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DEPARTMENTS

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The first six months of 2024 have been a literal scrum of business travel globally, as it seems post-pandemic exhibitions, conferences and events are in hyper-growth mode to recoup lost revenue. I anticipate that 2025 and beyond will result in a culling of the event calendar, as it's clear that while some events have roared back to life stronger than ever, 50% or more are perceptibly weaker; some a mere shadow of their former selves. That is a perfect segue to **Theresa Wilkie's** column this month on the Saudi Aramaco Jackup story, as the post-pandemic enthusiasm was me squarely with real-world reality. As Wilkie writes, Saudi Aramco's ambitious post-Covid jackup fleet expansion program, in which the operator looked to increase its fleet size from approximately 49 jackups in June 2022 to 90 in just two years, seemed a daring feat but was almost met earlier this year with 89 jackups at work, driving regional and global jackup utilization. However, in January 2024 Saudi Arabia ordered Saudi Aramco to halt its oil expansion plan and to target a maximum sustained production capacity of 12 million barrels per day (bpd), 1 million bpd below a target announced back in 2020. In early April the confirmation of various suspensions started rolling in, finally equating to 22 jackups across eight contractors to date.

Ups and downs are certainly not new in the offshore energy sector, and as another of our regular contributors – **Jesper Skjong**, Market Analyst, Fearnley Offshore Supply AS – writes, the market for OSVs, while still on a positive trajectory premised on an overall 45% increase spend on E&P from 2021 to 2025 to $200B, that has not been equally felt across all sectors, and in fact the OSV market is now at a stable and healthy level.

Looking at offshore wind in the U.S., the news continues to be a mixed bag with project starts and stops, and the industry as a whole continues to experience predictable growth pains. **Barry Parker** takes a deep dive into the finances behind offshore wind, writing "While offshore wind projects might be thought of as being in the 'utility finance' basket, they are ultimately high-risk deals that might better suit the portfolios of 'infrastructure investment' which, in recent years, has taken a shift towards tolerating more uncertainty when it comes to cash flows." Regardless of the pace and direction of offshore wind in the U.S., globally the sector is on a bull run, and the future undoubtedly lies in floating solutions that must and will leverage traditional offshore O&G experience. Filling in some of the technical and market blanks here is **Philip Lewis**, Research Director Intelatus Global Partners, with his article *Preparing for Floating Wind – Leveraging the Oil & Gas Supply Chain*, which examines similarities and differences between the deepwater oil & gas and the emerging floating wind segment.

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OE WRITERS


Haun

Eric Haun, former managing editor of *Offshore Engineer*, is the editor of *Marine News.* He has covered the global maritime, offshore and subsea sectors since 2013.


Konowe

Celia Konowe is from Reston, Virginia, recently graduating from the University of Rochester with a degree in environmental studies. She has study abroad experience in France and Ecuador, including the Universidad de San Francisco Quito's GAIAS (Galápagos Institute for the Arts and Sciences) program. Currently, she is pursuing her master of environmental studies degree at Dalhousie University in Halifax, Nova Scotia.


Laursen

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


Lewis

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

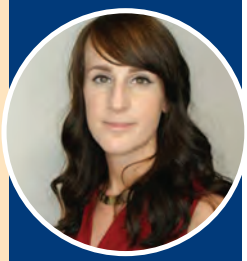
Barry Parker of bdp1 Consulting Ltd provides strategic and tactical support, including analytics and communications, to businesses across the maritime spectrum. He is a freelance writer and regular contributor to this magazine.

Jesper Skjong is a market analyst at shipbrokerage Fearnley Offshore Supply covering the offshore support vessel market, including O&G and offshore renewables.

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


Parker


Skjong


Wilkie

Celebrating Offshore Safety: The COS Safety Leadership Award

All images courtesy Getty Images

Since 2011, the Center for Offshore Safety (COS) has led the way in advancing safety and operational integrity for the U.S. offshore natural gas and oil industry. Through shared good practices and continuous learning opportunities, COS supports the industry in meeting its evolving safety and sustainability goals, which include reducing the occurrence of offshore industry safety incidents.

COS was established to help companies manage their operational risk by accrediting the auditors who provide them with Safety and Environmental Management Systems audits, which are detailed in API Recommended Practice (RP) 75, *Safety and Environmental Management for Offshore Operations*. In addition, COS provides feedback to the Bureau of Safety and Environmental Enforcement (BSEE) regarding the interaction between API standards and governmental safety regulations.

When it comes to offshore safety, the principle of "a rising tide lifts all boats" is particularly apt in describing the COS commitment to sharing and facilitating safety discussions. By promoting an open environment for exchanging knowledge, COS helps operators incorporate safety standards and mitigate risks for the entire industry through effective Safety and Environmental Management Systems.

The COS Safety Leadership Award plays an integral role in this mission, encouraging industry-wide collaboration and the exchange of good practices to enhance offshore safety. Given annually, the award honors operators and contractors who demonstrate outstanding leadership in developing safety management and performance practices. These practices and projects play a key role in advancing a culture of safety within the offshore industry. Nominations for the award emphasize the importance of engagement, encouraging industry professionals to acknowledge achievements and inspire further innovation and advancements.

While the award singles out individual achievement, it also highlights the broader benefits of sharing successful strategies and operational insights, furthering the industry's goal of creating a culture of safety and environmental stewardship.

By recognizing these achievements, the COS Safety Leadership Award encourages other companies to adopt similar practices, nurturing a continuous cycle of learning and improvement across the industry.

It is no coincidence then that the award is presented at the Annual COS Forum (Forum), COS' industry event where safety trends, challenges and innovations are discussed by industry leaders. The Safety Leadership Award presentation has become a focal point of this forum, providing a high-profile platform for finalists to showcase their achievements.

Previous Award Winners

Each year before the Forum, the COS Board reviews all nominations, selecting finalists in both the operator and contractor categories. These finalists are then highlighted at the annual event, where their impactful contributions and program successes are detailed and shared among members. Forum attendees vote to determine the award winners after seeing all six presentations.

Last year, Occidental Petroleum won top honors in the operator category for its Oxy Heat Stress Program, which protects workers from the health risks posed by extreme temperatures in offshore environments. Through rigorous audits, monitoring and the deployment of heat stress aids, Oxy aims to both reduce and mitigate heat incidents. Since its launch in 2020, Oxy has led to improvements in heat stress management metrics, along with a notable reduction in heat-related incidents.

In the contractor category, Valaris was recognized for its innovative approach to onboarding new offshore employees. Its immersive "Valaris Basic Training" program repurposed one of its offshore assets into a training rig, offering recruits an authentic, hands-on introduction to offshore work. The program significantly improved safety outcomes and retention rates among new employees.

Nominate for the 2024 COS Safety Leadership Award

This year, COS will again present Safety Leadership Awards in the operator and contractor categories, recognizing those who have made significant advancements in safety management practices, focusing on accident risk reduction and systematic safety improvements.

Help COS identify the projects or initiatives over the past year deserving of this coveted recognition. Submit your nomination and description for the projects or initiatives that exemplify the highest standards of safety excellence. By submitting a nomination, you are given a chance to highlight your company's achievements while contributing to the collective learning and improvement of the industry. Nominations are open until June 28, 2024; the six finalists (three in each category) will be showcased at the 2024 COS Forum in Houston, September 26, 2024. Your company does not need to be a COS member to submit a nomination.

No stone left unturned and nothing in return

In the pursuit of offshore safety, the industry celebrates its safety first, safety always mission, striving for no incidents and no catastrophic failures. And it is precisely this pursuit that highlights the importance of the COS Safety Leadership Award. This tangible recognition celebrates the rigorous and often unnoticed efforts that prevent incidents, transforming the industry's abstract goal into a concrete achievement celebrating proactive steps.

Please take a few minutes to nominate the projects or initiatives that you feel best exemplify the development and sharing of good safety management practices. Nominees must also provide a description of the program, which the COS Board will use when selecting the finalists. You can download the nomination form here. Nomination deadline is June 28, 2024.

All images courtesy Survitec

Survitec Gauntlet:

Protecting Offshore Crews & Assets from Valve Actuator Failure

A pioneering new energy containment safety device, the Survitec Gauntlet, is designed to reduce the risks associated with catastrophic value actuator failures in offshore oil and gas, protecting crews and assets.

By Eric Haun

As offshore oil and gas infrastructure ages and the ever-present risk posed by equipment failure looms, new solutions are required to help keep crews and assets clear of harm's way. One of these solutions is Survitec's Gauntlet, an innovative safety containment system designed to mitigate the risks associated with valve actuator failures in offshore environments.

Paul Gwynne, Sales and Contracts Manager (Energy), Survitec, describes the Gauntlet as a cutting-edge system that provides comprehensive 360-degree protection in the event of a catastrophic valve actuator failure. Utilizing advanced para-aramid materials with a yield strength 10 times that of steel, the Gauntlet can withstand tremendous forces to ensure that in the event of an actuator failure high-velocity projectiles are contained and dissipated harmlessly—similar to a bulletproof vest.

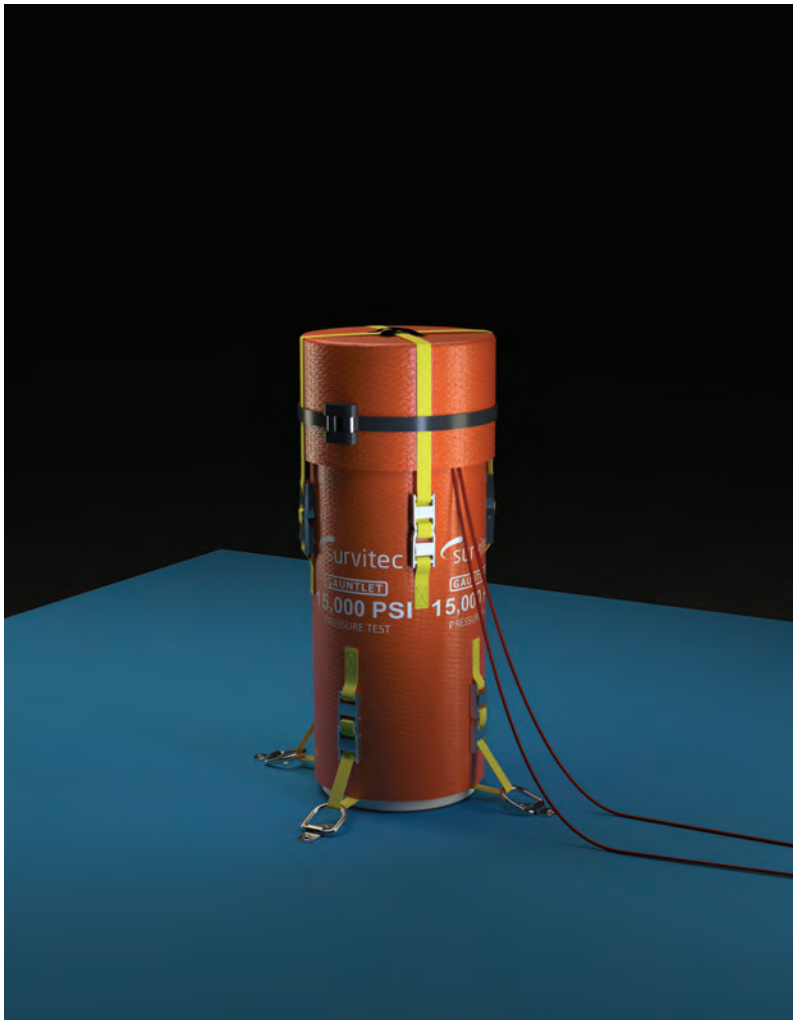
The technology, originally adapted from aerospace applications, can be designed to accommodate and be compatible with any valve actuator, and represents a significant leap forward in safety protocols for offshore facilities, Gwynne said.

The Gauntlet's inventor, Andrew Mackay, CEO, Infinity Oilfield Services Ltd., explained that the system's origins are rooted in a clear industry need. "There was a definite demand from clients in the North Sea, particularly Total and Shell," Mackay said, recalling incidents and near-misses that highlighted the vulnerabilities of existing safety measures. Traditional methods like steel clamps or scaffolding boards proved inadequate in containing the potential hazards posed by actuator failures, necessitating a more robust solution, he said.

The issue of valve actuator failures, predominantly caused by internal corrosion in aging equipment, poses a significant challenge, Mackay emphasized. "We've encountered hundreds of actuators in a degraded state," he said, noting internal corrosion can be nearly impossible to detect without dismantling the actuators. With offshore assets often exceeding three decades in service, the prevalence of degraded actuators underscores the critical need for proactive safety measures like the Gauntlet.

"It's very hard to predict when [a failure's] going to happen and how quickly it's going to happen. [The Gauntlet] adds a layer of safety, particularly for personnel that are not aware, working in the area, working on other items," Mackay said.

Gwynne elaborated on the current safety protocols and the Gauntlet's impact on industry standards. He said safety



OETV

Take a deeper dive into Survitec Gauntlet, a pioneering new energy containment safety device, in this OE TV interview with the developers.

protocols over these particular issues are ambiguous, noting that authorities have advised duty holders and operators to take responsibility to make their work areas safe. "The Gauntlet offers a step change in safety controls," Gwynne emphasized, highlighting its certification and rigorous testing in collaboration with Lloyd's Register. This approval ensures that operators now have a reliable solution to effectively manage and mitigate the risks associated with actuator failures.

Since its introduction, the Gauntlet has received positive feedback and adoption by major and supermajor operators across the U.K. and North Sea. Gwynne noted, "There's been significant implementation of the Gauntlet system, which has overnight provided immediate resolution to what would be a considerable hazard and risk to personnel and plant." This widespread acceptance underscores its role as a critical component in safeguarding offshore operations.

David Montgomery, Head of Sales UK, Survitec, underscored how the Gauntlet aligns with the company's broader strategy for safety enhancement. Survitec's existing lineup of safety solutions includes lifeboats, life rafts, marine evacuation systems, fire systems, life jackets, immersion suits, etc.

"Survitec has been providing safety solutions to protect lives and reduce risk for well over 100 years. We've always been at the forefront of safety innovation, and take immense pride in being a global leader for critical safety equipment and survival solutions," Montgomery said. "It is crucial that the working environment is as safe and risk-free as humanly possible, and the Gauntlet supports Survitec striving towards this goal."

As assets continue to age and risks escalate, the Gauntlet represents not just a solution but a pivotal advancement in ensuring safer working environments offshore.

"The risk of activator failure will increase as assets age, increasing the risk to lives and equipment. Currently, the Gauntlet is the only approved safety solution to address the risk. And as such, forms a key part of our strategy for safety enhancement in the industry," Montgomery said.

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Saudi Aramco Jackup Suspensions: The Story So Far…

By Teresa Wilkie, Director of RigLogix, Westwood

Saudi Aramco's ambitious post-Covid jackup fleet expansion program, in which the operator looked to increase its fleet size from approximately 49 jackups in June 2022 to 90 in just two years, seemed a daring feat. But fast forward to March 2024 and the Saudi Arabian National Oil Company (NOC) almost met its target having 89 jackups at work.

To reach this target, the operator awarded 247.8 years of contract backlog during the period January 2022 to December 2023, with the majority of awards being three-to-five-year deals, and some even as long as a decade.

The Middle Eastern operator took supply from all over the world, which meant not only Middle Eastern jackup utilization increased, but so too did the global figure – jumping from 83% marketed committed utilization in January 2021 to 94% by December 2023.

However, in January 2024 Saudi Arabia ordered Saudi Aramco to halt its oil expansion plan and to target a maximum sustained production capacity of 12 million barrels per day (bpd), 1 million bpd below a target announced back in 2020. Initially it was unclear if the NOC would cut any offshore rig capacity, but following multiple industry rumors, in early April the confirmation of various suspensions started rolling in, finally equating to 22 jackups across eight contractors to date.

Although the full terms and conditions of each suspension have not been disclosed, it is understood that the majority will be for up to one year apiece and at US$0 day rate (or another mutually agreed standby rate). The original term of the suspended contracts will automatically be extended for a period equal to the suspension for each rig, preserving the remaining backlog, while the drilling contractors can also market the rig for other work during the suspension or to terminate the remainder of the contract.

Eight Affected Rig Managers

Advanced Energy Systems (ADES), which provides the

Saudi Aramco Jackup Suspensions Overview (Accurate as of 29 May 2024)

Westwood Global Energy Group	# Jackups Confirmed for Suspension	# Jackups Commenced Suspension Period	# Jackups Re-Contracted Elsewhere	Average Age of Suspended Jackups
Advanced Energy Systems (ADES)	5	5	3	16
China Oilfield Services Ltd (COSL)	4	3	0	9
Shelf Drilling	4	4	0	26
Saipem	3	1	0	9
Arabian Drilling	3	0	0	10
Borr Drilling	1	1	0	5
Egyptian Drilling Company (EDC)	1	1	0	14
ARO Drilling/Valaris	1*	1*	0	14

**ARO chose to terminate the remainder of its deal with Saudi Aramco and the rig has since been returned to owner Valaris.*
***For a full list of rig names and further suspension details see Westwood RigLogix*

operator with its largest fix of jackups at 33 units in total was informed five would be suspended. China Oilfield Services Ltd (COSL) and Shelf Drilling will have 44% of their fleet on hire with the operator suspended (four units apiece out of nine). Saipem, which has seven rigs contracted to the operator, will see three units suspended, and Arabian Drilling with nine rigs on hire will also have three units idled. The three remaining companies – Borr Drilling, Egyptian Drilling Company (EDC) and ARO Drilling – were notified of one suspension each.

All these jackups have since begun their suspension periods, with the exception of one Saipem rig and two Arabian Drilling units that were still out working as of 29 May. Working utilization of the Saudi Aramco jackup fleet has fallen from 97.7% in March to just 82.1%, with this anticipated to hit 77% by June/July when the remaining rigs start their suspensions. Globally, marketed working utilisation fell from 86.1% to 83.7% in just two months (March-May 2024).

Furthermore, ARO Drilling-managed/Valaris-owned jackup Valaris 143, which only had approximately seven months remaining on its contract with Saudi Aramco, had its deal terminated by the rig manager. Upon dissolution of the contract, the bareboat charter agreement between Valaris and ARO was also terminated, and the rig was subsequently returned to Valaris.

Re-Contracting Confidence

However, it is not all doom and gloom. Of the remaining suspended jackups, three of the ADES rigs have already since been re-contracted for work outside of the region – one for work in Qatar, one for Egypt and another for operations off Thailand.

There appears to be confidence from most of the remaining affected rig managers about securing new deals. Borr Drilling, in its latest financial update, stated that it expects its one suspended jackup – Arabia I – to be redeployed in a different region before the end of 3Q 2024.

Valaris also stated that it is already in talks with new operators for the Valaris 143.

Shelf Drilling, meanwhile, believes it can secure work for three of its four suspended rigs, getting them back into operation before the end of 2024 at attractive dayrates and margin levels. The fourth unit, it believes, could also find new work next year.

COSL has yet to decide if it will relocate any of its four suspended rigs and has not divulged what it's plans will be, while Arabian Drilling has indicated that it is actively exploring opportunities to redeploy the units with other operators.

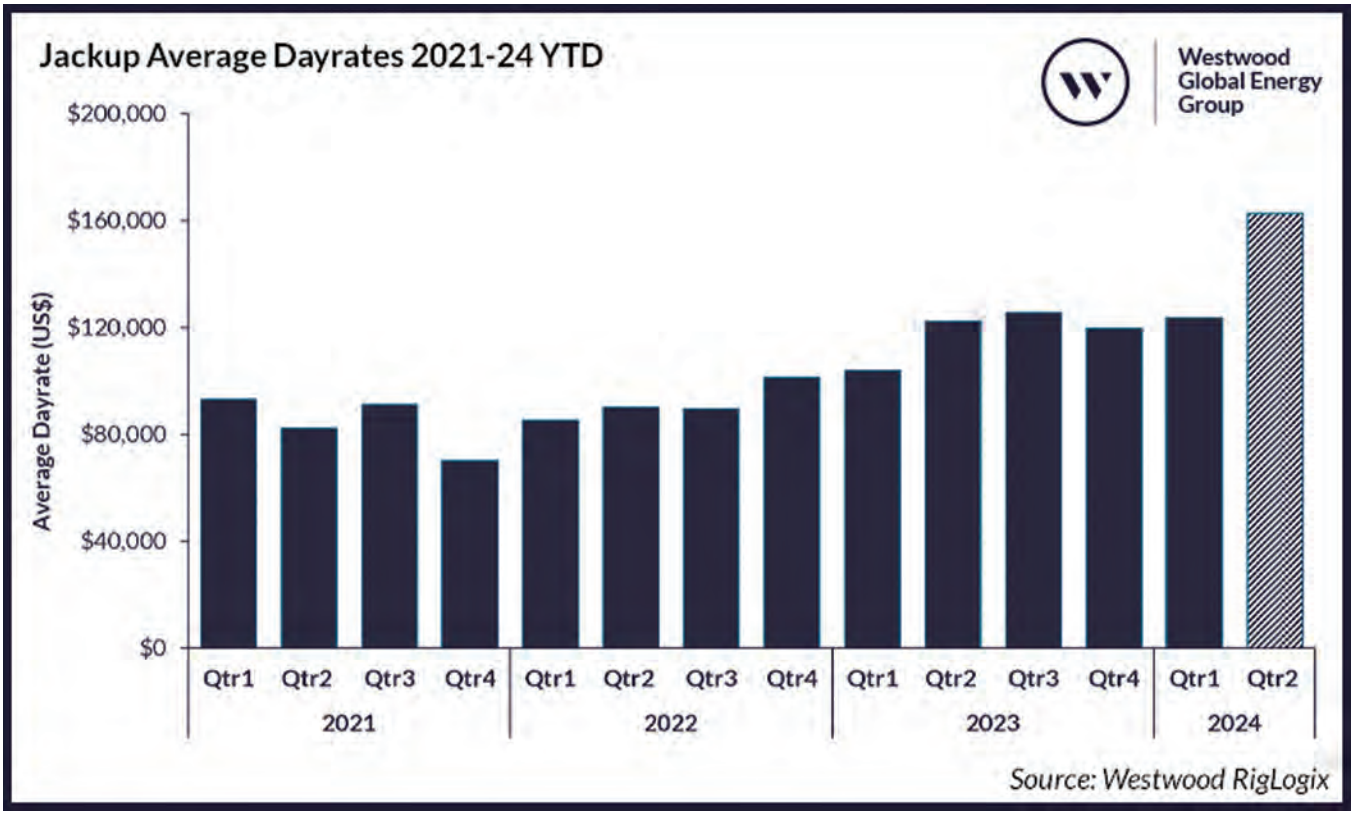
Saipem, meanwhile, has revealed that one of its suspended jackups was already budgeted to complete its contract around the middle of this year and will be delivered back to the owner. Another unit will undertake planned maintenance and recertification during the suspension period, and the third will most likely be redeployed into a different geographical area substituting another rented unit that will be subsequently delivered back to the owner.

Opportunities for redeployment

So where could these rigs potentially end up, should their managers choose to bid them elsewhere? RigLogix records a total of 32 requirements at a full tender or direct negotiation stage, that are due to begin in the next year should they move ahead.

India, Southeast Asia and Africa appear to be offering up the lion's share of potential demand days during this period. However, some rumours suggest that due to this new additional supply of jackup capacity in the market, we may see some operators that currently have active tenders out in the market look to cancel and re-tender as they may potentially be offered lower dayrates in the current environment. The upward trajectory of dayrates appears to be unaffected year-to-date.

Total remaining term on the suspended contracts comes to approximately 54 years of backlog, or 66 years including options. Of course, some of this has now been terminated and perhaps more will be in the future. It is unclear if those rigs that have been re-contracted outside of the region will return to finish their stints with the Saudi Arabian operator after their new commitments.



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PREPARING FOR FLOATING WIND – LEVERAGING THE OIL & GAS SUPPLY CHAIN

Examining similarities and differences between the deepwater oil & gas and the emerging floating wind segment.

By Philip Lewis, Research Director Intelatus Global Partners

There has been much excitement around the potential for the offshore wind industry to access deeper water sites through the deployment of floating wind technology.

Further, there has been much discussion around the development and deployment of disruptive technologies to leverage the opportunity of floating wind. However, in the short- to medium-term, there is insufficient time to mature early-stage concepts to the high degree of technical readiness that will satisfy classification societies, banks, insurance companies and others. This means that floating wind will need to lean heavily on the supply chains developed to support the offshore oil & gas industry.

In this article we look at some of the similarities and differences between the deepwater oil & gas segment and the emerging floating wind segment, concluding with our concern that we do not have the right number or the right type of vessels for the efficient construction of commercial scale floating wind farms.

Deeper Water & Floating Wind

The current floating wind hotspots are found in the APAC, European and North American regions.

In APAC, we look to China (100 -125 meters), South Korea (130-275 meters) and Taiwan's pilot arrays (~100 meters). Australia and India hold significant potential, but commissioning of commercial scale floating wind projects is unlikely until around the middle of the next decade.

Europe will see floating wind deployment in the Atlantic, Baltic, Mediterranean and North Sea, with the UK (80-150 meters) and Norwegian (200-400 meters) markets likely to drive activity through this and the first half of the next decade.

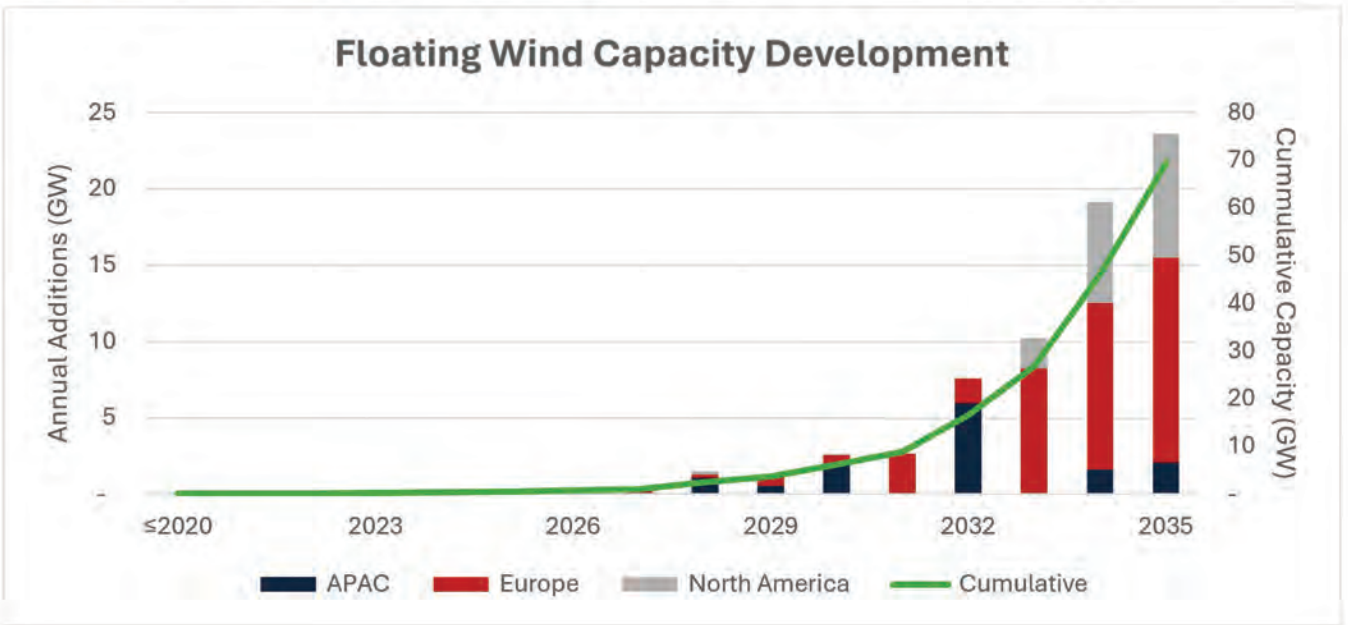
In the U.S., the first commercial scale projects will be off California (500-1,300 meters). Future activity is planned off Oregon (550-1,500 meters), the Gulf of Maine (190-300 meters) and the Central Atlantic (over 2,000 meters). Canada is also investing floating wind, but this is at the early stages.

The oil & gas industry has much experience working in the water depths discussed for floating wind. The bigger challenges come in the quantities involved.

Commercial Scale Floating Wind

Floating wind is an emerging technology. At end of 223, total global floating offshore wind capacity was less than 250 MW out of a total offshore wind capacity of 64 GW. We forecast total installed floating wind capacity of ~6.25 GW by the end of 2030 and close to 70 GW by 2035.

GLOBAL FLOATING WIND FORECAST



To achieve the forecast, commercial scale projects will need to commence offshore mooring and array cable pre-lay operations three-to-four years before final commissioning. Currently there are concerns that the supply chain cannot cope with the quantities required.

A commercial scale floating wind farm will generally be anything larger than 500 MW and likely be ~1 GW. At a high-level, we can say that the 1 GW floating wind farm will have a similar order of magnitude capital expenditure to an FPSO. The pre-lay of moorings and array cables and the towing of the turbines will leverage skills developed in the offshore oil & gas industry.

The table establishes that the global quantities of mooring lines, anchors and array cables are significant. The quantity is not the only challenge for the existing installation fleet of anchor handlers and subsea vessels, but also the physical size of the components. The size of the mooring components is also generally larger than that seen in the oil and gas industry. In fact, project planning is calling for mooring chain sizes that challenge and even exceed the capabilities of the world's largest deepwater anchor handlers. Given that today's fleet of large anchor handlers was not designed with floating wind in mind, it is not surprising that many are not the optimal tool for floating wind. Chain sizes can be reduced, but that results in the need for more mooring lines which accentuates the problem of vessel shortages.

A Fleet is Needed to Built Floating Wind Farms

Projects in planning will need large anchor handlers and subsea vessels to pre-install moorings and array cables and hook-up up the turbines, which have been towed by large anchor handlers supported by smaller anchor handlers.

Flexibility will drive floating offshore wind construction vessel utilization. Vessels will need to accommodate a variety of anchor types, chain, fiber rope and steel wire mooring lines, and tensioning operations.

Apart from one large vessel suitable to support floating wind projects that was delivered in China last year, there

	Number	Note
Turbines	~67	Nacelle, hub, blades and rotor ~1,500-2,000 tonnes. Land-based cranes needed to lift components, required hook heights of ~180 meters.
Floating structures	~67	~5,000 tonnes for a steel semi-sub. Semis are currently the most popular of three main concepts (semis, TLPs and spars). Completed turbine and structure assemblies may need to be wet stored in sheltered areas up to six months and even longer.
Mooring lines	≥201	Minimum 3/floater. Compares to 16± mooring lines for an FPSO. Global forecast ~6.5m (2031-2035) and ~37 m meters (2031-2035).
Anchors	201±	Generally, one anchor/line but mutualized anchors possible (fewer larger anchors). Compares to 16± anchors for an FPSO. Global forecast ~30,000 anchors by 2035.
Dynamic array & collector cables	≥67	Will depend on turbine spacing (assuming at least 1 nautical mile) and water depth. Will generally be pre-laid and dry stored along with the mooring system. Global forecast >15m meters by 2035.

Source: Intelatus Global Partners

has basically been no large anchor handling vessel ordering since 2014, including the last big vessels delivered in 2018-20. This asset class is seeing increasing demand from oil & gas work and was generally not built with floating wind in mind and so most vessels can be classed as suboptimal for floating wind.

Subsea vessels are being used to support oil & gas and bottom-fixed offshore wind vessels. Utilization in the segment is high and there has not been some new building activity, with orders placed for at least three new subsea vessels with 250 tonnes AHC cranes, the minimum required for floating wind projects.

As with bottom-fixed wind, floating wind projects will be supported by walk-to-work vessels (CSOVs or MPSVs and PSVs with active heave compensated gangways), CTVs and other support OSVs.

Is a Spike in New Building Coming?

New building of vessels suited to efficient floating wind construction is needed.

Increasing utilization and competition for key vessels is translating to higher rates and, at least for subsea vessels, ordering.

However, barriers to vessel FID still exist through technical, regulatory, and financial uncertainties. Until these barriers are cleared, vessel ordering will remain low and impact on floating wind projects.

In closing, we wish to extend the debate from hardware issues (vessels) and talk about the software (people). Attracting and retaining the next generation of talent and building sufficient technical competence in a timely manner is a key industry challenge and one that needs every bit as much attention as the vessel numbers and capabilities.

OFFSHORE SUPPORT VESSEL (OSV) MARKET RECOVERS TO HEALTHY LEVELS

The market for offshore support vessels has experienced tremendous development in the last couple of years. And while we expect the market to continue its positive journey, we would argue that, at least on an overall basis, the market has already recovered to healthy levels at the time of writing.

By Jesper Skjong, Market Analyst, Fearnley Offshore Supply AS

There are solid underlying fundamentals that are driving the increased vessel demand, chief among them is the increased offshore upstream investment on a global level. Overall, spending on exploration and production is set to increase roughly 45% from 2021 to 2025, reaching a total of almost $200 billion in the latter year.

Although this increased spending has translated into increased offshore activity as a whole, it should be noted that it has not hit all vessel segments equally, even among offshore drilling rigs. In fact, while the number of jackup drilling rigs under contract has risen in accordance with increased investments, the same cannot be said for floating drilling rigs.

As such, the OSV demand derived from E&P drilling has developed accordingly, where benign and shallow-water regions, typically dominated by high volume yet low capacity AHTS units, have seen the largest increase in terms of incremental demand. For deepwater and ultra-deepwater regions, we record a transition towards high-capacity ships, although herein we also take note of a significant shift to subsea field developments as opposed to conventional infrastructure.

Finally, as several offshore oil and gas regions have and will come into maturity, we register that there is a relatively higher growth for production support more than exploration derived operations, thus favouring assets focused on the former. These trends both have and will continue to shape the vessel landscape as the ongoing trends are expected to persist for the foreseeable future.

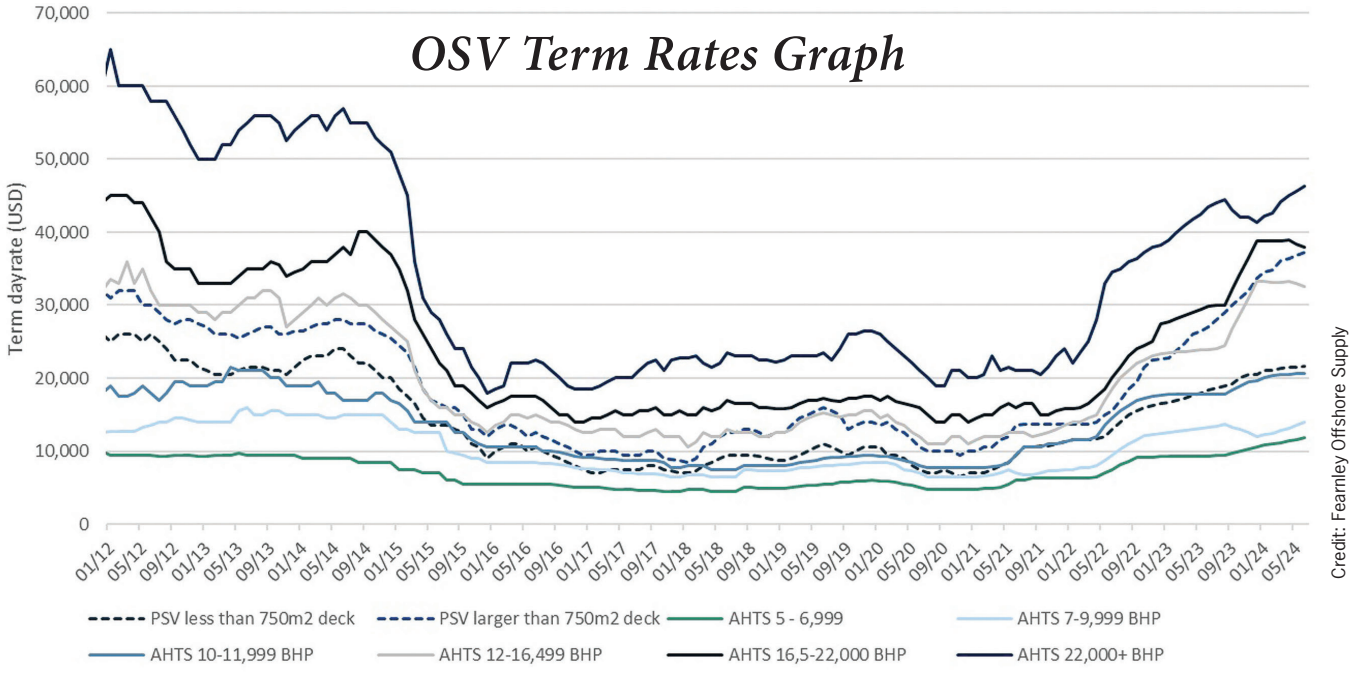
North Sea Demand Flat, While Other Regions Record Rise

The implications thus vary depending on the region in question, and in the North Sea basin, for example, we find that vessel demand has remained stagnant with flat development in recent years. Moreover, the increased dayrates herein has come about as a result of fewer vessels both active and in the fleet as a whole, and in fact, the current OSV fleet in this region is at its lowest in well over a decade.

In both the Southeast Asian and Middle East regions the opposite is true, wherein the number of working units has grown significantly, and the latter is currently at an all-time high level. Despite this, dayrates in the Persian Gulf has yet to materialize to the same degree as seen elsewhere. Granted, this is in large part due to the sever market share of government-controlled players throughout the supply chain, yet also as a result of persistently high vessel availability for most asset classes.

In both Brazil and off West Africa on the other hand, the dayrates has increased tremendously thus far in the upcycle brought on by a combination of both a distinct lack of suitable tonnage as well as higher vessel demand. Moreover, as these areas are facing a shortage of local vessels to support the activity hikes, we have seen a large number of ships mobilized from other regions, offering lucrative opportunities for international OSV owners.

To this effect, the average dayrates for all asset classes has increased significantly, and as seen on the graph,



several of which are now well above previous peak levels. Furthermore, given the large number of planned project developments and drilling campaigns in both regions, and with next to no new supply added in the near future, we expect continued upward pressure on rates overall.

Another OSV Newbuild Boom ... Not on the Horizon Just Yet

Historically, we as an industry have spoiled our own party by ordering far too many OSVs which then adds insult to injury in the ensuing downcycles. But even in the absence of a demand crash almost ten years ago, the

© David Maddock / Adobe Stock

market forces saw the newbuild orderbook bloated even compared to the then peak activity demand.

Could our current market cycle really be any different; have the market players burnt their fingers enough times that this time they do not repeat themselves? We certainly hope so, but either way there are a number of important reasons why we do not believe there will be another newbuild boom akin to what we have seen previously.

However voluntary or not the current newbuild ordering, or lack thereof, matters not, but what does matter is the cost and lack of available capital towards this end. It is a fact that the majority of the largest financial institutions that fuelled the previous ordering sprees have either exited entirely or significantly reduced their exposure to oil and gas.

The same is true for the availability of yard slots suitable for OSVs. On one end, the total capacity of such shipyards has been heavily reduced since the last run-up, especially in the Far East. But even more so, in the absence of OSV orders, the shipyards that are in operation have certainly not idly waited for the return of the market.

Other vessel segments, such as support vessels for offshore wind and commercial fisheries and aquaculture are all built at yards that used to build PSVs and AHTS. As such, there is currently a very limited number of slots left for anyone looking to place an OSV newbuild.

More to that point there are also severe supply chain constraints presently impacting the industry, especially concerning people and a wide range of equipment including diesel generators and engines. As a result of this, the build time for offshore vessels is currently between 24 and 36 months depending on the asset type. This, in combination with the abovementioned factors, all contribute to increased costs as well.

Finally, there is inherent technological risk associated with ordering a newbuild at this point in time, especially so when ordering on a speculative basis. While there are many good arguments for switching to low- and zero emission fuel alternatives, there is currently no market consensus towards just what fuel will be widely adopted by the industry. Choosing the wrong fuel today could have a negative impact on the vessels' operability in the future, and there are different preferences, not just amongst operators and charterers, but also in between regions.

All in all, we find it difficult to imagine another newbuild boom on the horizon from where we are standing, at least one similar to what we have seen before. In light of this, we remain firm in our upbeat expectations for the OSV market going forward, where both dayrates and vessel activity are expected to continue to rise for years to come.

All images courtesy Argeo

ARGEO STEAMS AHEAD ON SUBSEA SURVEY

*We recently sat with **Trond Crantz**, the founder and CEO of Argeo, a subsea service provider whose offerings span from acquisition to actionable data. Now, a year later, we spoke with Crantz to see what's new with Argeo, as well as gain further insight into the company's recent contract with Woodside Energy, new vessel and technology acquisitions, and AI/software development for data synthesis and communication.*

By Celia Konowe

Trond, sister-publication *Marine Technology Reporter* (MTR) featured you about a year ago in its March-April edition. What's new for Argeo since?

It's been a lot, I can tell you. It seems like the last time I spoke with MTR, it was two, three years ago now—that's how much has happened. But at the same time, we're still finding our feet. A year ago, we had just acquired Argeo Searcher, which was one of our first subsea survey vessels and had started our first ultra-deep-water projects. And since then, we've added so much more. The Searcher has completed several hallmark projects for prominent customers like the Norwegian Petroleum Directorate, Shell in Nigeria and the National Centre for Polar and Ocean Research (NCPOR) in the Indian Ocean.

We've rolled out our newest AUV line with Hugin Superiors and bought our newest subsea vessel, the Venture, from Shearwater while also bringing them in as a shareholder. The Venture was used by TotalEnergies for their Namibia development project Venus and is mobilized there, as we speak. We've also commercialized and proven the Argeo LISTEN system for subsea integrity inspections and proven its capability as a deep-sea mineral detection and resource estimation tool. Lastly, the Searcher is active in the Calypso field in Trinidad and Tobago as part of a contract with Woodside Energy.

If someone had told me one year ago that what we would be doing now, I wouldn't have believed it. I'd think it would be impossible, but there's been fantastic teamwork and spirit throughout the company, which has obviously grown. We have now 80 employees, both onshore and offshore, and that continues to grow as we develop more projects and technological advancements.

Out of all those projects you mentioned, is there one that was either your favorite or one that challenged Argeo?

That's the thing—they almost all are because a lot of what we are doing comes from teamwork. And of course, when you're moving into this, you're apprehensive. Will it work as we have tested? Will it give the results that we hoped it would? With NCPOR, we're trying to prove that these sensors can be used for identifying mineral resources at nearly 6,000 meters, which is basically unheard of. We've spent a lot of time developing the sensor system and when something works, it's a special moment for everyone involved, from the technology developers to the operators and so forth.

You've had great successes this far? How will you maintain this drive and uniqueness for years to come?

First, we aren't a company that stands still. We always move on. We have a portfolio of intellectual property that goes in sync with our technology development in three verticals—oil and gas, marine minerals, and renewables. We harness this in new sensors that can open new frontiers in terms of exploration—either in deeper water or in previously mentioned projects like offshore wind. This combination of technology as a service to deliver superior products is really what we're about.

When we started all of this, we knew that we could choose to be one of the best. That's always a strategy, but we chose to be unique in what we do and to bring something new to the field, which is somewhat of a heritage

"We have an in-house data platform called Argeo SCOPE that integrates all the data from our LEDs, allowing both our internal employees and our clients to interact with the data. We've also made good use of Elon Musk's Starlink to get data to shore, which has been an enormous step forward in terms of access to our vessels."

– Trond Crantz,
Founder & CEO of Arego

as well. Combining in-house engineering and technology into production systems and doing those types of job ten times faster with superior quality—that's Argeo. And as we became good at that, we also said that, "Okay. I think the customer would like us to deliver our products from our field units to have rapid answers to their questions." That makes us a bit special, I hope.

Let's switch gears to dive into your recent projects, including the contract with Woodside Energy. Can you tell me a little bit about Argeo's role in that, what value it brings to you, and the vehicle being used?

Absolutely. We've known Woodside for some time and we've been talking with them about the Calypso field. Our contribution is the Argeo Searcher with the new Hugin Superior. It's a big project for us as a company; we're positioning ourselves within the oil and gas sector, which is massively important.

We recently purchased two new Hugin Superiors, with all bells and whistles of sensors included. In addition, we fully integrated our own Argeo LISTEN system. The superiority of the AUV lies in the production facility of the vehicle (6000m) dual-HISAS which doubles the swath with and production speed, CathX cameras and laser, and the endurance of up to 60 hrs of real acquisition time. It is the most advanced AUV on the market to date, hands down.

As an expert in the field, what do you see as the future of ocean surveying and subsea sensing?

How long is a rope? There's a huge and very fast cycle of technology, which is ongoing. It never stops. We'll see big changes in terms of the vehicles we use, what they can do, and how they can achieve the things that they do. I think that's what everyone sees. But we're thinking, more specifically, how does machine learning and AI help us interpret data?

To give an example—with all the sensors turned on our Hugin Superior, for say 48-50 hours, we acquire up to 10 terabytes of data. Imagine sifting through all of that. It takes a long time today, but we're working on algorithms to help us pick out important pieces. Another thing we're working on is to make the data live for the client. We're

developing a new data platform that allows more live interaction with data for decision making. There's a lot going on the computer side to make things go faster, easier, and to be able to give more sense of what we're seeing.

We have an in-house data platform called Argeo SCOPE that integrates all the data from our LEDs, allowing both our internal employees and our clients to interact with the data. We've also made good use of Elon Musk's Starlink to get data to shore, which has been an enormous step forward in terms of access to our vessels. I can have a Teams meeting with our vessel in the middle of the Indian Ocean today. This was a fantasy 20 years ago.

Trond, do you have a final message to close us out?

What to expect from Argeo: We'll bring out more vessels, more tools, more vehicles, and more sensor systems—and with the pace that we've had so far, it won't take long.

AUTONOMOUS SURVEY TECHNOLOGY: CUTTING THE UMBILICAL

There is a flurry of development underway to cut seafloor seismic and geotechnical survey technologies free from on-site control.

By Wendy Laursen

PXGEO's MantaRay is a hovering autonomous underwater vehicle engineered to deploy and recover ocean bottom nodes with minimal impact to the ocean floor.

Source: PXGEO

"Geotechnical drilling and sampling will evolve towards fully autonomous operations on the seafloor."

– Andrew Galbraith,
Managing Director of Ocean Infinity

The deeper you go, the quieter the ocean becomes. It's something that Kyrre Tjøm is exploiting in his back-to-basics approach to ocean bottom nodes (OBNs). Like his competitors, the CEO and Founder of iDROP, is developing autonomous OBNs that can deploy themselves on to the seabed without ROV support.

The current method for laying the nodes, which catch reflected waves during seismic surveys, involves specialist vessels and specialist crews. It only takes one member of the team to fall sick to disrupt an entire survey schedule, says Tjøm. That's how in-demand the expertise is.

He has caught the attention of Woodside, ExxonMobil and others. Unlike his competitors, Tjøm is avoiding high-tech complexity above and below the surface. One way he is doing this is to exploit the quiet ocean floor to enable his Oceanid OBNs to communicate with others in the swarm and with the ship, using acoustics. This is facilitated by having upright OBNs that aren't obstructed by seafloor topology.

OBN-to-OBN communication is used for navigation and, as a swarm, to produce relatively small but high resolution seismic datasets. In the future, it will enable the swarm to report back to the launching vessel even if the vessel has moved beyond the reach of an individual OBN.

The OBNs are designed to glide to the seafloor without the need for ROV help or DP-positioning mother vessels. As part of their patented autonomy, the OBN's will use flight data to create a current profile as they traverse the water column at a predefined heading, constantly adjusting angle of attack to create the required lift to navigate autonomously into position while the deployment vessel has moved on.

Where other autonomous OBNs use 50% of their battery power for launch and retrieval operations, iDROP's gravity-based OBNs use around 5%. They use their rudders and landing gear to slow their descent prior to landing and correct their vertical inclination before mechanically deploying their payload of sensors into the seafloor. As there's no need for ROVs or umbilicals, if one OBN fails

Ocean Infinity's Armada surface robot vessels only require a skeleton crew because data processing and payload control is conducted from onshore operations centers.

Source: Ocean Infinity

its target spec, it is easy to deploy another.

Each OBN is about a meter long and weighs around 25 kilograms. The whole swarm system is containerized, up to 250 OBNs per container, and suitable for deployment by the deck crew of an OSV without ROV support. "We can scale it down to one OBN or up to 7,000. It doesn't really matter. It's just a number of containers," says Tjøm. "Deployment is 50% faster than with ROVs, and recovery is 50% faster." Along with greater simplicity comes a 95% drop in GHG emissions, he says.

iDROP and some of its competitors expect to move beyond pilot testing this year. His competitors have similar goals, claiming reduced emissions and dramatic reduction in deployment logistics. Last year, Blue Ocean Seismic Services claimed its autonomous OBNs outperformed ROV-positioned OBNs. PXGEO uses hovering autonomous underwater vehicles rather than ROVs, claiming they are capable of deploying and recovering OBNs significantly faster and with better precision than traditional methods.

Ocean Infinity is not removing ROVs from its autonomous processes, but it is removing on-site human supervision. This year, the company signed an agreement with Shell for the provision of lean-crewed and robotic geophysical and geotechnical services. This includes using Ocean Infinity's Armada surface robot vessels of various sizes which only require a skeleton crew because data processing and payload control is conducted from onshore operations centers.

Andrew Galbraith, Managing Director of Ocean Infinity, says that while ROV-based survey operations are integral to the Armada solution, the difference lies in their integration within a comprehensive system. "ROVs are launched, recovered, and operated from a mother Armada vessel, alongside various other payloads like Ocean Drill, SonicCorer, Infinity CPT and AUVs. This consolidated approach optimizes efficiency and coordination in offshore operations."

Ocean Infinity has already entered the offshore wind geotechnical market with its newly developed autonomous cone penetration test (CPT) device, Infinity CPT 250. Last year, for the Ossian wind farm, deep push seabed CPTs, seabed seismic CPTs and vibrocore operations were carried out remotely using over-the-horizon commands sent via a remote-control system.

Recent advancements in AI and in low orbit, low latency satellite communications which have greatly enhanced remote control solutions and real-time data transfer have made it possible to do this. Infinity CPT and other payloads communicate directly with control systems on the mother vessel via a lift umbilical. The vessel's control systems communicate via satellite to the remote control cen-

Ocean Infinity has entered the offshore wind geotechnical market with its newly developed autonomous cone penetration test (CPT) device, Infinity CPT 250.

Source: Ocean Infinity

iDROP's Oceanid OBNs to communicate with others in the swarm and with the ship, using acoustics.

Source: iDROP

ter and the cloud. Infinity CPT can receive mission statements and execute them with minimal supervision. The data is automatically processed and reported to clients.

Galbraith sees a future where geotechnical drilling and sampling will evolve towards fully autonomous operations on the seafloor. This includes autonomous Ocean Drills capable of investigating the sub-seabed independently, retrieving and storing soil samples with minimal human intervention. Intelligent control system software will facilitate this autonomous functionality, requiring only a mission statement for the robot to complete tasks optimally.

Robots such as Ocean Infinity's Ocean Drill or SoniCorer rely on an array of sensors that are used by algorithms to allow the robot to interface with the environment that it encounters during the completion of a given task. The data from the sensors will also be used to supervise or monitor the status of the robot and to allow the human monitor to intervene if needed from a remote location.

As more offshore operations are completed and Ocean Infinity's systems are proven to be effective and reliable, they will require less supervision. For example, part of the control system for Ocean Drill includes a product called Smart Drill which will eventually replace the need for a human driller who makes operational decisions. Smart Drill relies on a training data set relevant to a target borehole to plan and drill it in an efficient way with minimal supervision.

Ultimately, the Amada vessels themselves will operate without any onboard crew. They will use zero emission fuel and perform offshore data acquisition and intervention operations down to depths of 6,000 meters.

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THE STRAT
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A potentially cost-eff
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By Amir

TEGIC SHIFT
A TIEBACKS

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r Garanovic

Subsea tieback projects are transforming the offshore oil and gas industry by enabling efficient extraction from remote fields and satellite reservoirs, an approach aiming to significantly reduce capital, expenditure, environmental impact, and time-to-market compared to traditional offshore platforms. According to many analysts, subsea tieback projects are set to play an increasingly critical role in the future of offshore oil and gas production.

As of June 2024, the trend towards subsea tiebacks was accelerating, with a number of newly announced subsea tiebacks joining those already in advanced stages of development. Many companies are exploring collaborative development and shared infrastructure models to further drive down costs.

Subsea Tieback Projects Across the Globe

In the North Sea, one of the most notable subsea tieback projects is the Cambo field development, operated by Ithaca Energy, which acquired Shell's remaining 30% stake in the project back in November 2023, making it the sole owner of the project.

This was followed by Ithaca Energy's agreement with Eni, in April 2024, for the combination of assets, creating a major independent oil and gas company on the UK Continental Shelf (UKCS).

Located west of the Shetland Islands, the project involves a subsea tieback to an existing floating production storage and offloading (FPSO) unit Sevan. The Cambo field is projected to commence production by late 2024 and is expected to achieve a peak output of 170,000 barrels per day.

Subsea 7 is responsible for the engineering, procurement, construction, and installation (EPCI) of subsea infrastructure, including manifolds and flowlines, while TechnipFMC

is supplying subsea trees and control systems to ensure efficient production.

TechnipFMC's latest subsea trees are designed to handle high-pressure, high-temperature environments, critical for the challenging conditions in the North Sea, while Subsea 7's flexible flowlines, installed in early 2024, are optimized for long-distance tiebacks and capable of handling multiphase flow, ensuring reliable hydrocarbon transportation to the FPSO.

In West Africa, BP's developing the Greater Tortue Ahmeyim (GTA) project involves a 120-km subsea tieback to a nearshore LNG facility. Scheduled to deliver first gas by late 2024, this project is pivotal for gas export and energy supply in the region. TechnipFMC is providing subsea production systems and flexible flowlines, while OneSubsea has been hired to provide subsea boosting systems and control umbilicals.

TechnipFMC's flexible flowlines and production systems, installed in mid-2023, are designed to handle large volumes of gas over extended distances. These systems are critical for the project's efficiency and were chosen for their reliability in deepwater conditions. SLB's OneSubsea division provided boosting systems and control umbilicals in early 2024, ensuring effective gas transport and system integrity.

In Asia Pacific, the Ichthys LNG project, operated by INPEX, is undergoing a significant expansion with new subsea tiebacks planned for 2024 and 2025. This expansion aims to increase the LNG production capacity by tying back new gas wells to existing subsea infrastructure.

Subsea 7 is managing the EPCI of the subsea systems and pipelines, while Aker Solutions is providing subsea production systems and control equipment.

Subsea 7's involvement includes the installation of advanced flowlines capable of handling high-pressure gas transport. These systems were put in place in early 2024 and are designed to minimize hydrate formation and maximize production efficiency. Aker Solutions' subsea production systems, installed in mid-2023, feature integrated control systems that enhance operational efficiency and reduce downtime.

Supply Chain and Technological Advances

Technological advancements in the subsea tiebacks area of oil and gas developments are also picking up pace,

promising to deliver cost-effective and sustainable solutions, with most notable steps being made in subsea processing systems, enhanced flow assurance technologies, subsea robotics as well as digital technologies.

Subsea processing systems are transforming subsea tiebacks by allowing hydrocarbon processing directly on the seabed. Notable advancements include subsea separators, pumps, and compressors, like the ones supplied by OneSubsea for Shell's Whale field and BP's GTA projects,

Credit: Onesubsea

OneSubsea will deliver the subsea production system which will include two subsea trees, a two-slot template, an umbilical, and a control system for OKEA's Bestla project in the North Sea.

which is said to offer subsea boosting systems that enhance production efficiency and allow for longer tieback distances using multiphase pumps and compressors.

Flow assurance technologies are critical for maintaining continuous flow in subsea tiebacks, especially in deepwater and long-distance scenarios. Baker Hughes provides advanced flow assurance solutions, such as electrically heated pipelines and advanced chemical injection systems, which mitigate issues like hydrate formation and wax deposition. These technologies are integral in projects like LLOG's Shenandoah field and Shell's Whale field, ensuring reliable hydrocarbon flow from subsea wells to processing facilities.

Digital twins and remote monitoring technologies are also revolutionizing the management of subsea tiebacks. Digital twins create a virtual replica of subsea infrastructure, enabling real-time monitoring and predictive maintenance. Siemens and ABB are leaders in this area, providing digital twin solutions that enhance operational efficiency and predictive maintenance capabilities. Their technologies are deployed in projects such as the Johan Sverdrup field in the North Sea, allowing operators to optimize production and preemptively address potential issues.

Future Outlook

Subsea tiebacks offer significant financial advantages by leveraging existing infrastructure, which reduces the need for new platforms and extensive surface facilities. This approach cuts capital expenditures (CAPEX) and operational expenditures (OPEX), enabling companies to bring new fields online faster and more cost-effectively. The integration of advanced subsea technologies also improves production efficiency and reduces maintenance costs, further enhancing the economic viability of offshore projects.

Also, the offshore oil and gas industry is increasingly adopting low-carbon strategies, with subsea tiebacks playing a crucial role in minimizing environmental impact. By using existing infrastructure, subsea tiebacks reduce the need for new platforms and lower greenhouse gas emissions. Projects like Shell's Whale field and BP's GTA are integrating renewable energy sources to further reduce their carbon footprints.

As of June 2024, a number of projects are progressing globally, supported by advancements in technology and a focus on sustainability, with the new projects such as Shell's Dover field in the Gulf of Mexico and Equinor's Irpa field in the Norwegian Sea announced, further cementing the trend towards efficient, low-impact extraction methods.

Also, the OneSubsea joint venture and Subsea7 secured the EPCI contract from Norwegian oil and gas company OKEA to develop the Bestla project (formerly known as Brasse) in the North Sea, offshore Norway. Specifically, the companies were selected to accelerate the subsea tieback delivery to aging platforms, comprising a two-well project, with a 13-km tieback to the Brage platform.

Image courtesy DEME

DEME installation vessel ORION - now working CVOW

OFFSHORE WIND: INSIDE THE FINANC

CIAL WEB

Early 2024 saw a group of financial deals that have implications, in a broad sense, for how offshore wind projects may be financed. While offshore wind projects might be thought of as being in the 'utility finance' basket, they are ultimately high-risk deals that might better suit the portfolios of 'infrastructure investment' which, in recent years, has taken a shift towards tolerating more uncertainty when it comes to cash flows.

By Barry Parker

A 2022 article from consultants McKinsey, titled Infrastructure investing will never be the same, drives the point home, with the consultants writing that traditionally staid and stable, infrastructure investing had been shaken up by revolutions in energy, mobility and digitization. They add: "These assets offer many of the characteristics that infrastructure investors look for: real assets, protected market positions, and the potential to generate stable cash yields. However, to get exposure to these new asset classes, investors will have to accept a period of significant investment and negative cash flow, along with development, technology and commercial risks."

Maritime industry participants have been closely following the progress of Charybdis, a Wind Turbine Installation Vessel (WTIV) being constructed at the Seatrium AmFELS yard in Brownsville, Texas, by a subsidiary of Virginia-based utility Dominion Energy, for use in building its 2.6 GW Coastal Virginia Offshore Wind (CVOW) project. The vessel will support the installation of 176 turbines on the seabed, 27 miles off the coast of Virginia Beach, as well as three offshore substations, and both the offshore and onshore transmission configuration. In early April, Dominion launched the still-under-construction WTIV, to be based at Hampton Roads. To achieve the milestone, Dominion completed the welding of the ship's hull and commissioned the vessel's four legs and related jacking. A month later, the monopile installation at CVOW began with DEME's DP3 Installation vessel Orion. Monopiles, brought in from Rostock, Germany, are being stored at the Portsmouth Marine Terminal - a repurposed container handling facility.

As projects move ahead, financiers with expertise in structuring renewable energy deals are now eyeing offshore wind. Only a few months prior to the Charybdis launch, Dominion announced that fund packager Stonepeak - which is an alternative investment firm putting money to work on behalf of pension funds, endowments and other large institutions, with end-2023 assets under management (AUM) of $65.1 billion - had taken a 50% stake in the CVOW project. As explained in press announcements, Stonepeak will pay Dominion an amount slightly under $3 billion, representing half of the utility's capital outlays so far. Overall project expenditures are projected at $9.8 billion, but the deal structure builds in contingencies for costs topping $11 billion, by the expected completion date late in 2026. Stonepeak is no stranger to shipping, taking

Image courtesy Dominion Energy

Charybdis in the water after its April 2024 launch.

a position in TRAC Intermodal in 2020. A year later, it acquired Teekay LNG LP, a listed limited partnership with 47 LNG tankers and 21 LPG carriers, for $6.2 billion. Importantly, its investment funds have recently been behind wind farms offshore Taiwan. Infrastructure investors, a broad group, can structure deals in ways that utilities cannot, and can apportion risks and returns among multiple entities - examples are the common General Partner (GP)/ Limited Partner (LP) structures. Thus, they may be willing to take on more uncertainties than the traditional utilities. In a recently announced deal, the green-minded investment management giant BlackRock took over the well-known Global Infrastructure Partners (GIP), with more than $100 billion AUM. GIP already has presence in offshore wind, with holdings producing in the North Sea, Borkum Riffgrund 2, Gode Wind 1 and Hornsea, as well as a stake in BluePoint Wind, a future producer in the New York Bight still in the planning stages.

Another specialist in the sector, Copenhagen Infrastructure Partners (CIP), through two investment funds with K/S structures - set up to attract smaller non-institutional investors - currently holds a 50% stake in Vineyard Wind 1, alongside Avangrid, a subsidiary of the Spanish utility giant Iberdrola. Electricity production from a handful of installed turbines began feeding the Massachusetts grid in February 2024. When completed later in 2024, the 62-turbine Vineyard Wind will have a capacity of 806 MW. CIP's existing portfolio also includes numerous onshore wind producers, the East Anglia 1 project in the UK, with other offshore projects in its pipeline.

DEAL STRUCTURING BENEFITS FROM GOVERNMENTAL INCENTIVES

Beyond the construction and deployment phases, the long-term nature of operating offshore wind, with fixed contracts with durations of 10 years or more, is nicely suited for another financial tool, known as the tax equity package. Offshore wind takes advantage of incentives, including tax credits, that were greatly expanded under the Inflation Reduction Act (IRA), enacted in August 2022. These types of structures enable the project owners to raise cash from the sale of investment stakes to financial institutions, who can then utilize tax credits from previous programs (Investment Tax Credits, and sometimes, Production Tax Credits), combined with new incentives in the IRA. Describing the financing for Vineyard Wind 1, Avangrid said: "The $1.2 billion investment transaction was reached with J.P. Morgan Chase, Bank of America and Wells Fargo, making it the largest single asset tax equity financing and the first for a commercial scale offshore wind project." The tax equity package is tied to a highly complicated 'partnership flip' that has been used in many renewable energy packages - after the financial institutions are paid off, the project developer, in this case Avangrid and CIP, garners all, or nearly all, of the upside.

UPS AND DOWNS

Beyond the IRA, the Biden Administration is now looking further out into the future and further offshore, with its Floating Offshore Wind Shot initiative, aimed at reduc-

ing costs for electricity generation from floating turbines. At end April, the Bureau of Ocean Energy Management (BOEM) announced that it was looking closely at lease auctions in deep waters offshore Oregon and Maine and seeking comments to preliminary proposals.

While offshore wind continues to make strides in the United States, recent complications have derailed is forward momentum. The news is not all bad. Namely, at end March, Ørsted got the green light from BOEM on the 924 MW Sunrise Wind project, with 95 Siemens Gamesa turbines to be deployed south of Block Island. In another deal where utility Eversource is pulling back, Ørsted also inked a deal to acquire Eversource's 50% stake in Sunrise Wind. The project has also been greenlighted by New York State Energy Research and Development Authority (NYSERDA).

The good news comes with setbacks, though.

In late April, NYSERDA pulled back on an ongoing offshore wind solicitation. Three projects, each with 1.3 GW expected production, were put on hold before Power Purchase Agreements had been signed, as turbine manufacturer GE Vernova backed away from plans to produce turbines with 18 MW capability, with a likely cost increase related to the installation of a greater number of smaller turbines of around 16 MW. Earlier retreats, where potential power providers paid termination penalties after having signed Power Purchase Agreements (PPAs), included Ørsted scrapping its Ocean Wind I and Ocean Wind II projects off the New Jersey coast, which would have delivered a combined 2.2 GW. The developer said that macroeconomic factors have changed dramatically over a short period of time, with high inflation, rising interest rates, and supply chain bottlenecks impacting its long-term capital investment.

Previously scuttled deals had included Avangrid cancelling its PPA with utilities in Connecticut, effectively pulling the plug on the Park City Wind, an 804 MW project. Noting that the original pricing of its output had been agreed four years earlier, in 2019, Avangrid pointed to "… unprecedented economic headwinds facing the industry including record inflation, supply chain disruptions, and sharp interest rate hikes, the aggregate impact of which rendered the Park City Wind project unfinanceable under its existing contracts."

A pair of projects that have not been terminated, in spite of all the obstacles, further exemplifies offshore wind's suitability for the infrastructure investors at a time that conventional utilities are better suited to focus on the more predictable landside transmission/ distribution businesses. In February, 2024, at around the same type as its announcement of being acquired by BlackRock, GIP bought a 50% ownership share in two offshore projects - South Fork Wind (already producing 132 MW off Long Island) and Revolution Wind (coming online in 2025), as Eversource shifted its focus to the onshore side of these projects. As in the Sunrise Wind transaction, Ørsted will remain in the deal as a 50% partner.

The rationale for utilities terminating offshore wind deals, centering on inflation and various other disruptions, are the very same risks that the Stonepeaks, CIPs and BlackRocks of the world, together with the participants in their funds, may be more willing to embrace. Going forward, some of the complex financial structuring may be a way to keep some of the tottering and leaky offshore wind projects afloat. A late 2023 presentation from the American Council on Renewable Energy in conjunction with law firm McDermott, Will & Emery LLP, suggested that, among project developers, the tax equity is expected to be the most available financing source over the next three year. As McKinsey, in its brief aimed at financial institutions, had noted, building relationships with utilities to go after carve-out opportunities can be a way to build scale quickly in many areas where credible at-scale investments are hard to find.

THE MARITIME CONNECTION

By definition, there is a maritime component to offshore energy. Can vessel economics make, or break, offshore wind projects? Vessel assets serving the U.S. Outer Continental Shelf have been the subject of spirited discussions, however, few of these dialogues have looked at maritime assets in the context of overall project construction costs. On recently cancelled deals, Ørsted and Avangrid have referred to issues and disruptions with supply chains, with vessels not being mentioned specifically, suggesting that the problems might be on the land side.

Where do maritime assets fit into the jigsaw puzzle that is offshore wind?

When ordered in 2020, Charybdis, with its keel laying in December of that year, was slated for late 2023 completion, at a cost of $500 million. At 85% completion in May 2023, delivery is anticipated for late 2024/ early 2025, at an all-in cost exceeding $625 million. Arguably, two years of its capital cost could be allocated

Image courtesy Ørsted

ECO Edison, the first purpose-built US Flag SOV.

to CVOW before the WTIV moves on to other projects serving the coastal United States. Assuming a 15 to 20-year useful life for the asset, which would then move on to other installations, around $60 - $80 million capital cost might be attributed to CVOW. Contrast these 'back of the envelope' estimates with overall CVOW project costs pegged at between $9.8 billion and $11.3 billion - construction in non-U.S. yards is less.

Cadeler, a leader in the WTIV space, explained in its end 2023 annual report that it had orders with Asian yards Cosco and Daewoo in place for six newbuilds, and that the aggregate capital expenditures for the newbuilds are approximately €1.8 billion. This works back to €300 million, or roughly $330 million, for each unit.

When Maersk Supply's WTIV order with the Sembcorp yard in Singapore, was announced in late 2022, reports in shipping media pegged its capital cost at $350 million. The WTIV, when delivered, will initially be deployed at Equinor's 810 MW Empire Wind field, set to come online in 2026. A Jones Act compliant subsidiary of Kirby Corporation will provide a feeder service, bringing components out from a one-time containership terminal in Brooklyn for installation. Assuming a 20-year lifespan, the WTIV's capital cost for a one-year timeframe works back to $35 million. Overall Empire 1's project costs had been estimated at around $3 billion in 2021, prior to a substantial bump up in early 2024.

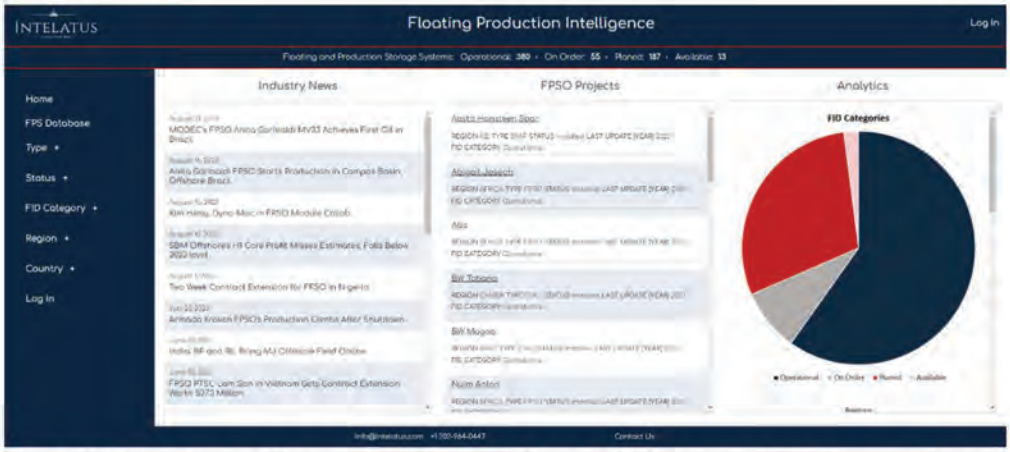
Construction of vessels in U.S. yards for the offshore wind market can benefit from the U.S. Maritime Administration's (MARAD) Title XI program, which provides government support for long term financings, available for 'vessels of national interest'. Dominion's CVOW will be supported by a Service Operation Vessel (SOV), to be operated by CREST Wind, owned by U.S. company Crowley and Danish specialist Esvagt, under a long-term charter with turbine behemoth Siemens Gamesa now under construction at Fincantieri's Bay Shipbuilding. According to MARAD filings, this vessel is priced at $168 million. A hybrid-powered SOV for Equinor's Empire Wind, also based in Brooklyn, to be delivered from Edison Chouest's LA-Ship yard in Houma, Louisiana, has been priced at $109 million, MARAD states, under the reported 10-year charter, that comes to around $11 million each year. In mid-May, 2024, another SOV, Eco Edison, also built by Edison Chouest, was christened at the Port of New Orleans. It will be serving three projects tied to Ørsted and Eversource, tasked with handling the land side. These include South Fork Wind, Sunrise Wind and Revolution Wind, a 704 MW project, offshore Rhode Island.

INTELATUS

GLOBAL PARTNERS

The all-new way to track FPS production in real time

Floating Production Systems Intelligence



Introducing the **ultimate online resources for offshore energy professionals** - the Floating Production Systems Intelligence and the Floating Wind . This comprehensive database provides key technical and commercial details on all floating production systems worldwide.

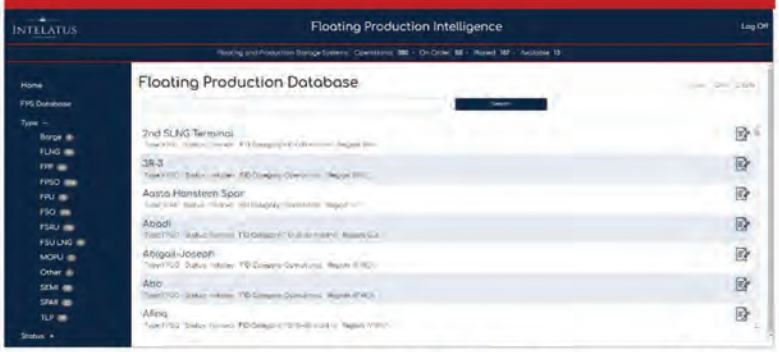
Track Progress and Production on:

Operational: 380

On Order: 55

Planed: 187

Available: 13



With over 700 floating production unit listings, the database is the most extensive compilation of FPSO, FPU, FPS and other floating production system information available.

The user-friendly interface allows for easy browsing and searching of the database by easy to filter parameters. Each system profile includes all key facts and capabilities, storage capacity, mooring type and more.

Visit https://fpso.intelatus.com for pricing and more information.

Credit: WindServe Marine

CREW TRANSFER VESSELS:

BUILDING THE U.S. FLEET

A fleet of Jones Act compliant crew transfer vessels is growing in stride with the United States' burgeoning offshore wind industry.

By Eric Haun

When the United Sates' first purpose-built crew transfer vessel (CTV), Atlantic Pioneer, was delivered in 2016, the country's offshore wind industry was just getting off the ground. In the years that followed, the industry has been building up—perhaps slower than expected at times—but today is moving forward in earnest.

Coinciding with this build-up is the growth of a fleet of Jones Act qualified vessels, including newbuilds and conversions, to service this nascent industry. Among these are CTVs, which ferry personnel and light equipment to support the construction and long-term service of offshore wind farms.

Today, nearly 30 of these vessels are in service, under construction or on order in the United States, and it is expected that dozens more will be built in the years ahead as more wind farms take shape in U.S. waters.

In-service Newbuilds

Atlantic Pioneer, built by Blount Boats in Warren, R.I., for Atlantic Wind Transfers (AWT) was literally the pioneer, built for America's first commercial wind farm off of Block Island, where it remains in service today.

The next U.S.-built CTV to come along was the WindServe Odyssey, delivered by North Kingstown, R.I. shipbuilder Senesco Marine for sister company WindServe Marine in 2020, followed by another Blount-built boat, Atlantic Endeavor, again for AWT, handed over in 2021.

In 2023, Senesco delivered two more vessels for WindServe Marine: WindServe Genesis and WindServe Journey; and Gulf Craft in Franklin, La. delivered WINDEA Intrepid for WINDEA CTV, a partnership between Hornblower Wind and MidOcean Wind.

Palatka, Fla. shipyard St. Johns Ship Building in January of this year announced its first CTV delivery: WINDEA Courageous for WINDEA CTV. In March, Blount delivered Gripper, the first CTV for American Offshore Services (A-O-S), a joint venture formed in 2020 by leading European CTV operator Northern Offshore Services (N-O-S) and U.S.-based investment firm OIC.

On Order and Under Construction

There are many more CTVs on order and under construction at U.S. shipyards, including the aforementioned yards, as well as Gladding-Hearn Shipbuilding in Somerset, Mass.; Breaux Brothers in New Iberia, La.; and Metal Shark in Franklin, La. Other shipyards such as Platypus Marine in Port Angeles, Wash. have agreements in place to build CTVs, but firm orders are yet to be confirmed.

The next CTV expected for delivery is another WINDEA vessel, WINDEA Enterprise, which started sea trials in June, according to builder St. Johns Ship Building. Other CTVs scheduled for delivery this year include AWT's Atlantic Resolute—also at St. Johns—as well as WindServe Marine's WindServe Enterprise at Senesco and a yet-to-be-named CTV for Patriot Offshore at Gladding-Hearn.

Firm CTV orders in the books of U.S. shipyards have

THE U.S.' FIRST CYV, ATLANTIC PIONEER, AT THE BLOCK ISLAND WIND FARM OFF RHODE ISLAND.

Credit: AWT

Credit: WindServe Marine

Credit: A-O-S

Credit: Gulf Craft

scheduled delivery dates through 2026, and there more than a dozen options rumored or known to exist.

Design and specifications

Leading designers of the United States' newbuild CTV fleet include Incat Crowther, NOS, Chartwell Marine and BMT. The aluminum catamarans range in size from 19.7 meters to 30 meters long (LOA), with beams ranging from about 7 meters to 11 meters. The vast majority have capacity for up to 24 passengers and are generally manned by a crew of six to eight.

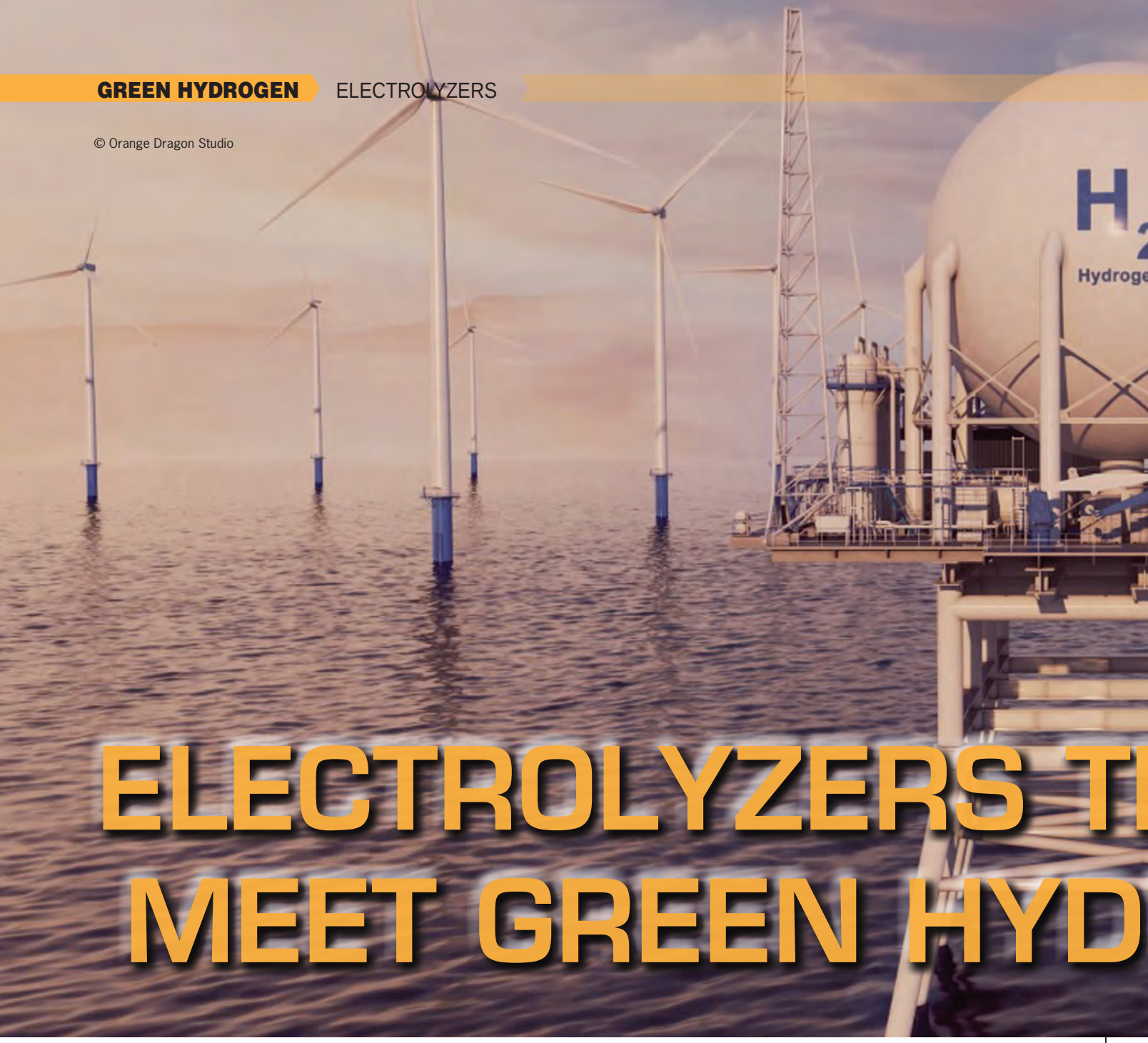
To date, all CTVs ordered in the U.S. are diesel mechanical, though a handful are described as "hybrid-ready", meaning they are built with space to accommodate a potential conversion to hybrid propulsion in the future. Most of the vessels delivered and on order are powered by Volvo Penta engines paired with IPS propulsion, while one owner with eight vessels in total, including options, has opted for MAN engines, including two with HamiltonJet waterjets and the remainder with CPP. Two vessels in the U.S. CTV fleet are powered by Scania engines, both with HamiltonJet waterjets.

Conversions

Several existing vessels have also been converted to gain new life as a CTV within the U.S. offshore wind sector. For example, in 2023, Hornblower Marine announced it converted the former offshore supply vessel (OSV) Gateway Endeavor at its facility in Bridgeport, Conn. for WINDEA. Hornblower also converted former fishing vessel Nice Day Too for Coast Line Transfers. Now a CTV, the vessel has been renamed Capt. Les Eldridge.

FORMER OSV GATEWAY ENDEAVOR HAS BEEN CONVERTED AND IS NOW OPERATING AS A CTV IN THE U.S. OFFSHORE WIND INDUSTRY.

Credit: Hornblower Group



ELECTROLYZERS TO MEET GREEN HYD

Electrolyzer technology is going to have to get cheaper and more scalable if it is going to enable a global green hydrogen economy.

By Wendy Laursen

ECH RAMPS UP TO ROGEN DEMANDS

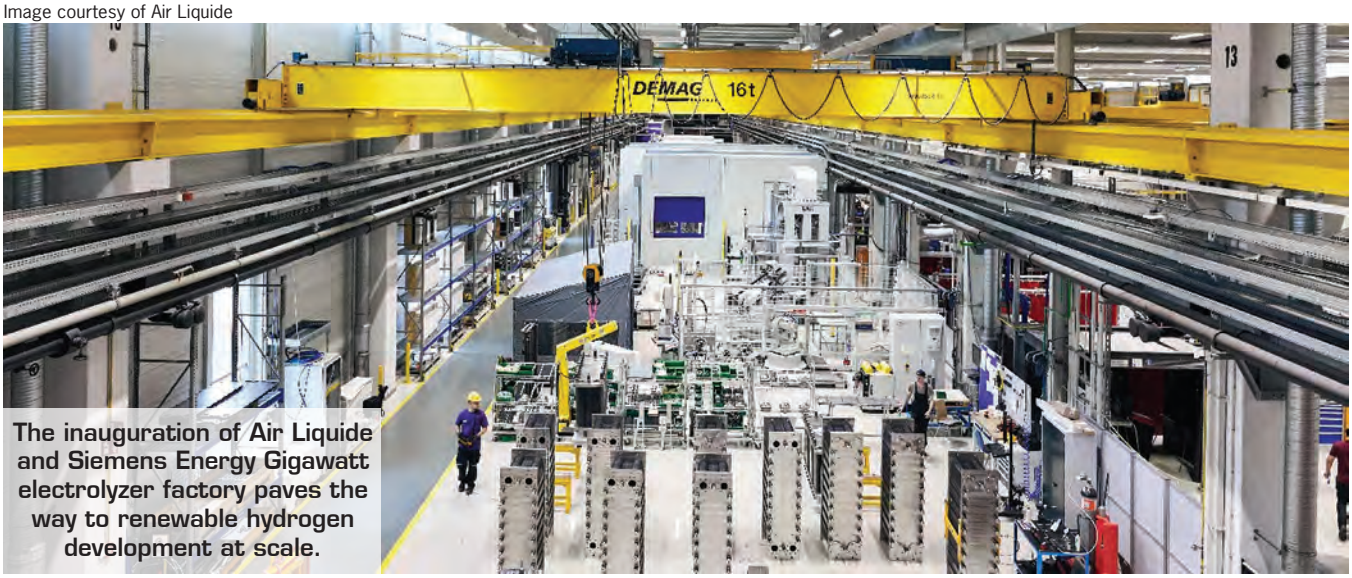
Somewhere on a benchtop in Brimsdown, London, there is a lab-scale prototype that can extract the platinum and polymers from PEM electrolyzer membranes so they can be recycled into new membranes.

Why? To reduce the cost of electrolyzers and therefore green hydrogen. Electrolyzers use electricity to split water into hydrogen and oxygen, and to meet global expectations for 2030 and then 2050, they must produce green hydrogen cheaper than hydrocarbon-based methods. They must also be able to do this at scale.

Electricity makes up most of the production cost of green hydrogen, and researchers around the world are trying to reduce that, but Johnson Matthey's benchtop unit is also representative of the fact that, despite new electrolyzer technologies well past lab-scale testing, there will still be a major role played by more established technologies such as PEM and alkaline electrolyzers.

Current technologies can be roughly categorized into two main groups: those suitable for use with intermittent renewable energy like PEM, pressurized alkaline and anion exchange membrane (AEM) and those suited to grid

Image courtesy of Air Liquide



The inauguration of Air Liquide and Siemens Energy Gigawatt electrolyzer factory paves the way to renewable hydrogen development at scale.

Image courtesy of Accelera

Accelera by Cummins leadership and distinguished guests cut the ribbon at the opening of Accelera's first electrolyzer production site in the U.S.

Image courtesy of Fortescue

In April, Fortescue officially opened an electrolyzer manufacturing facility in Australia – one of the first globally to house an automated assembly line.

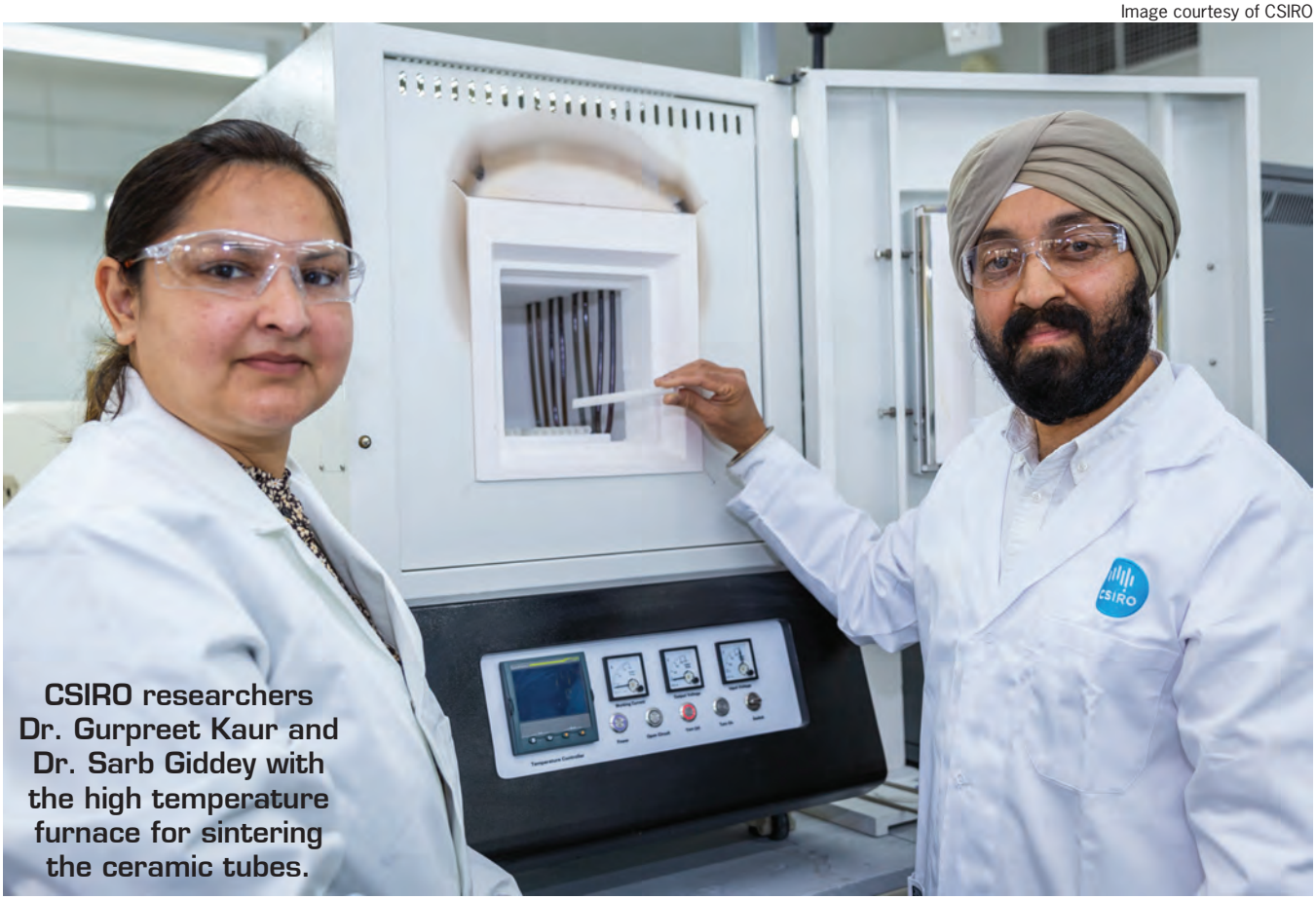
power or being incorporated into industrial plant like atmospheric alkaline and solid oxide electrolysis (SOE).

SOE is a growing technology that can also operate in reverse to act as a fuel cell, and AEM, a development of the PEM concept but with cheaper materials, is an emerging technology. While alkaline electrolyzers use a liquid electrolyte, and PEM electrolyzers use a polymer electrolyte, SOE use a solid-state ceramic electrolyte and requires heat to operate. But new variations on existing themes continue to emerge as the industry tackles cost and scalability challenges, and each have different materials, chemistries and heat and pressure requirements.

Using solar and wind energy, green hydrogen can be produced at peak times by running electrolyzers and then storing the hydrogen for later. "Here, there's an important role to play for green hydrogen which can operate at a different scale to batteries to balance out fluctuations in the supply of, and demand for, renewable energy production," says Synne Myhre Jensen, Public Affairs Advisor at Norwegian hydrogen company Hystar. As part of the company's HyPilot project, collaborator Equinor is planning to demonstrate dynamic hydrogen production tailored to the variable output typically found in offshore wind applications.

Johnson Matthey will supply membrane electrode assemblies for Hystar's patented PEM technology. "Each of our stacks can produce two to three times more hydrogen

Image courtesy of CSIRO



CSIRO researchers Dr. Gurpreet Kaur and Dr. Sarb Giddey with the high temperature furnace for sintering the ceramic tubes.

than a conventional stack, enabling more hydrogen production at peak production times and capitalizing upon lower electricity prices," says Jensen. "During these moments, the exact energy consumption is not important, as the electricity price is low anyway. It is then a matter of how much hydrogen you can produce by fully utilizing the renewable sources available." The technology is also more compact and safer than traditional PEM electrolyzers due to built-in air circulation to prevent combustion, she says.

Another project, the EU-Funded HYScale project, aims to upscale an efficient, durable, sustainable, and cost-effective AEM electrolyzer technology. Project partner CENmat claims to have re-engineered electrolysis from scratch to produce a system that operates with catalysts and electrodes free of critical raw materials and anion exchange membranes free of forever chemicals.

Australia's research organization CSIRO is developing both PEM and SOE technology. Its high-efficiency tubular SOE technology uses a series of sintered ceramic tubes and easily obtainable metals and can efficiently produce hydrogen and syngas (a mixture of hydrogen and carbon monoxide) – something that distinguishes it from existing PEM and alkaline technologies. It is also highly scalable.

"There is a limit to what extent efficiency of electrolyzers can be further improved," says Dr Sarb Giddey, Senior Principal Research Scientist and Group Leader at CSIRO. "The efficiency will stay in the 70-75% range maximum due to the thermodynamic limits and the losses related to balance of plant. The electrolyzer cost, electricity costs, and scale are still the major challenges for the large-scale adoption of hydrogen production via electrolysis for decarbonization of various energy sectors."

While SOE technology holds promise for power-to-X applications, it has a limited lifetime and its dynamic capabilities are currently a barrier to large-scale commercialization, so Denmark's Dynelectro has developed a novel SOE technology that uses a mix of alternating and direct current and can accommodate fluctuating green power and temperature variations. This is expected to increase the lifetime of SOE stacks from two to 10 years.

The scale-up of well-established technology is already underway. Accelera is developing 25MW PEM electro-

DNV predicts that electrolyzer costs will drop 25% by 2030 and 50% by 2050.

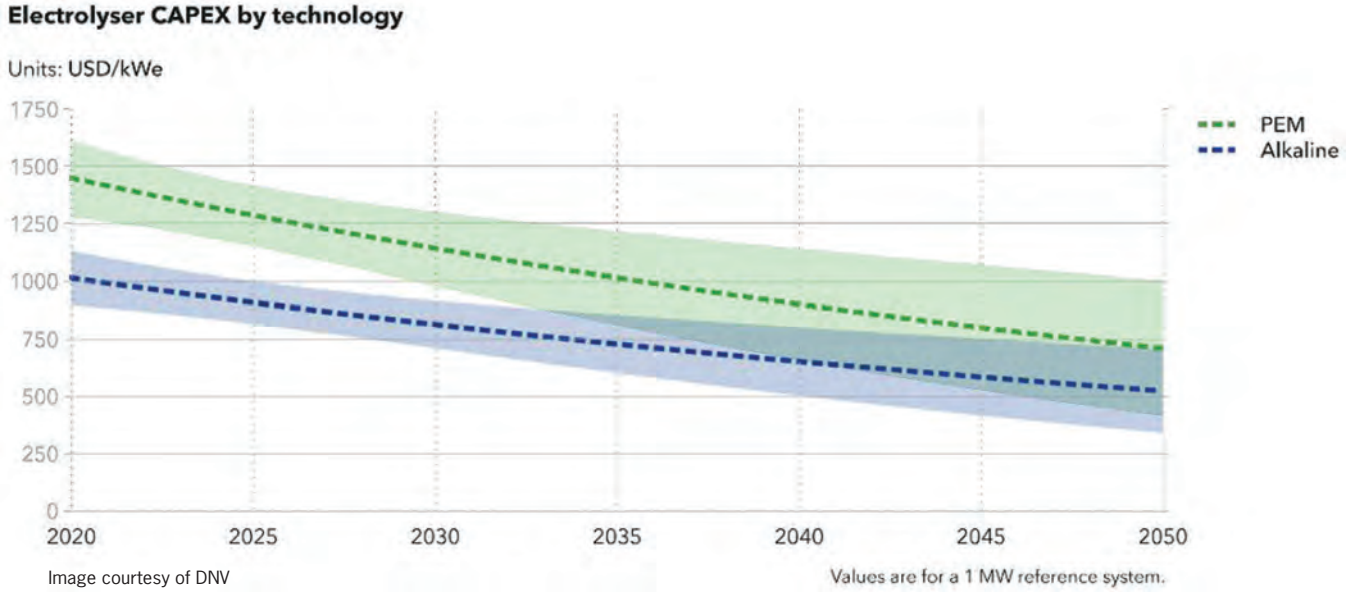


Image courtesy of DNV

lyzer modules suitable for larger electrolyzer projects (>200MW). The systems will be manufactured in its new US facility and also at another new plant in Spain.

Manufacturing speed is also increasing. Air Liquide and Siemens Energy officially inaugurated their joint venture gigawatt PEM electrolyzer factory in Berlin last year. The factory leverages robotics for series production, as does Fortescue's new PEM factory in Australia.

As a result of all the development underway, DNV predicts that electrolyzer costs will drop 25% by 2030 and 50% by 2050. Another prediction is that electrolyzer capex will drop and the market will consolidate mid-term, especially for large-scale electrolyzers. This could lead to supply chain optimization that could further reduce production costs.

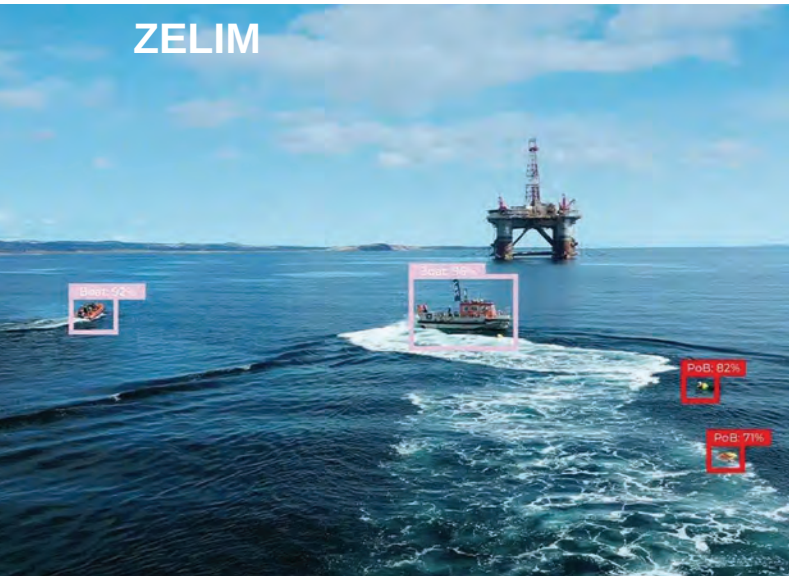
But where? China could disrupt the industry and take the same commanding market share it has in other industries despite the US pumping money into the industry (Nel and its partners received around $90 million from the Department of Energy for seven electrolyzer projects in March).

While much of China's electrolyzer production is currently satisfying the domestic market, that is likely to change. Bright-H Technology recently claimed industry leading energy efficiency for its alkaline technology, and Sungrow Hydrogen says its latest electrolyzer not only breaks the record of hourly hydrogen yield per PEM stack in the Chinese domestic market but also catches up with advanced international technologies in a number of key indicators.

So, the future of electrolyzers may well be found on a test bench in Hefei.

Johnson Matthey will supply membrane electrode assemblies for Hystar's patented PEM technology.

Image courtesy Hystar



Zelim's AI-Powered ZOE Software

Zelim has developed ZOE software, an artificial intelligence (AI)-supported detection and tracking solution designed to provide automated person overboard detection and alerts. Developed in collaboration with the U.S. Coast Guard, Zelim's ZOE is said to improve the probability of detection of people in the water with 96.8% accuracy for in water from 337 meters. When optical zoom is applied the distance increases, the company claims.

ZOE offers instant detection of passengers/ crew who fall overboard, tracking them through the fall and on the sea surface, providing geo-location information of the person in water to support rescue co-ordination.

The ZOE software was installed on board the Valaris Stavanger rig in February 2024. Zelim collaborated with the Texas-based offshore drilling contractor Valaris to customize the solution for the specific requirements of jack-up vessels. Following an initial trial period, Valaris will evaluate the suitability of the system for use on other assets in its fleet.

In the incidence of a person overboard, ZOE transmits an automatic alert to the radio operator, who can see a 10-second clip of when the alert was triggered whilst simultaneously viewing live footage, according to Zelim.

ZOE continues to track the person in the water, thereby increasing their chances of successful rescue.

The system logs the position of the vessel and the person overboard at the point of detection for mayday call geo-location, as well as providing the radio operator with a mayday script and actions checklist, ensuring fast and accurate reporting under stressful circumstances.

Emerson's Roxar Downhole Monitoring Tool

Emerson has developed a suite of Roxar downhole monitoring systems said to provide continuous access to pressure and temperature data from active wells, a critical requirement to operate safely, optimize production, and maintain well integrity for oil and gas companies. Collecting the data from active wells is challenging due to the harsh environment, limited onsite staff, and associated safety risks.

Emerson's Roxar system provides operational insight needed to assist in maintaining high production levels, risk management, and regulatory requirements compliance.

Norwegian energy giant Equinor recently selected Emerson to provide Roxar advanced well completion monitoring systems for its Rosebank oil and gas field in the North Sea, the U.K.'s largest undeveloped offshore field. According to Emerson, its suite of Roxar downhole monitoring tools will empower Equinor to use advanced oil recovery techniques, optimize reservoir performance and verify well integrity in real time.

Wind Power LAB's LASSIE

Wind Power LAB has introduced an innovative lightning surveillance tool tailored to combat strike damages to offshore wind farms through early detection of potential risk. The new lightning analysis service, known as LASSIE, offers major cost savings as repairs are identified earlier than expected, through the use of the technology-based monitoring tool, according to the company.

LASSIE, which is cloud based and non-intrusive with no turbine installation, enables proactive management of wind farms by prioritizing intervention for turbines in

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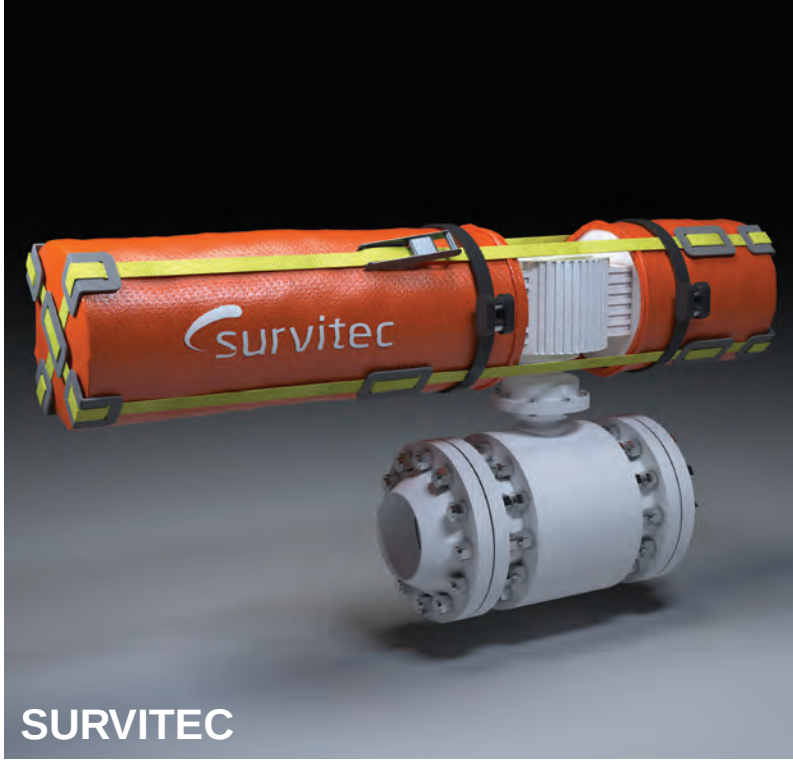

high-risk areas for lightning strikes.

This subsequently avoids significant cost escalation, such as unnecessary labor and materials, and potential catastrophic blade failure through non-detection.

The software features a proprietary algorithm which combines multiple data points from weather reporting systems. It also incorporates International Electrotechnical Commission (IEC) standards for electrotechnology compliance and Wind Power LAB's rotor blade subject matter expertise.

Through early detection of potential lightning impacts, wind farm owners and operators can ensure the efficient use of field resources to prioritize repairs.

As a result, the cost savings reduce lost production days by an average of 43% and allow for targeted external blade inspections, Wind Power LAB claims.

Salunda's Crew Hawk

Salunda, a provider of digitized solutions for safety critical industries, will install its Crew Hawk Red Zone monitoring solution to protect the personnel working on the offshore jack-up rig in the Middle East.

Salunda's Crew Hawk actively tracks crew movements and state of safety-critical equipment in real-time, providing feedback that spotlights safe operations and minimized risk.

The U.K.-based company pioneers the developed cutting-edge technology with a specialized focus on monitoring solutions for upstream, drilling vessels. Using the patented technology, Salunda enables precise location monitoring, reducing the risk of accidents and optimizing workflow efficiency, particularly in Red Zone environments. It works by triggering an alarm when an individual enters an exclusion or Red Zone, sending notifications to both the individual's personal locator and the area authority, allowing both parties to take corrective action.

Survitec Gauntlet

Survitec launched a new energy containment safety device designed to reduce the risks associated with catastrophic value actuator failures. Severe injury or death can be caused by the explosive forces released if a high-pressure spring-loaded actuator device fails, along with significant damage to equipment and facilities. However, there is often a lack of regular inspection and maintenance, and the risks have attracted little attention in terms of technology or regulation.

Compatible with all valve actuator types, the Survitec Gauntlet is a protective sleeve constructed from lightweight "bullet-proof" para-aramid armoring, ten times as strong as steel, and designed to contain the unpredictable forces of failure.

Technically qualified by Lloyd's Register, the Survitec Gauntlet provides immediate containment protection, enhancing safety measures and minimizing potential hazards. It is of minimal weight, placing no additional stress on the actuator, and protects the workings of the actuator from further corrosion and component degradation.

The concept of the safety device was developed due to issues identified in the North Sea oil and gas sector, oil rigs, platforms, and floating installations, such as FPSOs and FSRUs. The Survitec Gauntlet can be applied to any facility that operates actuator valves and where risks need to be mitigated.

BY THE NUMBERS

RIGS

Worldwide

Rig Type	Available	Contracted	Total	Utilization
Drillship	7	70	77	91%
Jackup	179	293	472	62%
Semisub	30	42	72	58%

Africa

Rig Type	Available	Contracted	Total	Utilization
Drillship		15	15	100%
Jackup	14	14	28	50%
Semisub		2	2	100%

Asia

Rig Type	Available	Contracted	Total	Utilization
Drillship	3	5	8	63%
Jackup	81	76	157	48%
Semisub	18	4	22	18%

Europe

Rig Type	Available	Contracted	Total	Utilization
Drillship	2	1	3	33%
Jackup	10	30	40	75%
Semisub	7	17	24	71%

Latin America & the Caribbean

Rig Type	Available	Contracted	Total	Utilization
Drillship		26	26	100%
Jackup	3	5	8	63%
Semisub	3	8	11	73%

Middle East

Rig Type	Available	Contracted	Total	Utilization
Jackup	37	136	173	79%
Drillship				

North America

Rig Type	Available	Contracted	Total	Utilization
Drillship	2	22	24	92%
Jackup	25	26	51	51%
Semisub	1	3	4	75%

Oceania

Rig Type	Available	Contracted	Total	Utilization
Drillship				
Jackup		1	1	100%
Semisub		6	6	100%

Russia & Caspian

Rig Type	Available	Contracted	Total	Utilization
Jackup	8	2	10	20%
Semisub	1	2	3	67%

Global Average Dayrates

Floaters		*Jackups*	
Ultradeep water	470.0	High-spec	167.5
Deepwater	361.5	Premium	139.6
Midwater	403.9	Standard	98.1

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

Data as of June 2024
Source: Wood Mackenzie Offshore Rig Tracker

DISCOVERIES & RESERVES

Offshore New Discoveries

Water Depth	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*
Deepwater	20	13	14	22	15	9
Shallow water	88	48	59	38	60	11
Ultra-deepwater	18	12	7	22	12	3
Grand Total	**126**	**73**	**80**	**82**	**87**	**23**

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

Offshore Undeveloped Recoverable Reserves

Water Depth	*Number of fields*	*Recoverable reserves gas mboe*	*Recoverable reserves liquids mbl*
Deepwater	593	50,827	23,217
Shallow water	3,269	460,474	154,206
Ultra-deepwater	349	43,861	26,889
Grand Total	**4,211**	**555,161**	**204,311**

Contingent, good technical, probable development.

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

Offshore Onstream & Under Development Remaining Reserves

Region	*Number of fields*	*Remaining reserves gas mboe*	*Remaining reserves liquids mbl*
Africa	578	19,145	11,641
Asia	841	16,630	7,453
Europe	762	12,359	11,576
Latin America and the Caribbean	193	6,992	40,777
Middle East	138	89,351	150,671
North America	468	2,565	12,885
Oceania	85	10,829	1,092
Russia and the Caspian	59	16,960	12,647
Grand Total	**3,124**	**174,832**	**248,743**

Onstream and under development.

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

Source: Wood Mackenzie Lens Direct

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