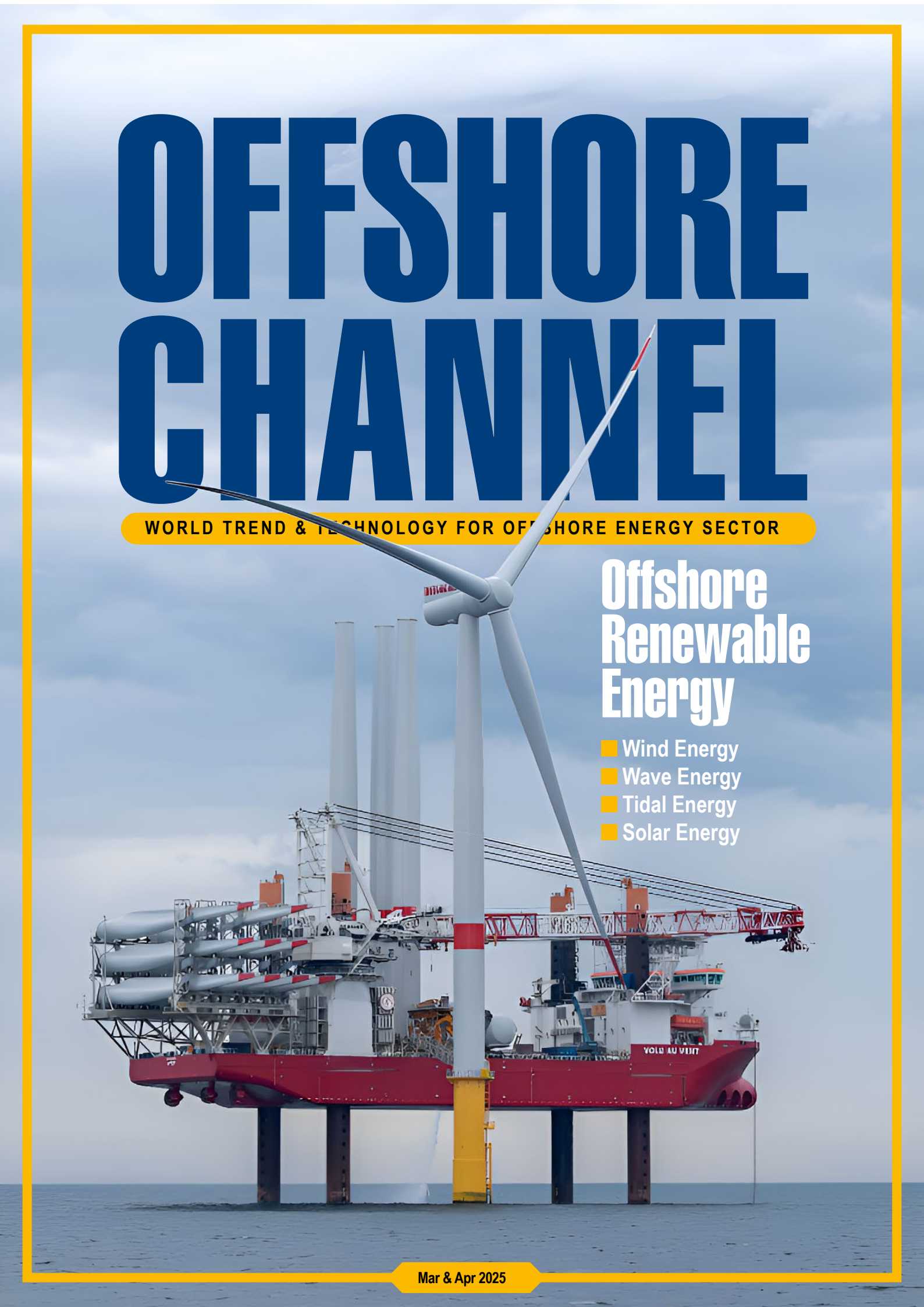
OFFSHORE CHANNEL

WORLD TREND & TECHNOLOGY FOR OFFSHORE ENERGY SECTOR



Offshore Renewable Energy

- Wind Energy
- Wave Energy
- Tidal Energy
- Solar Energy

Mar & Apr 2025

Farshid Ebrahimi
Responsible Director

Offshore renewable energy consists of many different sources that are abundant, natural and clean, like Wind, Wave , Tidal and Solar. Unlike traditional fossil fuels, this energy will never run out. Renewable energy is essential for reducing the potentially devastating effects of climate change, and protecting the natural environment for future generations. Offshore renewable energy includes offshore wind, wave, tide and solar, where the strength of the wind, the pull and rise and fall of the tides, and the movement of waves, produces a vast amount of power that can be harnessed by modern technology.

The energy of the oceans can be harnessed by modern technologies without emitting any greenhouse gases, making offshore renewable energy a potential cornerstone of the clean energy transition all around the world.

Offshore Channel Magazine reports on innovative engineering projects around the world, profiling the key players making a difference to the engineering profession. It's our flagship publication and our main channel for keeping our members up to date on what's happening at the offshore industry.

Offshore Channel Magazine is the flagship publication of the international Society of Professional Engineers. Published six times per year, Offshore Channel Magazine covers news and commentary on professional issues: licensing, engineering ethics, employment, legislative and regulatory issues, education, and many others that have a direct impact on professional engineers.

INSTALLATION OF FIRST TURBINE COMPLETED AT 496 MW OFFSHORE WIND FARM IN FRANCE

A major offshore wind development off the French Atlantic coast has reached a key construction milestone with the installation of its first wind turbine. The project, located off the coast of Saint-Brieuc in the Brittany region, is set to deliver a total installed capacity of 496 megawatts once fully operational.

This installation marks the beginning of the turbine deployment phase, which will see dozens of units erected in the coming months. The turbines are being installed on jacket foundations in water depths of around 30 meters, utilizing specialized offshore construction vessels.

Upon completion, the wind farm is expected to supply renewable electricity to approximately 835,000 people annually, supporting France's broader goals for clean energy expansion and energy independence. The project also contributes to the growing expertise in offshore wind engineering and logistics within the region.

As one of France's earliest large-scale offshore wind initiatives, this development is viewed as a cornerstone in the country's transition toward a low-carbon energy future.

PIONEERING SPIRIT RETURNS TO SERVICE FOR BORWIN5 OFFSHORE PROJECT AFTER ROTTERDAM GROUNDING INCIDENT

The world's largest heavy-lift vessel, Pioneering Spirit, has resumed operations following successful repairs, enabling it to undertake a critical role in Germany's BorWin5 offshore grid connection project. The vessel had experienced an unexpected grounding in the Port of Rotterdam on April 22, 2025, raising concerns over potential delays in the transportation of key infrastructure components for the project.

According to a spokesperson from Allseas, the vessel underwent prompt inspection and repair procedures, which were completed ahead of schedule. This timely recovery allowed Pioneering Spirit to depart Rotterdam on May 3 with the BorWin epsilon converter platform onboard. The platform, developed by Dragados Offshore and weighing over 12,000 metric tonnes, was subsequently transported to its installation site in the German North Sea.

The BorWin5 project, led by transmission system operator TenneT, is designed to connect the 900 MW He Dreiht offshore wind farm to the German mainland via high-voltage direct current (HVDC) transmission technology provided by Siemens Energy. The BorWin epsilon platform, once installed and commissioned, will play a pivotal role in enabling efficient power transmission over long distances from sea to shore.

To ensure environmental compliance and protect marine ecosystems during installation, advanced noise mitigation measures—such as the deployment of a Double Big Bubble Curtain (DBBC)—were implemented. These systems help reduce underwater sound emissions during foundation placement and heavy-lift operations.

The incident in Rotterdam had initially raised concerns over project timelines. However, Allseas' swift response and the vessel's rapid return to operational readiness have kept the BorWin5 schedule on track, reaffirming the importance of logistical resilience in the offshore wind sector.

With its massive twin lifting beams and dynamic positioning capabilities, Pioneering Spirit remains a key asset for large-scale offshore energy infrastructure, particularly in the evolving landscape of grid-scale renewable energy projects.

As Germany accelerates its transition to a low-carbon energy system, projects like BorWin5 are instrumental in scaling offshore wind capacity and ensuring the reliable integration of renewable energy into national power networks.

THE TOPSIDE OF TENNET NETHERLANDS HOLLANDSE KUST (WEST BETA) PLATFORM WILL DEPART FROM THE PORT OF HOBOKEN (ANTWERP) TOWARDS THE NORTH SEA.

The steel structure weighing over 3,500 tonnes will sail on a floating pontoon via the Western Scheldt past Municipality of Vlissingen into the North Sea.

Installation vessel Sleipnir from Heerema Marine Contractors will place the superstructure of the transformer platform on the chassis, which is already 50 km off the coast of Egmond aan Zee. This brings the completion of the third and final 700 megawatt platform off the North Holland coast into view.

With the connection of the plots 'Alpha' and 'Beta' in the Hollandse Kust (west) wind energy area, the installed capacity on the Dutch North Sea will grow from 4.7 to 6.1 gigawatts in the coming years. At the same time, we are continuing to build with our new 2GW connections via Maasvlakte 2 and Borssele to realize the ambition of the government - 21 gigawatts at sea in 2032.

FIRST OFFSHORE SUBSTATION INSTALLED AT COASTAL VIRGINIA OFFSHORE WIND

Great strides at Coastal Virginia Offshore Wind! The first of three offshore substations has been successfully installed at the 2.6 GW CVOW project. This 3,907 metric tonne lift marks the completion of the installation of the first topside onto the jacket, which was previously installed by DEME, marking another record lift for our offshore installation vessel Orion!

This milestone is the result of the fantastic teamwork and cooperation between all Deme Group, partners, subcontractors, local stakeholders and our client, Dominion Energy. Together with American suppliers and unions, we continue to push boundaries in offshore wind.

Orion now resumes the installation of the transition pieces before moving forward with the second campaign of monopile installation, driving this large-scale offshore wind project ahead.

HEEREMA'S CRANE VESSEL SLEIPNIR SUCCESSFULLY INSTALLS HOLLANDSE KUST WEST BETA TOPSIDE

Heerema's crane vessel Sleipnir has successfully installed the topside for TenneT's offshore transformer platform Hollandse Kust (west Beta) on the jacket foundation during the night and morning of 21 May.

With the placement of the topside some 50 kilometres off the coast of Egmond aan Zee in the Netherlands, a new milestone has been reached for the connection of wind at sea. From this autumn, this seventh and final 700 MW 'socket' of TSO TenneT will be ready for commissioning.

STOP WORK ORDER LIFTED, EMPIRE WIND PROJECT RESUMES CONSTRUCTION

Empire Offshore Wind LLC (Empire), a subsidiary of Equinor ASA, has been informed by the Department of the Interior's Bureau of Ocean Energy Management (BOEM) that the stop work order has been lifted for the Empire Wind project, allowing construction activities to resume.

"We appreciate the fact that construction can now resume on Empire Wind, a project which underscores our commitment to deliver energy while supporting local economies and creating jobs," says Anders Opedal, President and CEO of Equinor ASA.

"I would like to thank President Trump for finding a solution that saves thousands of American jobs and provides for continued investments in energy infrastructure in the U.S. I am grateful to Governor Hochul for her constructive collaboration with the Trump Administration, without which we would not have been able to advance this project and secure energy for 500 000 homes in New York. We are very appreciative of New York City Mayor Adams, congressional leaders including Senator Schumer, Senator Gillibrand, Representative Garbarino, and Representative Goldman, as well as labour groups and other advocates that have maintained their steadfast support for the project," says Anders Opedal, President and CEO of Equinor ASA.

"I would like to thank the Norwegian Prime Minister Støre and Minister of Finance Stoltenberg for their support at a critical time, and that the Minister of Finance raised the situation with the U.S.administration," says Anders Opedal, President and CEO of Equinor ASA.

The stop work order was issued on 16 April 2025. Following dialogue with regulators and federal, state, and city officials, the stop work order has been lifted and construction activities will resume.

REVOLUTIONIZING BOLTING TECHNOLOGY:
MEET THE XA1POWER BATTERY HYDRAULIC PUMP BY PLARAD

For over 60 years, Maschinenfabrik Wagner, known under the brand PLARAD, has been at the forefront of bolting technology innovation. Specializing in a broad range of torque and tension systems—including electrical, pneumatic, hydraulic, manually, and battery-powered torque tools and pumps—PLARAD also offers comprehensive service and maintenance solutions for all common bolting systems.

Now, PLARAD is setting a new standard in the industry with the introduction of the XA1power Battery Hydraulic Pump. This groundbreaking tool is designed to transform the way you approach bolting operations, offering unmatched flexibility and ease of use.

Why the XA1power Stands Out:

170 bolting applications per charge: Reliable performance you can count on.

Lightweight and compact: Weighing only 10 kg, the XA1 is easy to transport and reduces physical strain.

Wireless remote control: Enjoy full operational freedom with remote access.

Engineered for excellence: CE-approved and designed by industry experts, ensuring top-tier performance.

Fully automatic operation: Simplifies tasks and boosts productivity.

Test over 1000 bolts on a single charge: Maximize efficiency with an impressive battery life.

Perfectly engineered to operate hydraulic wrenches up to 800 bar and deliver torque up to 150,000 Nm, the XA1 offers unparalleled versatility. Its compact design eliminates the tripping hazards associated with traditional power cables and heavy equipment, making it an ideal choice for both fieldwork and industrial environments.

With the XA1, PLARAD introduces a new era of bolting technology. Whether you're working in construction, wind energy, or oil and gas, this innovative tool delivers the power and precision you need—anywhere, anytime.

Contact us for more information:

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NORTHLAND POWER

Northland Power is a Canadian based global power producer dedicated to accelerating the global energy transition. Founded in 1987, with almost four decades of experience, Northland has a long history of developing, owning and operating a diversified mix of energy infrastructure assets including offshore and onshore wind, solar, natural gas and battery energy storage. Northland also supplies energy through a regulated utility.

FIRST FLOATING WIND TURBINE FOUNDATION DEPLOYED FOR FRENCH PILOT PROJECT

The first floating foundation for a pioneering offshore wind pilot project off the coast of southern France has officially been launched. The project, known as EolMed, will feature three floating wind turbines with a combined capacity of 30 megawatts (MW).

The floating substructure was launched from the port of Fos-sur-Mer, marking a significant milestone for France's floating wind ambitions. Once fully assembled and equipped with its wind turbine, the unit will be towed and anchored approximately 18 kilometers off the coast near Gruissan, in the Mediterranean Sea.

This demonstration project aims to validate the viability of floating wind technology in deeper waters where fixed-bottom turbines are not feasible. In addition to contributing to France's renewable energy targets, the EolMed project is expected to provide valuable insights into the logistics, installation, and long-term performance of floating wind systems.

The development is part of a broader national strategy to scale up floating wind capacity, positioning France as one of the key players in Europe's emerging floating wind sector.

AIKIDO TECHNOLOGIES IS SET TO DEPLOY ITS INNOVATIVE 15MW FLOATING WIND PLATFORM, AO60, IN NORWAY BY 2027

This project will be one of the largest floating wind platforms constructed and deployed to date. The AO60 platform comprises thirteen modular steel components, including columns and trusses, that can be fabricated at existing offshore wind or steel fabrication sites. These components will be transported to a final assembly site near the test center, where the platform can be completed in a matter of days, not months, like traditional construction techniques.

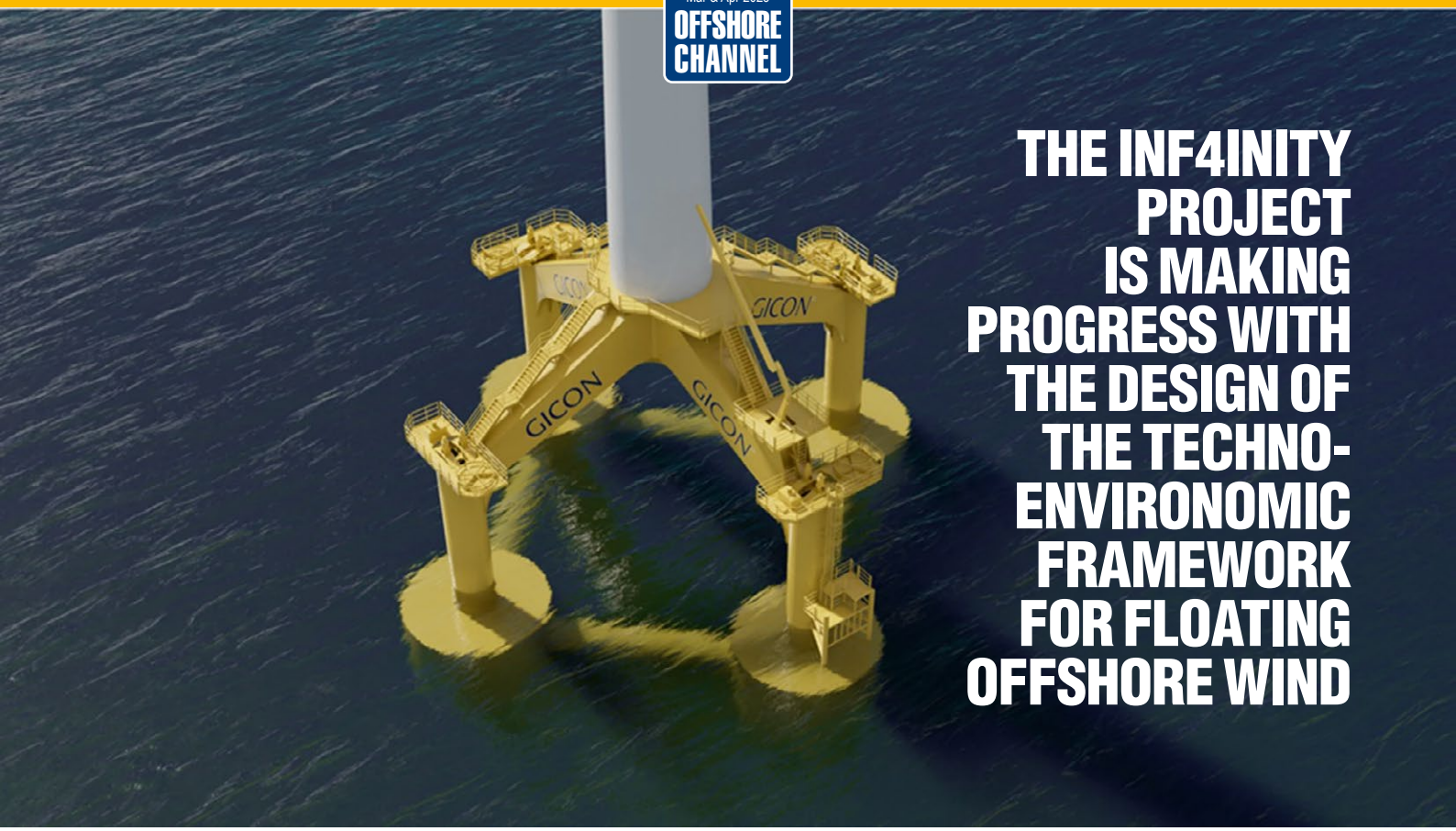
The platform uses pin joints to complete the assembly without any major welding or painting work, allowing it to be folded during assembly and unfolded during a simple ballasting procedure. This approach enables the use of existing maritime infrastructure, ports, and vessels in Norway, potentially reducing costs and accelerating deployment.

CONSTRUCTION PHASE OF POROTYPE FOR THE TRIWIND FLOATER!

Archime3 is a €2.4M project awarded to Beridi by the European Commission under the H2020 Program. Its main objective is to demonstrate that Beridi´s patented technology can drastically reduce costs and construction time of floating wind platforms for installation of large wind turbines, thus reducing the Levelized Cost Of Energy (LCOE).

The aim of the ARCHIME3 prototype phase is to highlight the potential of floating offshore wind as a reliable and cost-effective source of renewable energy, as well as the readiness of the TRIWIND design for mass production on a commercial scale.

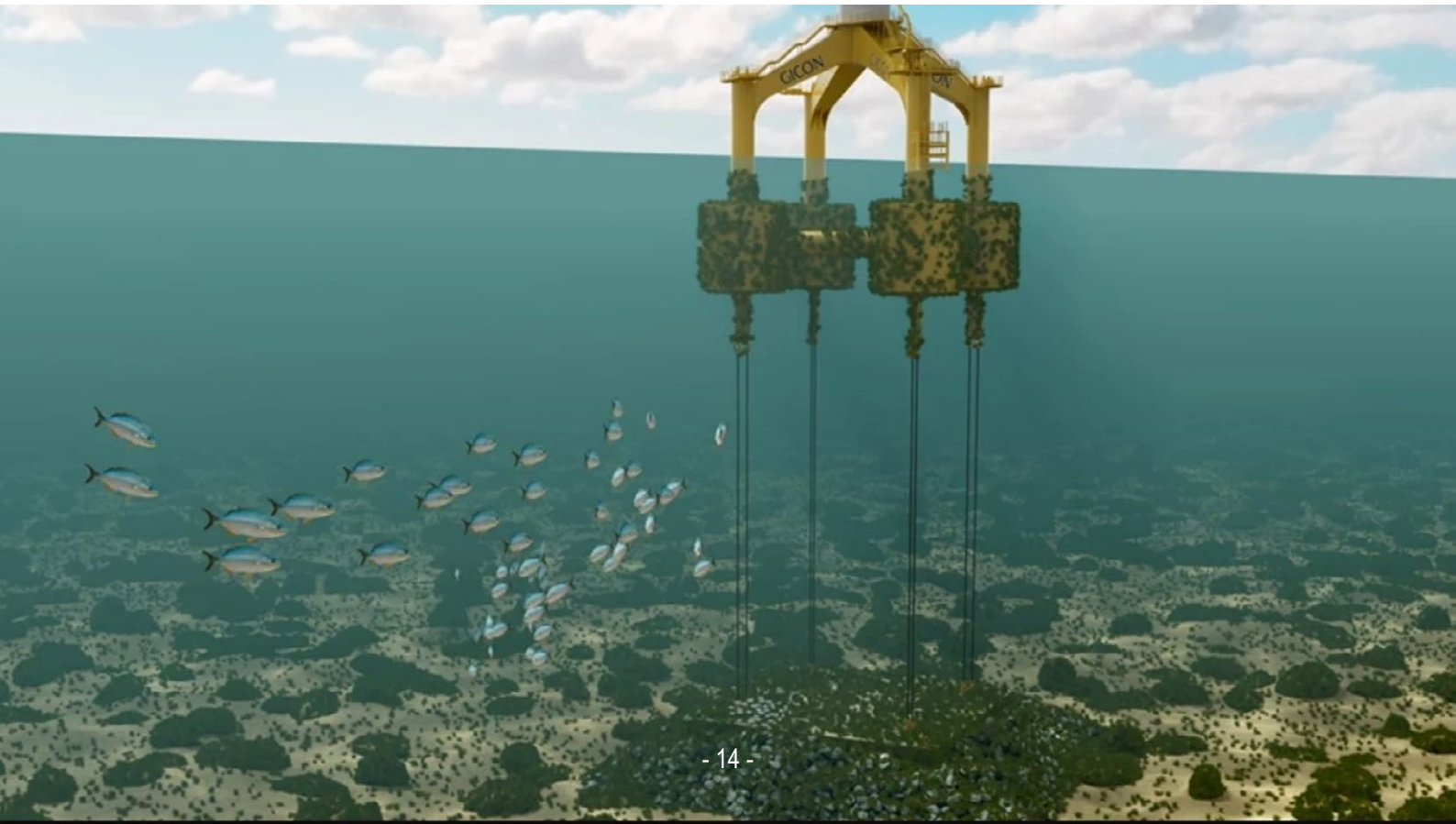
At the project site, work will now continue to complete the upper slab before concrete and watertightness testing and trials takes place.



THE INF4INITY PROJECT IS MAKING PROGRESS WITH THE DESIGN OF THE TECHNO-ENVIRONOMIC FRAMEWORK FOR FLOATING OFFSHORE WIND

The work has been divided into two main research lines: socio-environmental and technical. The most relevant Key Performance Indicators (KPIs) have been classified to generate a first-of-its-kind catalogue of the key aspects to be considered in any future techno-environomic study. Besides the KPIs, the catalogue includes the main characteristics and alternatives, potential socio-environmental, and design parameters affected by the KPI.

The model will optimise the components, turbines and/or farms based on an enhanced-LCOE, ensuring that the maximum benefit is extracted from the resource via minimising negative impacts and maximising positive outcomes.



GAZELLE WIND POWER SECURES TUPEM AUTHORIZATION TO LAUNCH ITS 2 MW FLOATING WIND DEMONSTRATOR OFF THE COAST OF AGUÇADOURA, PORTUGAL

VIANA DO CASTELO, Portugal and DUBLIN – April 10, 2025 – Gazelle Wind Power has achieved a significant project milestone with the approval of a 10-year TUPEM (Titulo de Utilizacao Privativa do Espaco Marítimo) authorization, clearing the way for the deployment of its 2 MW Nau Azul floating wind demonstrator project off the coast of Aguçadoura, Portugal. This project showcases the company's next-generation floating offshore wind technology, which is aimed at unlocking deep-water wind resources to strengthen Europe's energy security through scalable renewable power.

Issued by Portugal's Directorate-General for Natural Resources, Safety and Maritime Services (DGRM), the TUPEM authorization grants Gazelle Wind Power Portugal, S.A., exclusive rights to occupy and utilize a designated area of national maritime space for the installation, operation and testing of its innovative floating platform technology. The project is a critical step toward demonstrating that Gazelle's patented, lightweight, and modular design can unlock deep-water wind energy while also lowering the levelized cost of energy.

The Nau Azul project will feature Gazelle's patented platform, which uses a unique geometry and counterweight system that reduces steel use, significantly cutting CAPEX and simplifying industrialization. Its compact design enables deployment from shallow ports, offering a smaller footprint and lower overall costs. The project site, located in Aguçadoura, is a landmark for offshore energy innovation, having previously hosted WindFloat 1, one of Europe's earliest floating wind pilot projects.

"This TUPEM authorization marks a major milestone for our business and underscores Portugal's leadership in offshore wind and its commitment to a secure, sustainable energy future," commented Gazelle Wind Power CEO, Jon Salazar. "Securing the TUPEM authorization allows us to launch environmental monitoring and prepare for the installation of our full-scale, grid-connected demonstrator, which will serve as a blueprint for commercial deployments worldwide. It's a major step forward in our roadmap to commercialization."

In addition to generating a range of economic benefits for the region, including the creation of new jobs across the local supply chain, Gazelle is also working with local educational organizations such as IPVC, INESCTEC, and INESCTEC. OCEAN to reimagine floating offshore wind by advancing the underlying science. From manufacturing and assembly to marine operations and ongoing maintenance, the Nau Azul project will support skilled employment opportunities and help stimulate sustainable economic growth in the Viana do Castelo area.

About Gazelle Wind Power

Gazelle Wind Power Limited is accelerating the commercialization of the floating offshore wind market with its next-generation platform. Gazelle's solution is poised to become the benchmark for the industry with a design that is targeted to lower costs, enable local content, utilize pre-existing port infrastructure, and incorporate shipbuilding construction with modular assembly. The floating platform offers high stability and easy transport, installation, and maintenance while preserving fragile marine environments. The company is based in Dublin and Viana do Castelo, Portugal, and has a presence in Vigo, Spain, and London.

For more information, visit www.gazellewindpower.com.

INNOVATIVE FLOATING WIND PLATFORM ADVANCES TO TESTING AND DEMONSTRATION PHASE

In a significant development for offshore renewable energy, a new floating wind platform designed for deepwater deployment has entered the next stage of its journey toward commercial use. The design, a collaboration between ECO TLP and Mocean Offshore, has received Front-End Engineering Design (FEED) approval from the American Bureau of Shipping (ABS), marking a key milestone in its path to real-world application.

According to ECO TLP's CEO, Nicole Johnson Murphy, the non-site-specific FEED approval allows the platform to accommodate a broad range of water depths and turbine sizes. "This achievement significantly streamlines the certification process for future commercial projects," she stated. "It also reinforces our ability to safely operate at sea while meeting financial and insurance requirements."

This floating wind foundation design had previously secured an Approval in Principle (AiP) from ABS in 2023. Following that endorsement, the project moved into the FEED phase, which now paves the way for the platform's adaptation to specific sites and eventual demonstration at sea.

With this latest milestone, ECO TLP and Mocean Offshore are positioning themselves at the forefront of floating wind technology—an area expected to play a crucial role in the future of clean, scalable offshore power generation.

AKER SOLUTIONS UNVEILS THREE INNOVATIVE FLOATING WIND FOUNDATION DESIGNS

Aker Solutions has introduced three floating wind foundation designs – the YFloat, CONFloat-Omega, and CONFloat-7C – that draw on fifty years of offshore experience to maximize energy production, simplify construction and reduce maintenance. All three have passive ballast systems and the capability of supporting turbines that are 15 MW and larger.

"These three foundations build on our strong heritage in concrete and steel floaters developed through Aker Solutions, and reflect our continued evolution in the offshore wind industry. We are drawing on our experience and expertise to reduce costs and develop efficient products and value chains for future offshore wind projects", said Henrik Inadomi, Executive Vice President for New Energies in Aker Solutions.

About the three foundations:

The YFloat™ is an advanced steel floating substructure meticulously designed to provide a stable and efficient platform for wind turbines. Its symmetrical design facilitates efficient pre-fabrication with the option of local assembly, reducing material usage and simplifying the manufacturing process. The YFloat offers scalability that facilitates higher power generation and reduced levelized cost of energy (LCOE).

The CONFloat™-Omega is a circular concrete floater concept featuring a moonpool at its center and an offset turbine and tower, specifically designed for harsh environmental conditions. The concrete material and robust construction ensure high resistance to fatigue and minimal maintenance requirements.

The CONFloat™-7C draws on the legendary CONDEEP™ designs, with a 7-cell configuration featuring a centralized turbine and tower. This design reduces integration and completion draught, thereby enabling a wider range of execution locations and ports.

Aker Solutions boasts an impressive portfolio of successful offshore projects, with expertise spanning jackets, gravity-based structures, mooring solutions, topsides, and floating foundations in both steel and concrete. The company's data-driven approach and digital solutions ensure cost-effective and efficient project execution from engineering to installation.

SAL HEAVY LIFT TRANSPORTS XXL MONOPILES FOR EAST ANGLIA THREE OFFSHORE WIND PROJECT

A MILESTONE IN OFFSHORE WIND LOGISTICS

SAL Heavy Lift is making waves in the offshore wind sector with its key role in the East Anglia THREE project. As one of the largest offshore wind logistics operations to date, the project involves the transportation of 95 XXL monopiles, each weighing nearly 2,000 metric tons, from Spain to the Netherlands.

With a focus on efficiency and sustainability, SAL is using its MV Zhong Ren 121 and 122 vessels to move these massive structures from Fene and Bilbao to Flushing (Vlissingen). The logistical operation not only underscores SAL's heavy-lift capabilities but also sets new industry benchmarks in offshore wind transport.

LASHLESS SEAFASTENING: A GAME-CHANGER FOR EFFICIENCY

A standout feature of this operation is the implementation of the Lashless Seafastening system, designed to significantly reduce loading and unloading times. Unlike conventional methods that rely on disposable materials, this system eliminates waste while ensuring secure transport. Custom grillage and seafastening designs provide added stability, preventing damage to the monopiles during transit.

By adhering to DNVGL standards, SAL ensures the highest level of safety and compliance in its transport operations. The meticulous planning behind this initiative reflects the growing push within the industry to streamline project logistics without compromising quality or security.

DRIVING THE GLOBAL ENERGY TRANSITION

Beyond the logistics, the impact of SAL's involvement in the East Anglia THREE project extends to the broader renewable energy landscape. Offshore wind projects like this are pivotal in advancing the global shift toward cleaner energy sources. By optimizing transportation efficiency and minimizing its environmental footprint, SAL plays a crucial role in supporting the expansion of offshore wind capacity.

With offshore wind developments gaining momentum worldwide, specialized heavy-lift solutions are becoming more critical than ever. SAL's expertise in handling complex cargo ensures that projects of this scale can progress smoothly, reinforcing the company's position in the evolving renewable energy supply chain.

As the East Anglia THREE project moves forward, the industry will be watching closely, taking note of how optimized logistics can drive progress in offshore wind development.

SCOTTISHPOWER'S RECORD BREAKING EAST ANGLIA THREE FOUNDATION

ScottishPower Renewable's East Anglia THREE wind farm is already breaking records with foundations that weigh as much as 250 African elephants

A new offshore wind industry record has been set by East Anglia THREE, ScottishPower Renewables' wind farm off the East coast of England.

The company has successfully installed the first pair of monopile foundations, becoming the largest installed to date from a jack-up vessel in Europe with 93 more on the way over the next year.

Each of these will as the base for a 14.7 MW Siemens Gamesa turbine — the most powerful within ScottishPower and Iberdrola's portfolios.

Once operational, this US$5.3bn venture is set to supply power to more than 1.3 million homes.

RWE INSTALLS FIRST FOUNDATION AT THOR OFFSHORE WIND FARM

RWE has taken an important step in the construction of the 1.1 gigawatt (GW) Thor offshore wind farm in the Danish North Sea: the first of 72 monopile foundations has been successfully installed.

The monopiles were shipped from the heavy-lift terminal in Eemshaven, the Netherlands to the Thor construction site in the Danish North Sea, located approximately 22 kilometres off the west coast of Jutland, and installed by the vessel “Les Alizés”. Five monopiles can be loaded in one shipment. The monopiles are around 100 metres in length and weigh up to 1,500 metric tons each. This is roughly equivalent to the weight of 1,000 small cars.

Sven Utermöhlen, CEO of RWE Offshore Wind: “With Thor we are constructing Denmark’s largest offshore wind farm to date. The installation of the first monopile is a highly symbolic moment and a great achievement for the entire RWE team after years of planning and preparation. My thanks go to all colleagues and partners involved for their contribution. Building a project of this size and scale is a great opportunity to demonstrate our expertise in delivering valuable offshore wind farms around the globe.”

Secondary steel structures for the foundations are being handled from the Danish Port of Thyborøn, which is the offshore construction base for Thor and home port for the project’s service vessels. The control centre for managing marine logistics and traffic throughout the offshore construction phase is also based in Thyborøn.

CLARKSONS REPORT FAN ZHOU 8 BOUND FOR EEMSHAVEN WITH 10 MONOPILES FOR RWE OFFSHORE WIND FARM

Clarksons Port Services report that the heavy lift vessel Fan Zhou 8 has sailed from Penglai, China, bound for Eemshaven, the Netherlands.

The vessel, loaded with 10 monopiles for the RWE project Nordseecluster 1 and 2 departed Penglai on 15 April and is due to arrive in Eemshaven on 25 May

Clarkesons are proud to have served their client, RWE, and the vessel with port agency services.

The Fan Zhou was built in the Taizhou Zhonghang Shipyard for Jiangsu Fanzhou Shipping.

Her dimensions are:

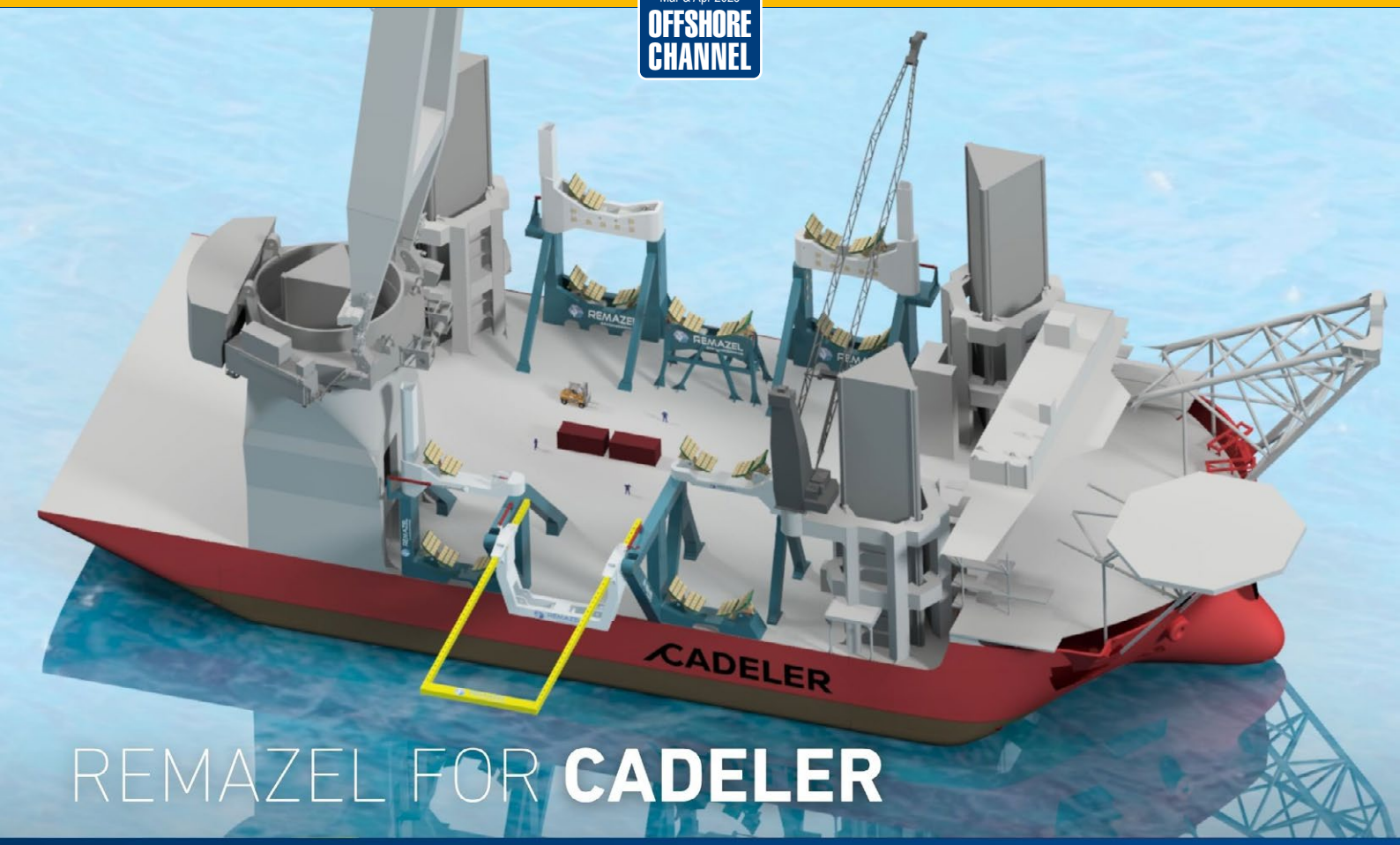
- 256m long
- 51m beam
- 13m draft
- 58,405.4t maximum capacity

COSCO Shipping & Guangzhou Offshore Heavy Transport Co., Ltd. (CSGS) proudly announce the successful completion of all 36 monopile transports for the THOR Offshore Wind Farm, Denmark's largest offshore wind project developed by RWE.

The semi-submersible vessels "Xiang Rui Kou" and "Hua Yang Long" executed four critical voyages, transporting monopiles (each weighing 1,400 tons) from Penglai, China, to Eemshaven, Netherlands, via the Suez Canal.

"Hua Yang Long" spearheaded the 1st and 3rd voyages with precision, while "Xiang Rui Kou" completed the 2nd and 4th ones, showcasing seamless collaboration across complex logistics.

Both vessels demonstrated unparalleled expertise in heavy-lift operations, including custom mooring modifications, SPMT roll-on/roll-off efficiency, and adherence to stringent delivery windows..



NEW ORDER ACQUIRED

REMAZEL ENGINEERING

Remazel Engineering has secured a major contract with Cadeler for the design and construction of an MP Upending Hinge and Seafastening Cradles system for their Wind Ace Vessel. This new vessel will play an important role in the installation of offshore wind turbine foundations.

Remazel's system will be designed to handle monopile foundations with a bottom diameter ranging from 9 to 12 meters, a length of up to 120 meters, and a total weight of 2,900 tonnes. A true engineering challenge that we are thrilled to take on!

The Wind Ace vessel, part of Cadeler's state-of-the-art A-class fleet, is set to redefine industry standards for offshore wind installation. With a deck space of 5,600 m² and an unparalleled payload capacity exceeding 17,600 tons, the vessel will be positioned to install the latest generation of monopiles efficiently and safely.

Remazel's engineering expertise and commitment to innovation will ensure that the MP Upending Hinge and Seafastening Cradles meet the highest performance and safety standards. This collaboration marks another milestone in Remazel's mission to support the offshore wind industry with cutting-edge solutions that enhance operational efficiency and sustainability.

About Remazel

Remazel is a leading provider of engineering and manufacturing solutions for the offshore and renewable energy industries. With decades of experience, the company specializes in the design and production of advanced handling and lifting systems that meet the most demanding industry requirements.

A CUTTING-EDGE OFFSHORE VESSEL CAPABLE OF INSTALLING 5,000 METRIC TON MONOPILES TO SUPPORT FUTURE 20-30 MW WIND TURBINES.

The Vitruvian is a state-of-the-art offshore vessel designed and developed by OFFSHORETRONIC a Barcelona-based leader in innovative maritime solutions.

This advanced vessel, engineered with the assistance of TSC Offshore Group Corporation, a subsidiary of the Hong Kong-based CMIC Ocean En-Tech Holding, is tailored to meet the rigorous demands of modern offshore operations. Combining efficiency, sustainability, and cutting-edge technology, the Vitruvian represents a leap forward in offshore wind installation capabilities.

Key Features of the Vitruvian:

The Vitruvian is specifically designed to handle monopiles far larger than those manageable by many existing wind farm installation vessels. It safely performs the transportation and installation (T&I) of XXXL monopiles exceeding 3,000 metric tons, addressing the industry's need for future-proof solutions.

While new and larger crane vessels are required for offshore installation, vessel contractors and owners face the challenge of ensuring these costly assets remain viable and profitable.

The Vitruvian's design is engineered to handle monopiles up to 5,000 metric tons, ensuring long-term relevance and cost-efficiency.

Key Driver for Vessel Development:

The offshore wind industry is actively seeking significant cost reductions in installation processes, particularly for turbines, while simultaneously pushing for larger wind turbines to achieve the necessary economies of scale.

The next generation of wind turbines, with capacities ranging from 20 to 30 MW, is expected to enter the market by the end of this decade. These larger turbines are projected to reduce the Levelized Cost of Energy (LCOE) by 20-30%, making them a critical component of the industry's cost-reduction strategy.

The Vitruvian is poised to play a pivotal role in this transition, offering a cost-effective, efficient, and future-proof solution for the installation of next-generation monopiles and turbines. By addressing the challenges of handling heavier and larger components, the Vitruvian ensures the offshore wind industry can meet its ambitious goals for growth and sustainability.

CADELER

CADELER TAKES DELIVERY OF ITS LATEST NEXT-GENERATION WIND INSTALLATION VESSEL, WIND PACE

Cadeler announces the successful delivery of its latest jack-up wind turbine installation vessel, Wind Pace, marking another significant milestone in the company's ongoing fleet expansion.

Delivered safely, on time, and within budget, Wind Pace becomes the seventh vessel in Cadeler's growing portfolio of wind turbine installation vessels, further strengthening the company's capacity to meet the increasing global demand for large-scale renewable energy solutions.

Wind Pace was officially named at a naming ceremony on the 12 March at the COSCO Shipping Heavy Industry (COSCO) shipyard in Qidong, China, where she was built.

After her delivery, Wind Pace will be deployed in the U.S. under a contract from Q2 2025 to Q1 2026, supporting a project at an offshore wind farm in the region, Cadeler's second project in American waters.

Her sister vessel, Wind Peak, the first of Cadeler's two newbuild P-class vessels, was delivered in August 2024, and has just embarked on her first installation project, the Sofia Offshore Wind Farm, off the Yorkshire coast of the United Kingdom - one of the largest single offshore wind farms in the world.

A vessel engineered for tomorrow

Wind Pace is specifically designed to handle the increasing size, scope, and complexity of next-generation wind farm projects as well as the most challenging offshore conditions.

The P-class vessels are capable of transporting and installing up to seven complete 15 MW turbine sets per load or five 20+ MW turbines, reducing the number of roundtrips required and significantly accelerating installation time while improving energy and cost efficiency. An advanced hybrid power system and cyber-secure operational infrastructure ensure high efficiency and enhanced safety.

"The P-class vessels set a new benchmark in offshore wind installation technology. With advanced crane capabilities, enhanced transit effectiveness, and reduced energy intensity, these vessels unlock new levels of efficiency for our customers. Wind Peak, the first P-class vessel, has already fully demonstrated this since her delivery last year. Likewise, we expect Wind Pace to play a key role in supporting our clients in the necessary expansion of offshore wind," says Mikkel Gleerup, CEO of Cadeler.

Being the largest vessels in the Cadeler fleet today, both Wind Peak and Wind Pace boast a deck space of 5,600 m², a payload capacity of over 17,600 tonnes, and a main crane capable of lifting 2,600 tonnes at 47 meters. Additionally, each vessel can accommodate up to 130 crew members and installation technicians.

"Cadeler has always looked for new ways to provide better solutions for our customers whilst remaining conscious of the increasing need for sustainability in our industry. The P-class vessels exemplify this commitment with a design prepared for future dual-fuel green-methanol operations and an electrical system that captures and stores excess energy for re-use," Gleerup noted.

The P-class vessels are the result of close cooperation between Cadeler and its key partners on these newbuildings, including COSCO, GustoMSC, NOV, Kongsberg, Huisman, and MAN Energy.

PD PORTS ANNOUNCES AMBITIOUS TEESPORT OFFSHORE GATEWAY DEVELOPMENT PROPOSALS

PD Ports is proud to share its ambition to develop one of the UK's largest offshore wind manufacturing and installation hubs – the Teesport Offshore Gateway.

Unlocking 180 acres of development potential for a range of offshore manufacturers, assembly, marshalling and supply chain support services, the proposed site will confirm Teesside's place at the heart of the UK push for Net Zero and energy independence.

Representing a multi-million pound investment in the River Tees, the Teesport Offshore Gateway will include an up to 1km long deep-water riverside quay, permitting unrestricted access to the North Sea and suitable for both floating and fixed bottom offshore wind development.

Set within the heart of PD Ports' Teesport industrial port complex, the UK's sixth largest port, the site offers a strategically located position for development, supported by quality infrastructure, strong road and rail links and a skilled workforce.

While the plans are at an early stage and subject to a variation of existing deep water berth development consents, it is anticipated that development of Teesport Offshore Gateway could cost in the region of £200million and would secure critical port facilities in support of the Government's offshore wind development ambitions.

ELIRE INFRA INVITED TO PARTICIPATE IN A FLOATING PORT STUDY COMMISSIONED BY SCOTTISH ENTERPRISE.

The study aimed to inform Scottish Enterprise about the feasibility of various floating platform options, highlighting the transformative potential of temporary floating ports in addressing critical challenges faced by the OSW industry.

ELIRE Infra was recently invited as part of a small group of companies to contribute in detail to an industry feasibility study evaluating the potential of floating ports for offshore wind (OSW) deployment. Commissioned to inform Scottish Enterprise (SE), the feasibility study highlights the transformative potential of temporary floating ports in addressing critical challenges faced by the OSW industry, as Scotland focuses on leading in industries shaping the transition to net zero.

Developing and expanding ports with appropriate characteristics, including adequate lay down area, load capacity, lifting capability, and quayside depth is complex, costly, and will take several years to implement.

To alleviate reliance on conventional port infrastructure, Scottish Enterprise commissioned ARUP to conduct desk research and review floating/temporary port concepts and innovative deployment technologies proposed by several companies.

Photo by: Gareth Rowland

PURUS CELEBRATES NAMING OF 'PURUS CHINOOK'

Next-generation battery-hybrid vessel combines future fuel flexibility, cyber resilience and comfort-class crew design ahead of European deployment with Vestas

Purus, a leading provider of maritime services for the offshore wind industry, has celebrated the official naming of Purus Chinook, the first of two recently ordered VARD 419 commissioning service operation vessels (CSOVs), at a ceremony held on 8 May 2025 in London.

Attended by stakeholders including representatives from Vard, Vestas, and DNV, along with government MPs and industry partners, the ceremony marked a key milestone for Purus as it expands its support for the offshore wind industry and the wider clean energy transition. At the event, DNV formally presented plaques for Purus Chinook's Cyber Secure Essential and COMF-V1 notations - both significant achievements that set the vessel apart in terms of digital resilience and onboard crew comfort.

The vessel is now preparing to commence a multi-year contract with Vestas, supporting offshore wind farm operations across multiple European sites, beginning with an initial deployment in the UK.

Photo by: Meng Wei WEI

OFFSHORE PHOTOGRAPHER

AN IMAGE CREATION SPECIALIST WITH THE NECESSARY CERTIFICATIONS TO ACCESS MARINE SITES, TO DOCUMENT THE ACTIVITIES OF THE OIL AND GAZ AND MARINE RENEWABLE ENERGY INDUSTRIES

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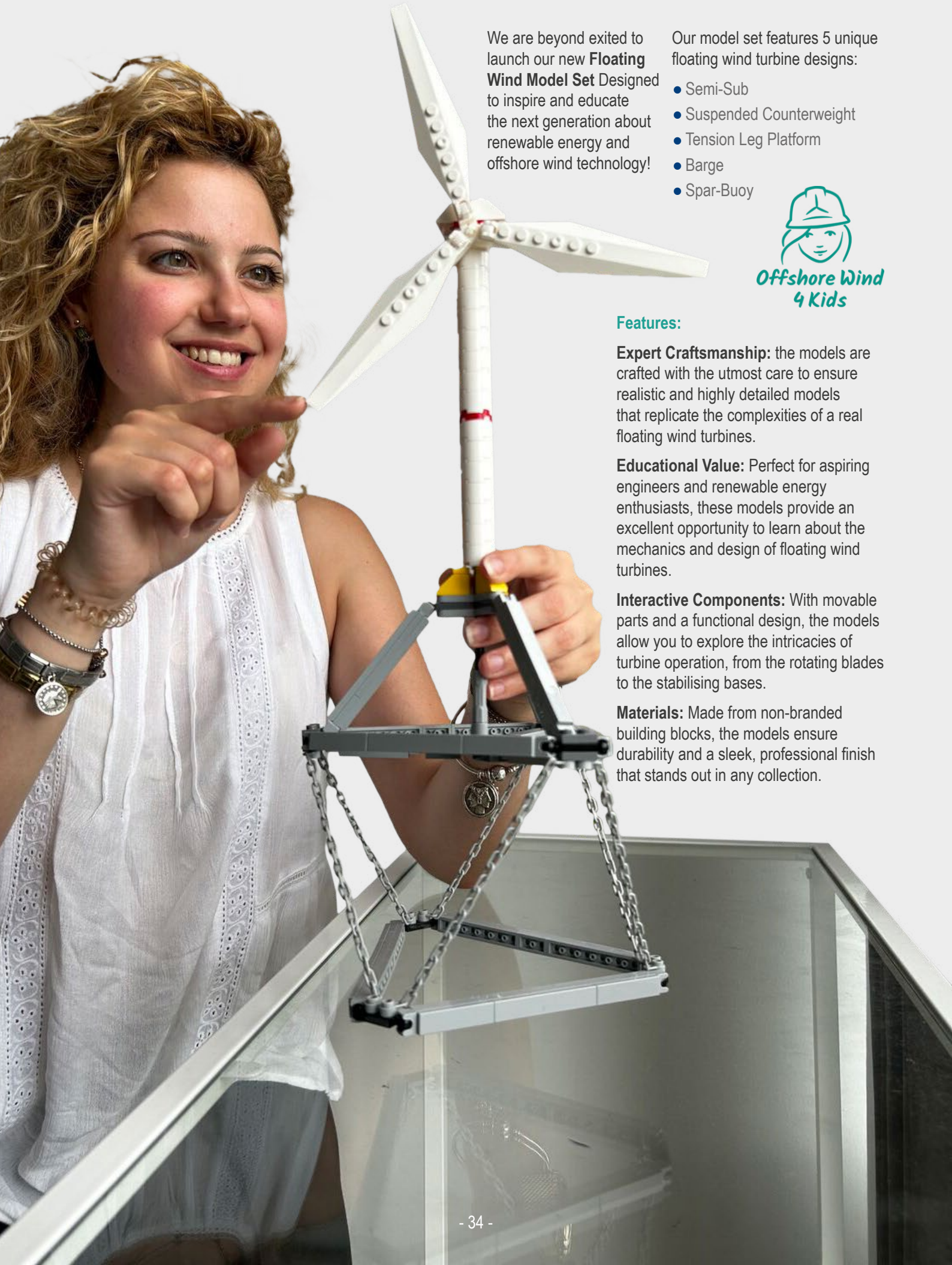
Offshore Wind 4 Kids



We are beyond exited to launch our new **Floating Wind Model Set** Designed to inspire and educate the next generation about renewable energy and offshore wind technology!

Our model set features 5 unique floating wind turbine designs:

- Semi-Sub
- Suspended Counterweight
- Tension Leg Platform
- Barge
- Spar-Buoy

Offshore Wind 4 Kids

Features:

Expert Craftsmanship: the models are crafted with the utmost care to ensure realistic and highly detailed models that replicate the complexities of a real floating wind turbines.

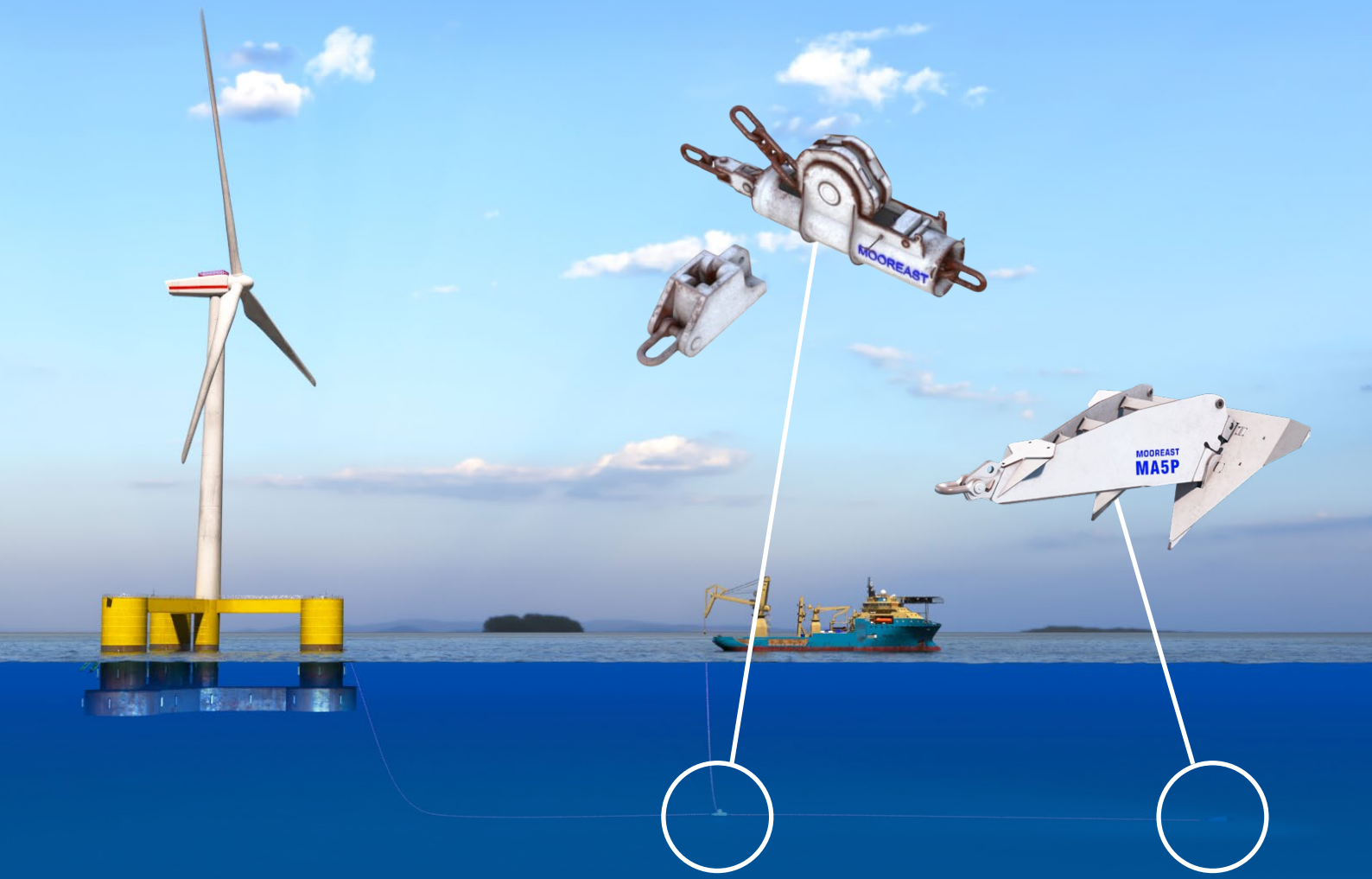
Educational Value: Perfect for aspiring engineers and renewable energy enthusiasts, these models provide an excellent opportunity to learn about the mechanics and design of floating wind turbines.

Interactive Components: With movable parts and a functional design, the models allow you to explore the intricacies of turbine operation, from the rotating blades to the stabilising bases.

Materials: Made from non-branded building blocks, the models ensure durability and a sleek, professional finish that stands out in any collection.

MOOREAST

MOOREAST OUTLINES STRATEGIES TO ENHANCE MOORING SOLUTIONS FOR THE FLOATING RENEWABLE ENERGY SECTOR



Mooreast Holdings Ltd announced plans to expand its mooring and rigging solutions product portfolio and to enhance partnerships with international players in order to extend its value proposition to the global floating offshore renewable energy sector.

Mooreast released a Business Update outlining growth strategies outlined its growth strategies following its successful listing on Singapore Exchange (SGX) Catalist in November 2021.

More impact with less Jacking grease

Proven results

- Reliable protection of equipment
- >25% less handling & maintenance
- Up to 30% volume reduction

More impact with less

Properties

- Extreme load capacity
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Man riding and explosion proof cranes are qualified to operate in dangerous areas and are designed according to EN50014.
All the crane models can be certified by any IACS members and be equipped with all the optional depending on their applications.
Our Product Range
Hydraulic Foldable-Telescopic-boom cranes
Hydraulic Elbow Knuckle-boom cranes
Hydraulic Knuckle-Telescopic boom cranes
Hydraulic Telescopic boom cranes
Hydraulic Lattice boom cranes
Hydraulic A-Frame cranes
Hydraulic Stiff-boom cranes
Hydraulic / Electric Davit cranes for
*Offshore Wind/O&G applications
*Life raft
*Provision
*Life boat
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RIDGEWAY ROCKBAGS 100% RECYCLED

ENSURING STABILITY: SCOUR PROTECTION FOR SUCTION PILES IN OFFSHORE WIND FARMS

As the offshore wind industry continues to grow, ensuring the stability and longevity of our structures is more crucial than ever. One key challenge we face is scour – the erosion of sediment around underwater foundations, particularly suction piles that support wind turbines.

Why is Scour Protection Essential?

Scour can lead to significant structural issues if not addressed, risking the integrity of turbine foundations and ultimately impacting energy production. Effective scour protection is vital for:

- Maintaining Structural Integrity: Preventing sediment displacement around suction piles ensures they remain securely anchored and stable.
- Enhancing Operational Efficiency: A well-protected foundation contributes to optimal turbine performance and reduces maintenance needs.
- Promoting Sustainability: Protecting our offshore structures minimizes environmental impact and supports marine ecosystems.

Innovative Solutions

At Ridgeway Rockbags®, we are dedicated to implementing cutting-edge solutions for scour protection. Our approach includes utilizing advanced materials and techniques tailored to withstand the harsh marine environment while ensuring minimal disruption to local ecosystems.

Join Us in Leading the Way!

We believe that by prioritizing scour protection, we can enhance the resilience of offshore wind farms and contribute to a sustainable energy future. Let's work together to harness the power of wind while safeguarding our marine environments!

RIDGEWAY

ROCKBAGS®
100% RECYCLED

INNOVATIVE SUBSEA ASSET PROTECTION

Introduced into the U.K. and Europe by Ridgeway and Sumitomo in 2009, We have been busy listening, learning and promoting the offshore applications and benefits of the Kwoya Filter Units or more commonly referred to by the offshore and marine markets as “Rockbags”.

Designed originally as an effective means of “filter layer” scour protection for subsea structures in dynamic seabeds and challenging velocities, the Kwoya Filter Unit Rockbag has evolved to become a significant technical product and proven a safe, 100% recycled clean engineering solution with various innovative options on size and product specifications.

The knowledge base and expertise learned from severe Japanese weather conditions has expanded the use of the Rockbags over many decades within civil engineering applications also marine infrastructure protection of cables, pipelines, and seabed correction. Patent protected for various applications (Patent Nos EP2341592, EP2348215 and EP2354535, the Rockbags, used in combination with other traditional methods of cable and scour protection, are adding value to the solutions toolkit of the marine contractors.

Ridgeway have been working in collaboration with clients to add value on providing tools for stability calculations, CFD, excessive performance testing and modelling also trusted environmental subsea performance during their lifetime and importantly safe decommissioning.

Once installed the filter unit Rockbags create their own mini ecosystem encouraging the regeneration of aquaculture environments, this aspect has become an important aspect for developers adding real value environmental engineering and sustainability in their subsea solutions.

In addition to this, Ridgeway have established a comprehensive geographical stock network of fast response capability for filled Rockbags under hook at ports throughout Europe utilising local labour and logistics.

Ridgeway have now a significant project track record for example flagship projects such as Teesside Offshore Wind Farm by EDF Energy Renewables. A world first in 2013 using Filter Unit Rockbags for scour protection on monopiles. It has also won contracts for works in Ireland at Arklow Bank, in Scotland at Beatrice, in England on Robin Rigg constructed by German provider E.ON, Gwynt y Môr wind farm in Wales (RWE Renewables UK) and other E.ON’s schemes such as Humber Gateway and Rampion.

For more information please visit: www.rockbags.com

RIDGEWAY

Offshore Wind Farm Project	Country	Owner	Protection	Year
Sherringham Shoal	UK	Equinor	Cable Underpinning	2010
Nordsee Ost	Germany	RWE	Jacket scour protection	2012
Arklow Bank	Ireland	GE Energy	J-tube cable support	2012
Teesside	UK	EDF	Monopile scour protection	2013
Westermost Rough	UK	Orsted	Cable protection	2014
Karehamn	Sweden	E.on	Cable protection	2014
Gwynt y Mor	UK	RWE	CPS Stabilisation	2014
Humber Gateway	UK	E.on	Cable protection	2014
Luchterduinen	Netherlands	ENCO	Freespan correction	2015
Dolwin 2	Germany	Tennet	Cable protection at OSS	2015
Dudgeon	UK	Equinor	Cable protection	2016
Wavehub	UK	Wavehub	Cable protection	2016
Egmond aan Zee	Netherlands	Shell	Freespan Correction	2016
Rampion	UK	E.on	Cable protection	2016
Robin Rigg	UK	E.on	Monopile scour protection	2016
North Wind	Belgium	Parkwind	Belmouth Stabilisation	2016
Race Bank	UK	Orsted	CPS Stabilisation	2017
Beatrice	UK	SSE	Bellmouth cable support	2018
East Anglia 1	UK	Scottish Power	Cable protection	2018
Kincardine Floating	UK	Pilot Offshore	Export cable support	2018
Formosa Phase 1	Taiwan	Orsted	Monopile scour protection	2019
Wind Float Atlantic	Portugal	Repsol/EDP/ENGIE	Cable route preparation	2019
Barrow	UK	Orsted	Cable stabilisation at OSS	2019
Yunlin	Taiwan	WPD	Monopile scour protection	2020
Hornsea 1	UK	Orsted	Cable protection/support	2021
Galloper	UK	RWE	CPS Stabilisation	2021
Saint Nazaire	France	EDF	Cable protection	2021
Hollandsee Kust Zuid	Netherlands	Vattenfall	Cable crossing protection	2022
St Brieuc	France	Iberdrola	Export cable protection	2022
Arcadis Ost 1	Gremany	Parkwind	Cable protection	2022

Jochem **Tacx**
Cesare **Meinardi**

BUILDING AN OFFSHORE WIND FARM

OPERATIONAL GUIDE

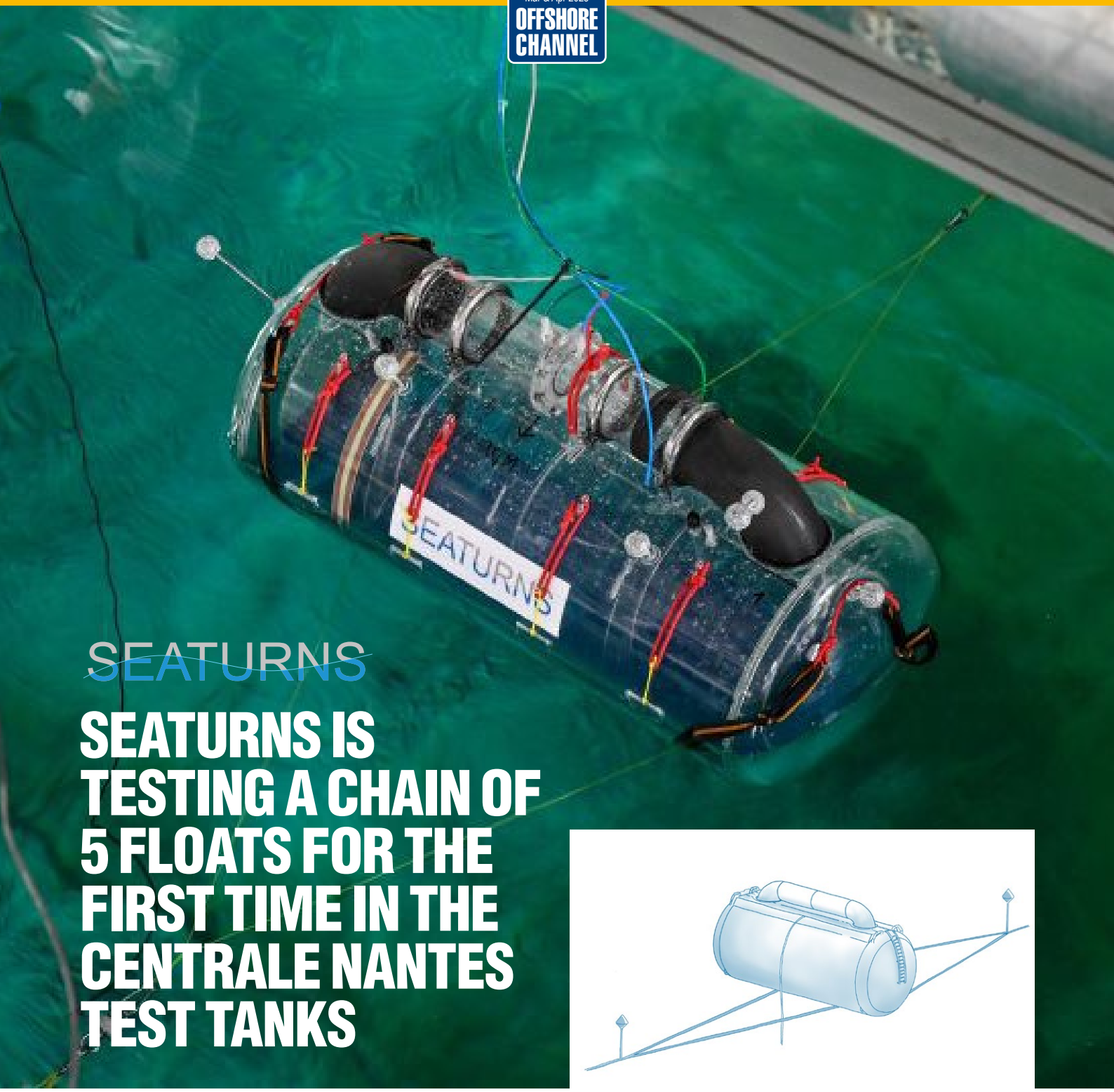
Second edition

SYNERGYXR™

FIDAR Offshore Animation

Signing a cooperation agreement between SynergyXR and Fidar Offshore Animation for the development of VR&AR technology in the offshore renewable energy industry.

SynergyXR is a powerful cloud platform that lets companies train employees, deliver maintenance and offer remote support across all XR devices without having to write a single line of code.



SEATURNS

SEATURNS IS TESTING A CHAIN OF 5 FLOATS FOR THE FIRST TIME IN THE CENTRALE NANTES TEST TANKS

Centrale Nantes recently welcomed SEATURNS to its Centrale Nantes test basins for a series of crucial tests in the EMR sector. The team was able to benefit from the expertise and know-how of the test tanks to test for the first time a chain of 5 connected wave energy systems on a 1/15 scale under various wave conditions. The objective of these tests is to validate this configuration and its anchorings with a view to a future offshore farm.

These tests integrated trajectography measurements to better understand the movements of the floats and correlate them to the performance measurement. These measurements over a large area which covers the entire experimental system are possible with new cameras, financed by Nantes Métropole as part of the WEAMEC Call for Materials Project.

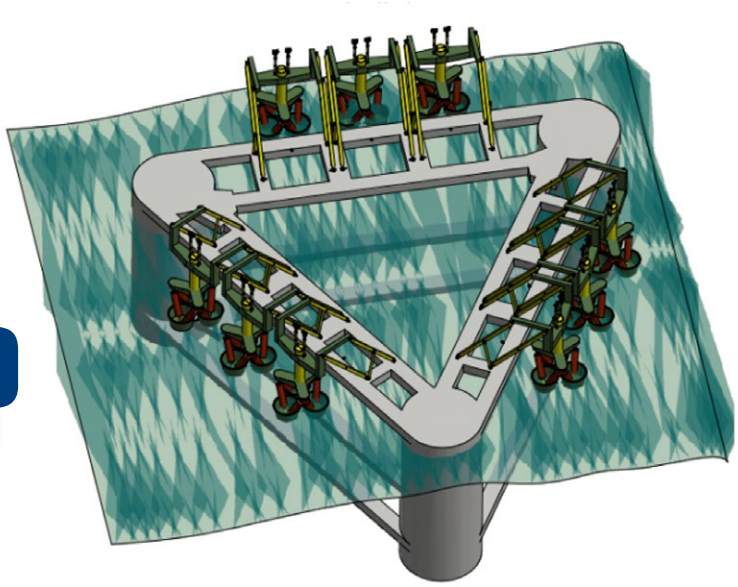
What is SEATURNS?

To capture wave energy and convert it into electricity, SEATURNS has developed a breakthrough wave solution based on an innovative system. This efficient and innovative technology consists of exploiting the technique of the internal water pendulum oscillating in a cylindrical float. It is a simple, compact, robust and small solution. This concept has been patented in France and internationally (South Africa, Australia, China, Europe and USA).

Photo credit: Centrale Nantes

WAVE HEXAPOD

WAVEHEXAPOD TECHNOLOGY



How the WaveHexapod works

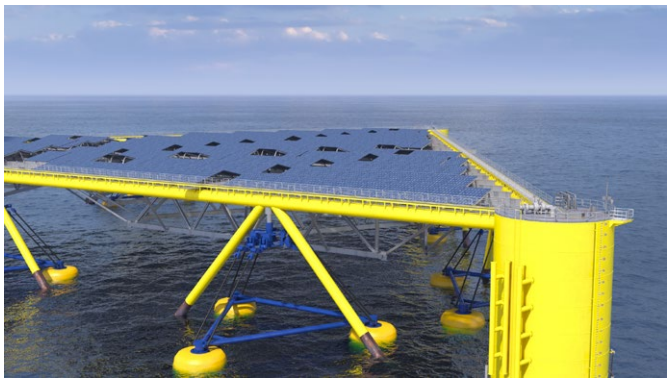
The wavehexapod is a hexapod consisting of 6 generators on 3 buoys. The hexapod hangs from a fixed connection with the outside world at the top. We have now designed submersibles that contain 9 Hexapods and are connected to the bottom only with anchor cables.

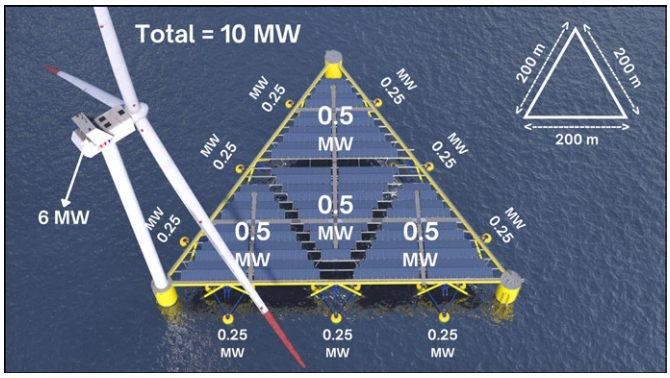
The wavehexapod can make optimal use of the movement of the waves with its 3 buoys. Waves go up and down, but also move in the horizontal plane. With its hexapod structure, the wavehexapod can make optimal use of this 3D movement. Every movement can be converted into energy in this way, in the case of wavehexapod this energy is converted into electricity through the 6 generators.

The wave hexapod has a unique proposition. Because the hexapod can be safely placed between windmills with a submersible, we use the existing infrastructure to increase the energy output in the wind farm. Up to 4 times more energy per year. In addition, the wavehexapod with its submersibles can also be located in old depreciated wind farms to generate energy, in order to make optimal use of the existing cabling.

Both with brownfield (old park engineering) or greenfield (new park engineering) the wave hexapod does not use the windmill poles, but only uses the electricity connection of the poles.

10 MW OFFSHORE ENERGY ISLAND!





Using multiple sources of energy, such as wind, solar, and wave power, in offshore environments offers several advantages and helps diversify the energy generation portfolio.

Here are some reasons why these sources are commonly employed:

1. Resource Availability: Offshore locations offer abundant renewable energy resources like wind, solar, and wave power. By utilizing these diverse sources, we can unlock the full potential of renewable energy generation.

2. Redundancy and Stability: Combining multiple energy sources increases system reliability by compensating for fluctuations or downtime in one source. This redundancy ensures a continuous power supply, reducing the risk of outages and improving overall grid reliability.

3. Complementary Nature: Wind, solar, and wave power complement each other due to their different characteristics. Wind energy is stronger in the night and winter, solar energy is abundant during the day and summer, and wave power is more consistent year-round. Combining these sources balances out their intermittency and variability, resulting in a more consistent and reliable power output.

4. Energy Production Optimization: Integrating multiple energy sources maximizes energy production by leveraging their different peak generation periods. This integration enables a stable and continuous power supply, optimizing the use of renewable resources and increasing overall energy output.

5. Environmental Impact: Offshore renewable energy sources emit minimal greenhouse gases, have low environmental impacts, and reduce dependence on finite fossil fuels. Wind, solar, and wave power offer clean energy alternatives, mitigating climate change and preserving ecosystems when properly designed and managed.

6. Technological Advancements: Advancements in offshore renewable energy technologies have made harnessing wind, solar, and wave power more feasible and cost-effective. Ongoing research and development efforts drive innovation, improving efficiency, reducing costs, and expanding the deployment of offshore renewable energy systems.

In the following, we mentioned the companies that activated in this industry, maybe better results can be achieved by the synergy of technologies by these companies. Principle Power,Wind Catching Systems, AE-WaveHexapod,Eco Wave Power,Slow Mill Sustainable Power BV, SolarDuck,Ocean Sun

Renders created by: Fidar Offshore Animation

NOVIOCEAN HYBRID ENERGY CONVERTER

NoviOcean 1 MW Hybrid Wave, Wind & Solar Energy converter is set to change the renewable energy offshore landscape.

Easy to Produce, Install and Maintain

- Simple Well Proven Parts
- Modular Design
- High Survivalbility

Environment

- Low Visual and Audible Signature
- Low Environmental Footprint

Cost Efficient

- Weight to Power : ½ vs Offshore Wind
- LCOE 1/3 vs start of Wind & Solar
- Power To Weight Ratio : 2-50 vs Wave
- Energy Competitors

TIDAL STREAM ENERGY PROJECT: COLLISION RISK DATA AND EVIDENCE SUMMARY, 2025

Aim:

The aim of this evidence project is to summarise data collected to date on consented (pre-construction), operational, or decommissioned tidal stream energy projects in the UK and worldwide, to assess the conclusions regarding their impacts on marine species, particularly marine mammals as to date, they have been a key consenting concern in the UK.

Objective:

Its purpose is to provide an insight into project impacts and outcomes, and how those conclusions can inform future tidal stream energy developments in the UK. Publicly available construction and post-construction data, including from The Crown Estate's Marine Data Exchange (MDE), are the focus for this project. A primary objective of this report has been to assess monitoring methods used at tidal stream sites, with a particular focus on impact monitoring techniques. Marine mammal surveys involving pinniped (seal) telemetry, passive acoustic monitoring, underwater video footage, active sonar, and visual surveys, as well as sound measurements to assess underwater noise levels at the turbine site both during construction and in operation, are the types of reports selected to feed into the data summary. This review focuses on four key tidal stream energy projects in the UK before briefly summarising the progress that has taken place in this sector elsewhere in the world.

Background:

This report recognises and builds on the contributions made by other stakeholders, inclusive of but not limited to the OES-Environmental 2020 State of Science Report (noting the 2024 version had not been published during the scoping phase of this project, however, the 2024 report was reviewed once available), Welsh Government's Marine renewable energy: environmental information notes 2022, and ORJIP Ocean Energy Information Note: Collision Risk. This report also utilises and builds upon the Tethys knowledge base launched by the Pacific Northwest National Laboratory (PNNL), which is an online information hub for marine and wind energy developments worldwide.

This report builds on information from various reports and stands out due to its technical emphasis on the methodologies used for impact marine monitoring at tidal stream energy sites, including advantages and limitations of those methodologies. It aims to enhance stakeholders' understanding of the current publicly available evidence base, particularly regarding UK waters, related to potential collision risk and possible displacement of marine mammals. By highlighting the strengths and limitations of various monitoring methods, the report seeks to support future improvements in these techniques, reducing uncertainties by improving the future evidence base for tidal stream and ultimately aiding project consenting.

Image © MCRP

PROJECT UPDATE VESTMANNA: COMMERCIAL SCALE POWERPLANT: DRAGON 12 GRID CONNECTED, PRODUCING ELECTRICITY

Minesto, leading ocean energy developer, continues operation and testing activities in Vestmanna, Faroe Islands. The Dragon 12 megawatt tidal kite "Luna" is in electricity production, following an upgrade period most prominently including a longer tether.

The Dragon 12 "Luna" is installed in Vestmannasund, Faroe Islands, producing electricity to grid with an extended tether configuration. Electricity production combined with a range of study visits from customers and other stakeholders make Vestmanna to the centre of attention for Minesto.

"The initial electricity production with the updated tether looks promising and in line with our expectations. We are excited to continue our testing, and satisfactory to keep pushing forward in production mode", said Dr Martin Edlund, CEO of Minesto.

FRENCH COMPANY COMPLETES FLOATING SOLAR PLATFORM FOR PETRONAS PROJECT IN MALAYSIA

Offsolar, a French renewable energy firm, has completed the construction of a 238 kWp floating solar platform for Petronas' Centre of Excellence for Offshore Renewable Energy (CEFORE) initiative in Malaysia. This marks a significant advancement in the country's offshore renewable energy development.

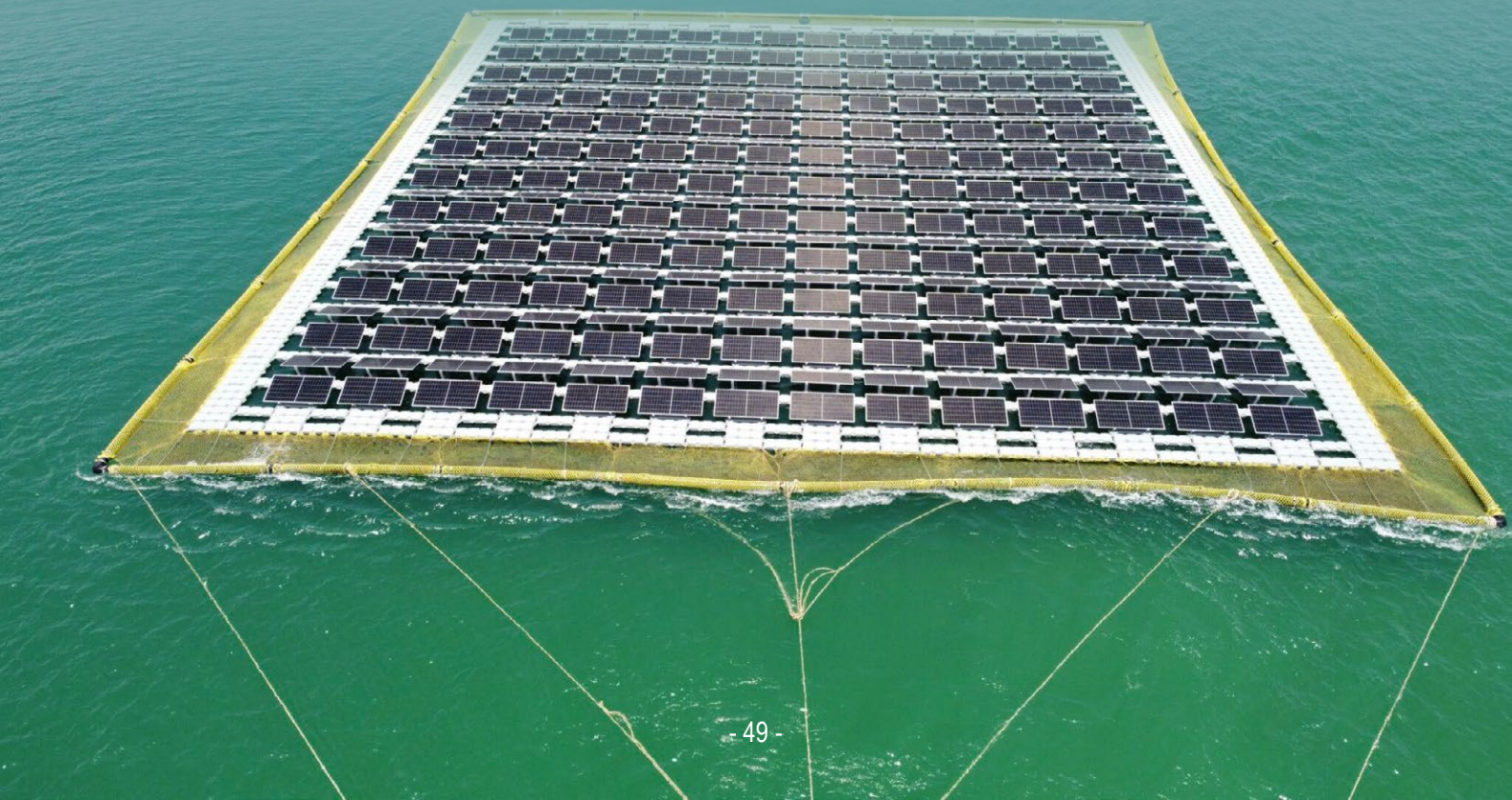
The platform, which is now entering its commissioning phase, is part of Petronas' broader strategy to transition to cleaner energy. Designed to withstand challenging marine environments, the floating solar system is set to provide clean and cost-effective electricity, especially in areas where land is scarce.

This project, which reflects the growing confidence in Offsolar's expertise, is being carried out in collaboration with University Malaysia Terengganu (UMT), Schneider Electric, CITAGLOBAL ENERGY, and Honeywell. It aligns with Malaysia's energy transition roadmap, combining offshore wind, floating solar, ocean wave energy, and advanced energy management systems.

UMT highlighted that the CEFORE project will help propel both UMT and Petronas toward significant milestones in Malaysia's renewable energy sector. In addition, the generated electricity will benefit local communities, particularly the fishing industry.

Offsolar, headquartered in Toulouse, is committed to advancing offshore renewable energy by providing resilient, cost-efficient solutions that can integrate well with offshore wind, aquaculture, and other marine activities. With Southeast Asia's push for renewable energy, floating solar is poised to play a pivotal role, addressing challenges such as the lack of land for traditional solar farms.

This development further emphasizes the potential of floating solar technology in offshore energy applications, providing a versatile solution for the region's energy needs.



INNOVATIVE WAVE TURBINE - GREEN ENERGY FROM SEA WAVES

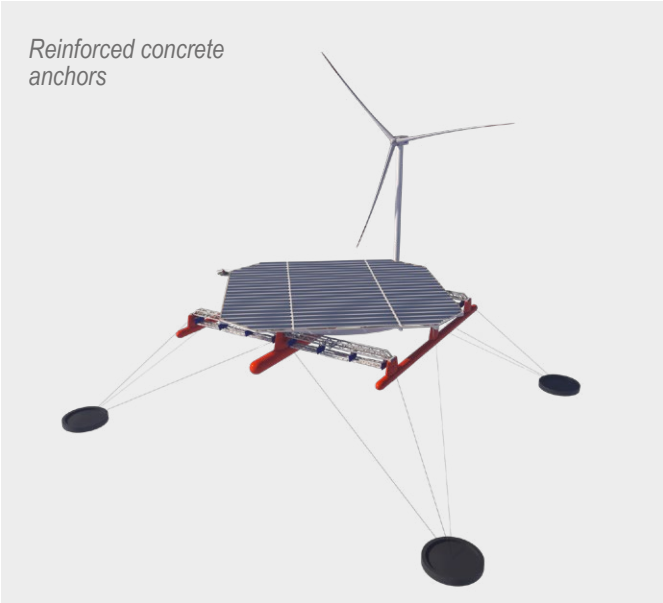
WAVE TURBINE

The wave turbine is a groundbreaking project of WUPROHYD design office, thanks to which one will be able to finally harness the huge energy resources from sea and ocean waves. This new RES can boast an estimated capacity of 2.5-3 TW, or 2,500,000-3,000,000 MW.

WUPROHYD design office, as the only one in Poland, has developed and patented this original prototype technology for the use of sea wave energy to produce electricity. Its main element comprises an ingenious wave turbine, i.e. a sea wave converter. At the current stage of the project, the technology development maturity level is RTL4 (according to the Technology Readiness Level), i.e. model tests were carried out for two different profiles of the turbine rotor. The tests confirmed the assumed rotational movement of the turbine rotor under the influence of the circular motion of water particles. The theoretical efficiency was determined at the level of approx. 7%. Therefore, the turbine can easily be used to directly drive power generators.

WAVE TURBINE OPERATION AND CONSTRUCTION

In the current division of wave converters into terminators and attenuators, the wave turbine should be classified as a terminator, i.e. it is situated on the long side parallel to the wave crest (trough) and absorbs the wave energy in a short time. It is composed of a rotor that rotates in relation to a horizontal, stationary axis fixed in the supporting structure, which is oriented parallel to the wave crest (trough) of the wave. The rotor axis is below the water level, enabling it to work fully submerged at a depth at which the circulating movement of the water particles makes it rotate smoothly. The full rotation of the rotor takes place in time equal to the period T of the wave that moves it, in which it absorbs both the kinetic energy and the potential energy of the wave motion.



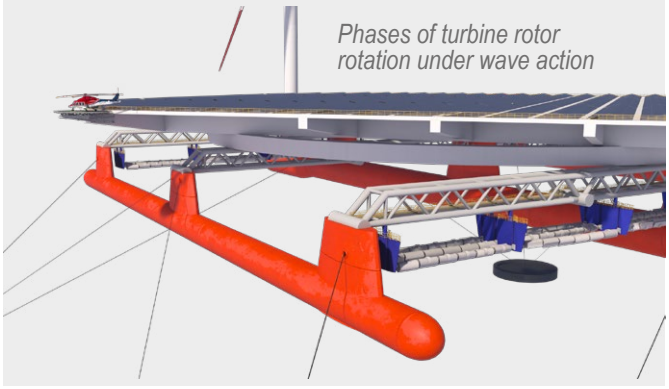
Reinforced concrete anchors

HYBRID OFFSHORE POWER PLANT GUARANTEES LCOE REDUCTION

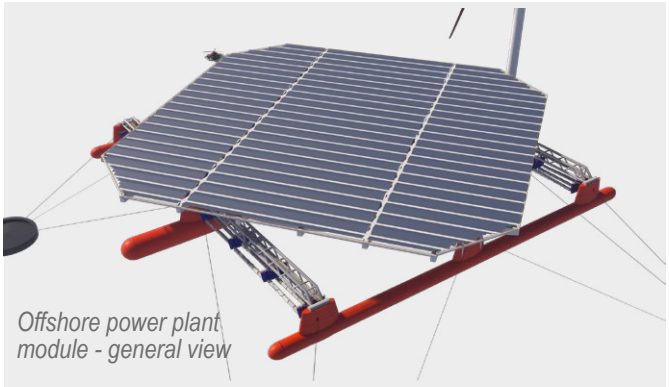
The use of sea wave energy is still a very underdeveloped field. In reality, there are no objects that could be called offshore power plants as far as installed power is concerned. Most of them are just very expensive prototypes, with low efficiency, recovering a small part of the wave energy. The main reason for such state of development of offshore energy is the occurrence of enormous loads due to wave forces in the marine environment, requiring powerful load-bearing structures for devices located on the seabed or floating as well as very complicated converters. Taking into account the very difficult sea conditions and having a simple device for converting the energy of waves, we have designed a floating offshore power plant - an energy island that enables one to harvest huge energy resources of seas and oceans on an industrial scale.

MANUFACTURING TECHNOLOGY

The load-bearing structure of the energy island is designed to be self-erecting and attached to reinforced concrete anchors. The advantage of this solution is that it can be folded, built and equipped as much as possible in a dry dock, which is ingenious, as taking into account its dimensions in an open mode - it would be impossible for the opened structure,. In addition, such a solution reduces the costs of installing the energy island at sea, limiting the use of very expensive floating cranes and tugs to the necessary minimum. In order to install smaller pieces of equipment, the structure is equipped with a crane that can move along the track mounted on its trusses. Moreover, the very high stability of the three-hull structure will reduce downtime caused by bad weather conditions related to work at sea. In practice, the adopted production technology requires only a pontoon and a tug for transporting the elements of equipment, which have not been installed in a dock. Reinforced concrete anchors are also designed to be floating. After being towed to their destination, they will be flooded by loading their ballast tanks with water. Anchors, if necessary, will be lifted by blowing the water from the ballast tanks with compressed air.



Phases of turbine rotor rotation under wave action

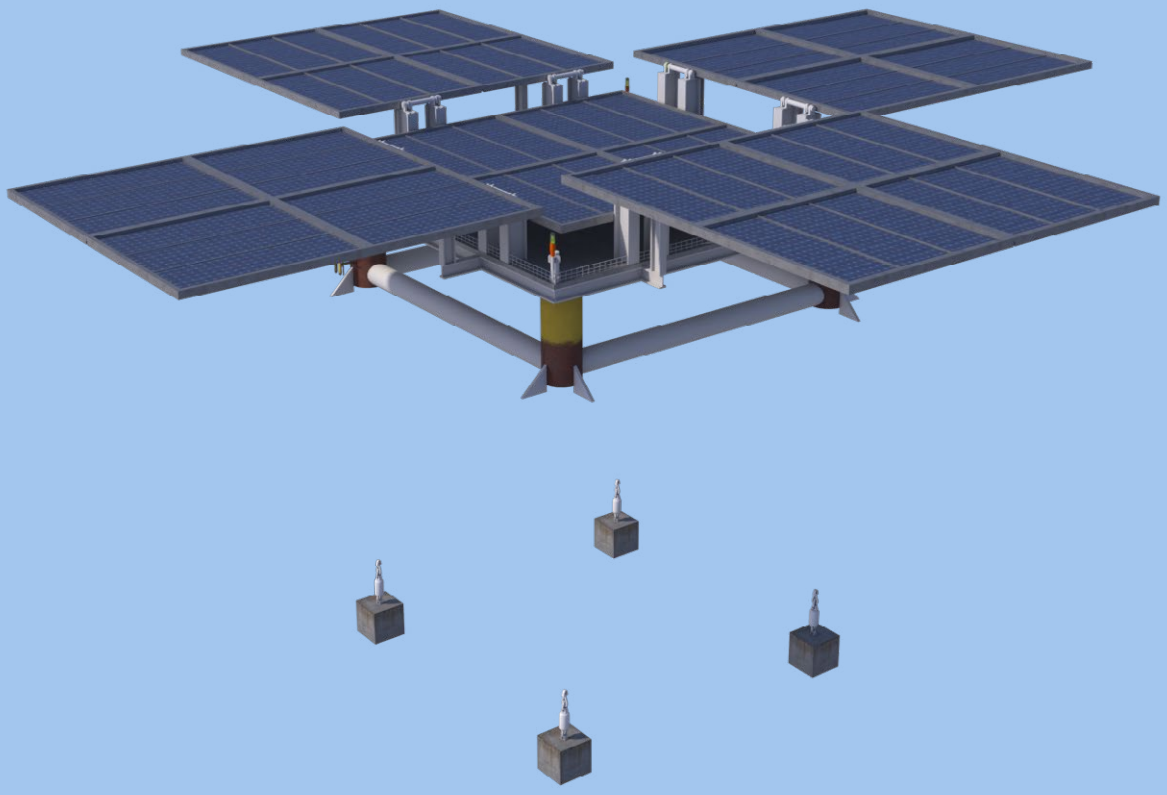


Offshore power plant module - general view

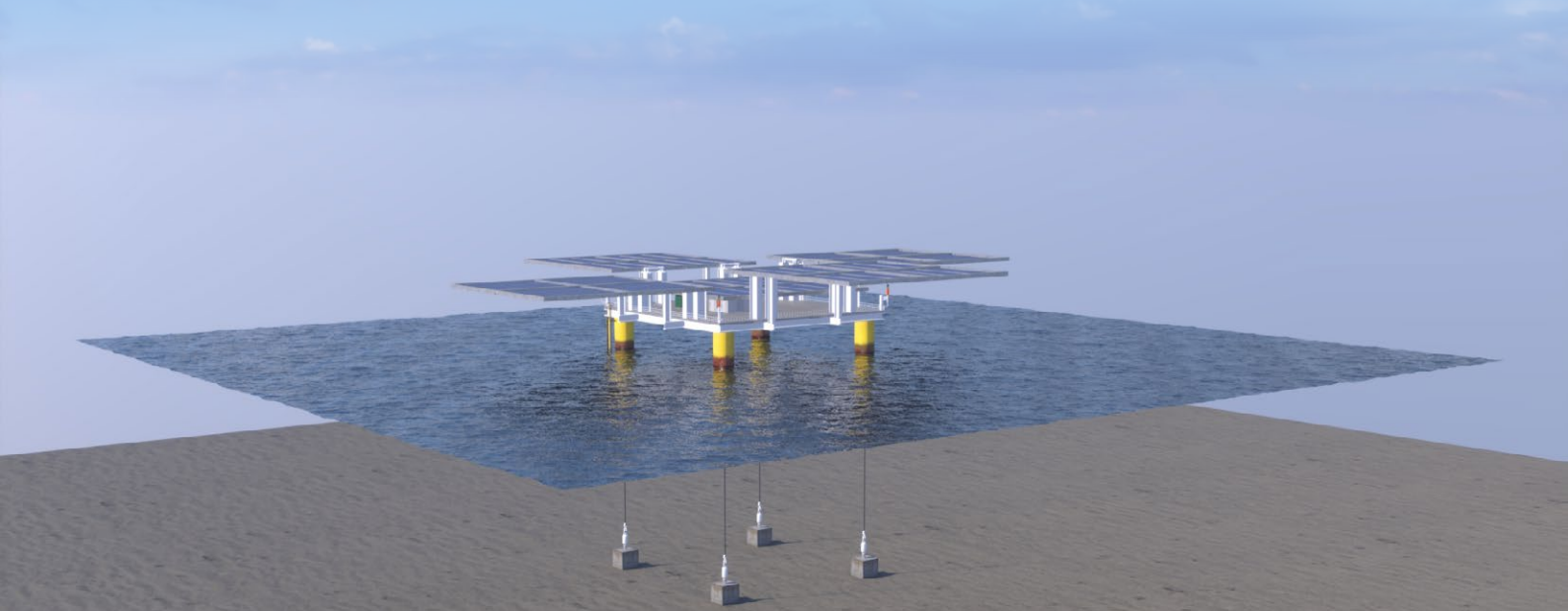
ADVANTAGES OF THE PROPOSED SOLUTION

The energy island designed in the concept phase can be characterised by the following :

- reduction in LCOE compared to other floating objects using only wind and solar energy,
- will generate electricity in a predictable and stable manner from three independent renewable energy sources,
- it is made in the “floating” technology - floating platforms, unlike the previously used foundation solutions used for wind turbines placed on the seabed,
- its structure is independent of the depth of the water on which it is to work. Increasing the depth is related only to the lengthening of the mooring lines, so there is no necessity to make a more powerful foundation structure,
- it can be located at large distances from the shore at great depths so as to eliminate the negative impact of its view on the landscape, which is associated only with the cost of laying a longer cable, and not with a more powerful foundation structure,
- ensures the operation of photovoltaic panels at a low temperature, which increases its efficiency and allows to increase the amount of energy produced thanks to the work in a system “keeping up with the sun”, which is unprofitable on land,
- due to its high displacement, it can be used to produce green hydrogen,
- absorbing the energy of sea wind waves, it can be used to protect the sea shore.



- Salinex's Innovative-Offshore Floating Solar PV Plant.
- First of kind for deep offshore Solar PV with inbuilt Solar Panel protection from harsh weather.
- Power generation of 2,272kWp within a 50m x 50m floating semi-submersible.
- Can be provided onsite with Hydrogen / Desalination / BESS systems.
- Dynamic tracking of Solar PV with wave heights
- Safe transit from quay side to site with closed Panels.
- Power generation during sunlight hours, complimenting Offshore Wind farms
- Built in novel Wave Energy Harvester and tidal turbine for extracting clean energy-site dependant.
- Efficient and economical with low LCOE



ARE SOLAR PVT EVACUATED TUBES THE FUTURE OF THE OFFSHORE FLOATING SOLAR PANELS?

Matthias Herberich

Farshid Ebrahimi

Looking to the future, we need to be open to new ways to we can make our contribution to climate protection effectively.

In the currently available PV floating systems, they use framed standard photovoltaic modules and these are today more than 2 sqm and flat. But the size of the modules increases more and more with increasing performance. In the countryside this may be an advantage, but on the water, this is a big disadvantage. The static load caused by snow and above all wind and high waves are a major risk factor. The load on the material is therefore very high.

“Our innovative TUBE MODULE has addressed this problem”, explains the developer of this tube Matthias Herberich.

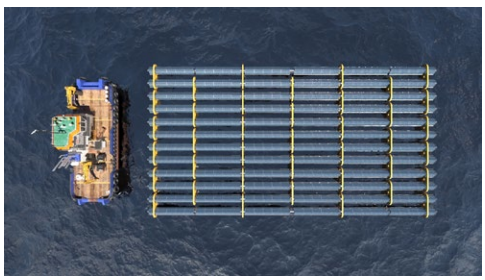
The round shape reduces the possible snow load. Wind and waves have less attack surface. Thus, many photovoltaic projects can from a static point of view with classic modules on land and on water realized only at high cost.

Not to forget the design, because the power generation by Photovoltaics can also look good.

The prototype in the field of floating PV has already been successfully tested in practice. The next steps are optimization of size and performance and after this the test in wind and wave tunnel for the preparation of pilot plants at sea and on land.

Founding of a start-up. Investors are welcome.

Contact: entwicklungsbuero-herberich@email.de



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Client Country Year

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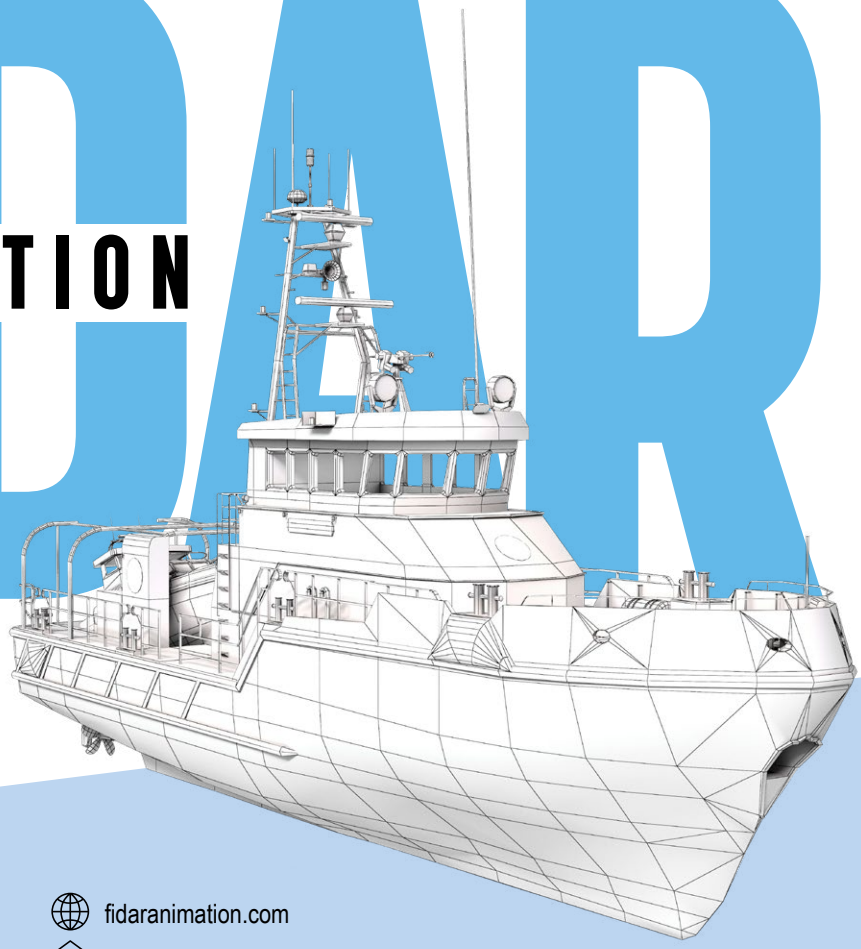

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