. By working in close collaboration with operators and the wider supply chain, specialist service providers can help deliver technically robust well decommissioning solutions across both mature and emerging markets.

In doing so, the skills and experience developed through well decommissioning will continue to support the wider industry, enabling operators and service companies to safely manage late-life wells while establishing the permanent barriers required for the decades ahead.

As mature basins continue to evolve, well decommissioning will play an increasingly central role in ensuring the industry manages its existing wells safely, responsibly and with the highest technical standards.



Halliburton Unveils Volta All-Electric Control System for Intelligent Completions

Halliburton has launched the Volta all-electric control system, part of SmartWell intelligent completions, aiming to set a new standard for engineered reservoir management, optimization, and insight.

The Volta all-electric control system uses field-proven technologies and an open communication network to allow customers to execute continuous health and reservoir monitoring and gain critical insights to improve well performance.

This design increases annual well output, avoids deferred production through reduced recovery time from planned or unplanned shut-ins. The integration of Clariti digital reservoir management suite identifies opportunities to further optimize well performance.

The Volta all-electric control system architecture helps deliver maximum resolution and faster zonal control, which supports a wide range of well types and completion applications. Its mono-conductor, single-line design eliminates hydraulics to streamline deployment and minimize operational risk.

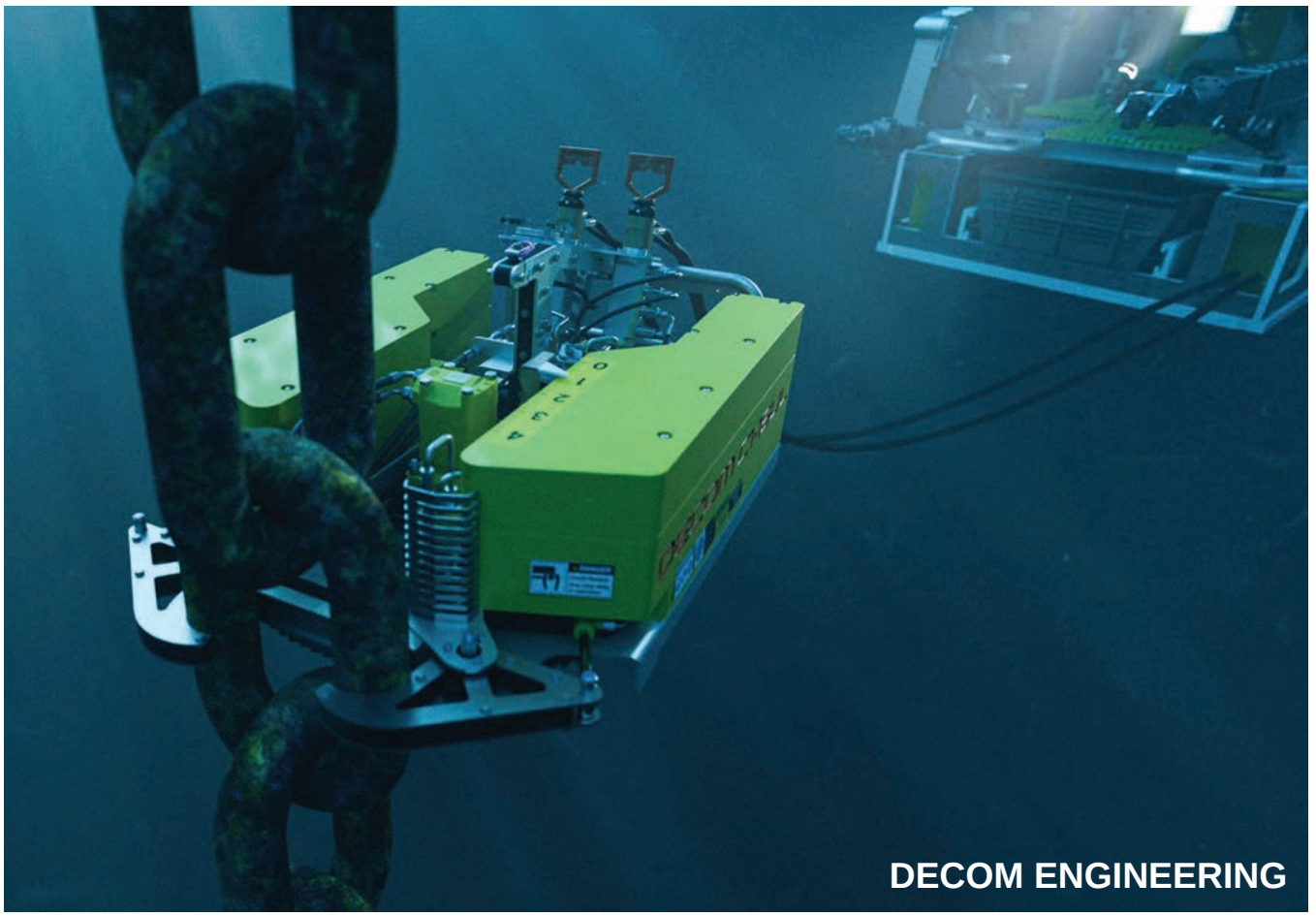
The modularity of the Volta all-electric control valve improves flexibility and reduces inventory. Pre-installation preparation of system sub-assemblies accelerates execution and supports consistent service quality.

Sonardyne Launches Intelligent Subsea Monitoring Tool

Underwater technology specialist Sonardyne has launched Observer, a new advanced monitoring system for real-time integrity management of subsea infrastructure across the offshore energy industry.

Observer combines high and low frequency motion and position monitoring, powerful in-built analytics and wireless communications to deliver live insight into how subsea assets are truly behaving.

This means unseen process and environmental challenges, from pipeline expansion and contraction to vortex and flow induced vibration, can be addressed before they become a problem, lowering risk and intervention and costs,



while extending asset life.

Out the box, it's ROV-deployable, can interface with a wide range of third-party sensors, and can be deployed for up to 10 years at 3,000 m, according to the company.

Observer is designed for use on all subsea assets, through the water column, including pipelines, risers, moorings, umbilicals, wellheads and associated infrastructure, helping integrity managers to reduce uncertainty and strengthen decision making.

The system is easily user configurable, putting control in asset managers' hands, while data offloading is available on demand through Sonardyne's trusted underwater communications.

US Patent Advances Decom Engineering's Subsea Cutting Tech Offering

Aberdeen-based subsea technology specialist Decom Engineering has secured a United States patent covering key elements of its Chopsaw cutting technology, strengthening its position in the subsea and onshore cutting market.

The patent protects a combination of mechanical and operational features, including a linear drive cutting system, modular drive arrangement and adaptable clamping methodology, the company said.

Decom Engineering said its system differs from traditional cutting tools by using a controlled linear motion to guide the blade through materials, improving precision, control and consistency across applications.

The technology is designed to cut a range of materials, including carbon steel, duplex and coated structures, with the company's C1 Chopsaw capable of handling diameters of up to 46 inches.

The patent also covers a modular drive system that allows components such as motors and blades to be replaced on site, as well as adaptable clamping configurations enabling use across different structures, from umbilicals to mooring chains.

Decom Engineering added that further patent applications covering the technology are progressing in multiple international jurisdictions.

Trendsetter Adapts Tethered BOP Tech to Manage Fatigue Risks Offshore

Trendsetter Vulcan Offshore has completed the installation of a tethered blowout preventer system (TBOP) in the Gulf of America to address wellhead fatigue in soft seabed conditions. The system, based on the company's Hercules tethered BOP technology, was adapted for a completion project in the Central Gulf of America in water depths of nearly 4,000 feet.

The technology uses four polyethylene-based tethers anchored to suction pile foundations to control blowout preventer stack movement above the wellhead, transferring loads to the seabed and reducing cyclic stress on the well system. Trendsetter said the system was deployed in response to challenging seabed conditions that could lead to increased fatigue loading on the wellhead.

The Hercules system was originally developed to allow deepwater floaters equipped with dynamic positioning systems to operate safely in shallow water.

According to Trendsetter, the customized system enabled stable operations during critical phases of the well and helped manage fatigue risks in conditions that posed elevated technical challenges.

Agogo FPSO Hosts Offshore Carbon Capture System on Industry First

Yinson Production has started operating a pilot carbon capture and storage (CCS) unit on the Agogo floating production, storage and offloading (FPSO) vessel offshore Angola, which is deemed the world's first post-combustion CO2 capture plant installed on an offshore facility.

The system has been developed in collaboration with Azule Energy and Norway-based Carbon Circle.

The unit is operating under real production conditions on the Agogo FPSO, which is part of the Agogo Integrated West Hub project in Block 15/06 offshore Angola.

"By integrating carbon capture into an FPSO, we are not only reducing emissions from operations, but also building understanding of how such systems perform offshore," Yinson Production said.

Yinson Production added the deployment reflects ongoing collaboration with partners to introduce new technologies on operating offshore assets.

VibroJet Technology Cuts Noise in Monopile Installation for Offshore Wind

Van Oord has installed monopile foundations using a combined jetting and vibration method at commercial scale for the first time, aiming to reduce underwater noise during offshore wind construction.

The installation used GBM Works VibroJet technology together with CAPE Holland equipment at the Hollandse Kust West wind farm offshore the Netherlands.

The VibroJet system combines controlled water jets with vibration inside the monopile to fluidize surrounding soil and reduce resistance during installation, allowing piles to sink with lower force.

Van Oord said the method was deployed from its installation vessel Boreas and applied across the project's monopile installation campaign, with all 52 foundations installed at the site.

According to GBM Works, the system allows precise operational control through its Fluidflow prediction model, which assesses soil behavior and optimizes water jetting performance in varying seabed conditions.

The system was used in dense sand conditions in the Dutch North Sea, where vertical vibration technology helps temporarily reduce soil resistance to enable installation.

Data collected during installation will be used to validate models for underwater sound and pile behavior to support wider adoption of low-noise installation methods.

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