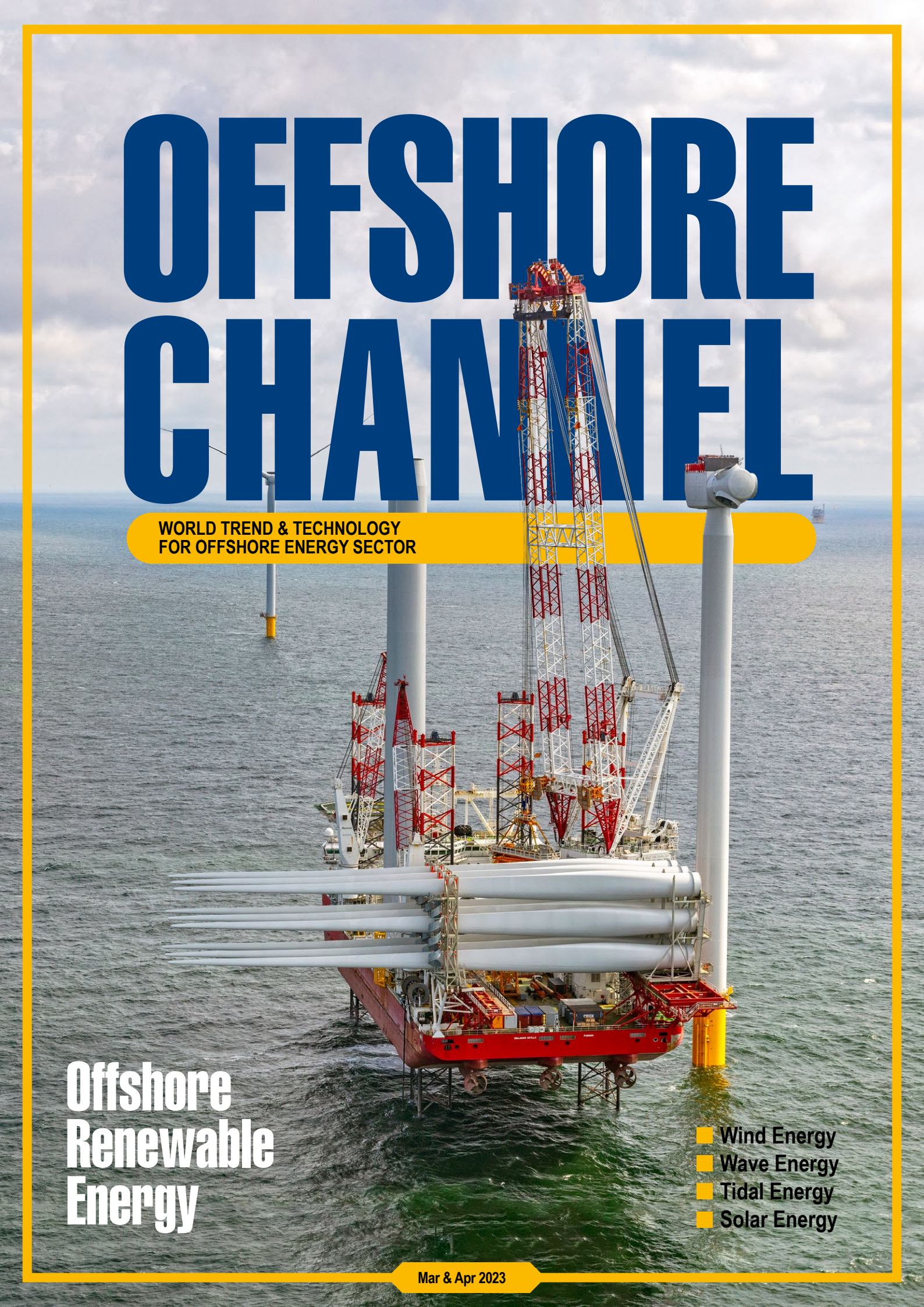
OFFSHORE CHANNEL

WORLD TREND & TECHNOLOGY
FOR OFFSHORE ENERGY SECTOR



Offshore Renewable Energy

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

Mar & Apr 2023

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.

The second phase of the Dogger Bank Wind Farm has moved a step closer to completion following the successful installation of the Dogger Bank B offshore substation jacket.

EDF RENOUVELABLES

The electrical substation of the future EolienEnMer park of the Calvados has been successfully installed in the project area, + 10km from the coast.

WORLD'S FIRST UNMANNED HVDC OFFSHORE PLATFORM INSTALLED AT WORLD'S LARGEST OFFSHORE WIND FARM

- Dogger Bank Wind Farm will be first UK High Voltage Direct Current (HVDC) connected offshore wind farm
- 70% reduction in topside weight per MW for offshore platforms

Construction of what will be the world's largest offshore wind farm, Dogger Bank, has reached another milestone with the installation of the world's first unmanned High Voltage Direct Current (HVDC) offshore substation.

The substation is the first of three platforms, supplied by Aibel, to be installed at Dogger Bank, which is being constructed in three 1.2GW phases known as A, B and C.

The Dogger Bank A platform measures 65 x 36 metres across and 39 metres high and sits on a four-legged steel jacket foundation structure which is fixed to the seabed, at a water depth of around 28m.

Approximately 146km from the nearest point of land at Flamborough Head, near Bridlington in East Riding of Yorkshire, the platform installation was delivered by principal contractor Sapiem.

The innovative offshore platform has a lean design and is the first unmanned HVDC platform which will be operated from shore and accessed only by a Service Operations Vessel. The platform will receive 1.2GW of AC power from Dogger Bank A's 95 offshore wind turbines and convert it to DC, which will then be sent ashore to an onshore convertor station near Beverley in East Riding of Yorkshire.

Fitted with Hitachi Energy's latest generation HVDC converter technology, Dogger Bank will be the first offshore wind project in the UK to use this technology to transmit the electricity produced back to shore, ensuring that the electricity is transmitted efficiently over long distances while minimising losses.

WORLD'S DEEPEST WIND TURBINE FOUNDATION INSTALLED IN SCOTTISH WATERS

THE world's deepest wind turbine foundation has been installed 16 miles off the coast of Angus at the site of the £3 billion Seagreen wind farm.

Transported to the project site on a barge operated by main contractor, Seaway 7, the foundation was met by the Saipem 7000, a semisubmersible crane vessel, which lifted the 2,000 tonne turbine foundation into place.

The installation of the jacket means Seagreen has now topped its own record from October 2022, when a previous foundation was installed at a depth of 57.4 metres (approximately 188 feet). The deepest foundation has been installed at a depth of 58.6 metres.

FIRST TURBINE STANDS AT SAINT-BRIEUC OFFSHORE WIND FARM

The first of 62 Siemens Gamesa SG 8.0-167DD wind turbines has been installed on the 496 MW Saint-Brieuc offshore wind farm site in the Bay of Saint-Brieuc in Brittany, some 16.3 kilometres from the Breton coast.

The operation was carried out from the jack-up vessel Brave Tern of the Norwegian company Fred. Olsen Windcarrier.

The first Siemens Gamesa 8 MW turbine of the Saint-Brieuc offshore wind farm was installed on position number SB44, located in the northern part of the site. According to Iberdrola, thanks to this, Brittany acquires its first offshore wind turbine.

The turbine has 209 metres at the tip of the blade and the rotor is 167 metres in diameter.

The installation vessel Brave Tern will carry out several iterations in the coming months from Siemens Gamesa's factory in Le Havre, each time with the constituent elements of four wind turbines on board.

CHINA'S FIRST DEEP-SEA FLOATING WIND PLATFORM IS COMPLETE

The construction of China's first deep-sea floating wind power platform is ready to come online.

This floating wind platform is known as Haiyou Guanlan, and Chinese oil giant China National Offshore Oil Corporation (CNOOC) announced on Saturday that it has completed installation of its 5,000-meter (16,404-foot) undersea cable.

Haiyou Guanlan's subsea cable is designed to operate at a depth of 120 meters (394 feet), and it has an expected life of 25 years in harsh subsea conditions.

The cable connects the floating wind platform to the Wenchang offshore oil and gas platforms, off the coast of Hainan Province, in southern China.

The 7.25 megawatt (MW) Haiyou Guanlan wind turbine is expected to generate around 22 million kWh annually.

It will save nearly 10 million cubic meters of fuel gas each year and can meet the equivalent annual electricity demand of 30,000 people. It will also reduce CO_2 emissions by 22,000 tons.

FLOATING WIND FORERUNNERS

REMAZEL ENGINEERING CONFIRM ITS POSITION AFTER THE SUCCESSFUL INSTALLATION OF NO. 2 MOORING SYSTEMS FOR FLOATING FOUNDATIONS & A NEW CONTRACT SIGNED

REMAZEL ENGINEERING

Remazel path towards energy transition has started in early 2020 and today the Company can count on a significant track record in new sectors as offshore wind and floating wind.

Despite the challenges and the question marks emerging from the market, Remazel is one of the very first companies to be involved in the supply of no. 3 full-scale deep sea mooring systems for the Chinese market.

The prototypes developed cover three different designs and includes a sheave fairlead solution, mainly coming from Oil&Gas application, the in-line tensioner and an on-hull mooring type. All these solutions have been developed by Remazel's engineering team, who executed all the necessary fatigue analysis and partnered with the Customers to elaborate the complete installation procedure. Then, the manufacturing phase as well as the full load test were performed in Remazel's facilities is China, by the approval of DNV certification.

In April 2023 the Company has successfully delivered and installed an in-line mooring tensioner for one of the major Players in the Chinese market and in early May 2023 the third Contract has been formalized with another important Chinese Company for a new mooring solution. The latter, is an integrated system of a floating wind turbine and marine aquaculture, and will be deployed in Fujian Province.

"The speed at which Remazel has been able to embrace energy transition is impressive. Be part of such outstanding and pioneer projects in the offshore renewable landscape represents for sure a competitive advantage that could support our growth in these sectors." Andrea Rosa, CEO of Remazel Engineering.

"Our technical competences together with the commercial action of our Chinese branch, Remazel Asia, were crucial for the acquisition of these pioneer contracts. The know-how and competences acquired during project execution, in particular during the load-testing phase and equipment installation, allowed us to benefit from our experience and study the best solution." Alberto Pegurri, Technical Director Offshore Business Unit, Remazel Engineering.

REMAZEL ENGINEERING

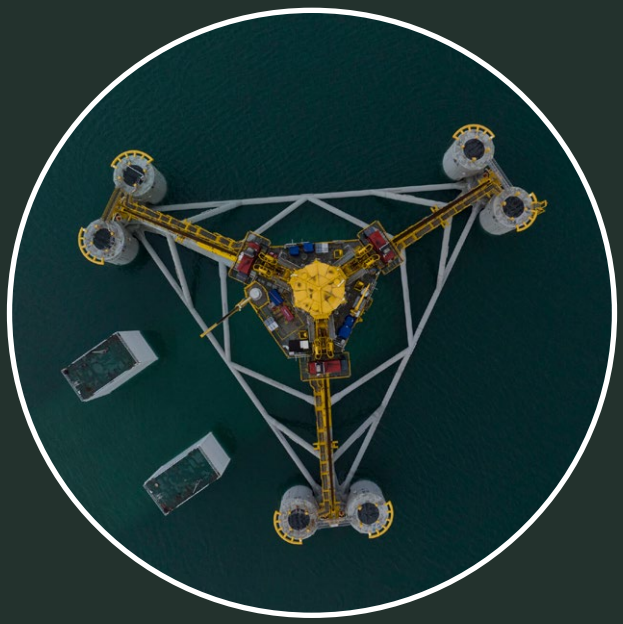
START OF OPERATIONS TO LAUNCH WIND TURBINE FLOATS IN PROVENCE GRAND LARGE

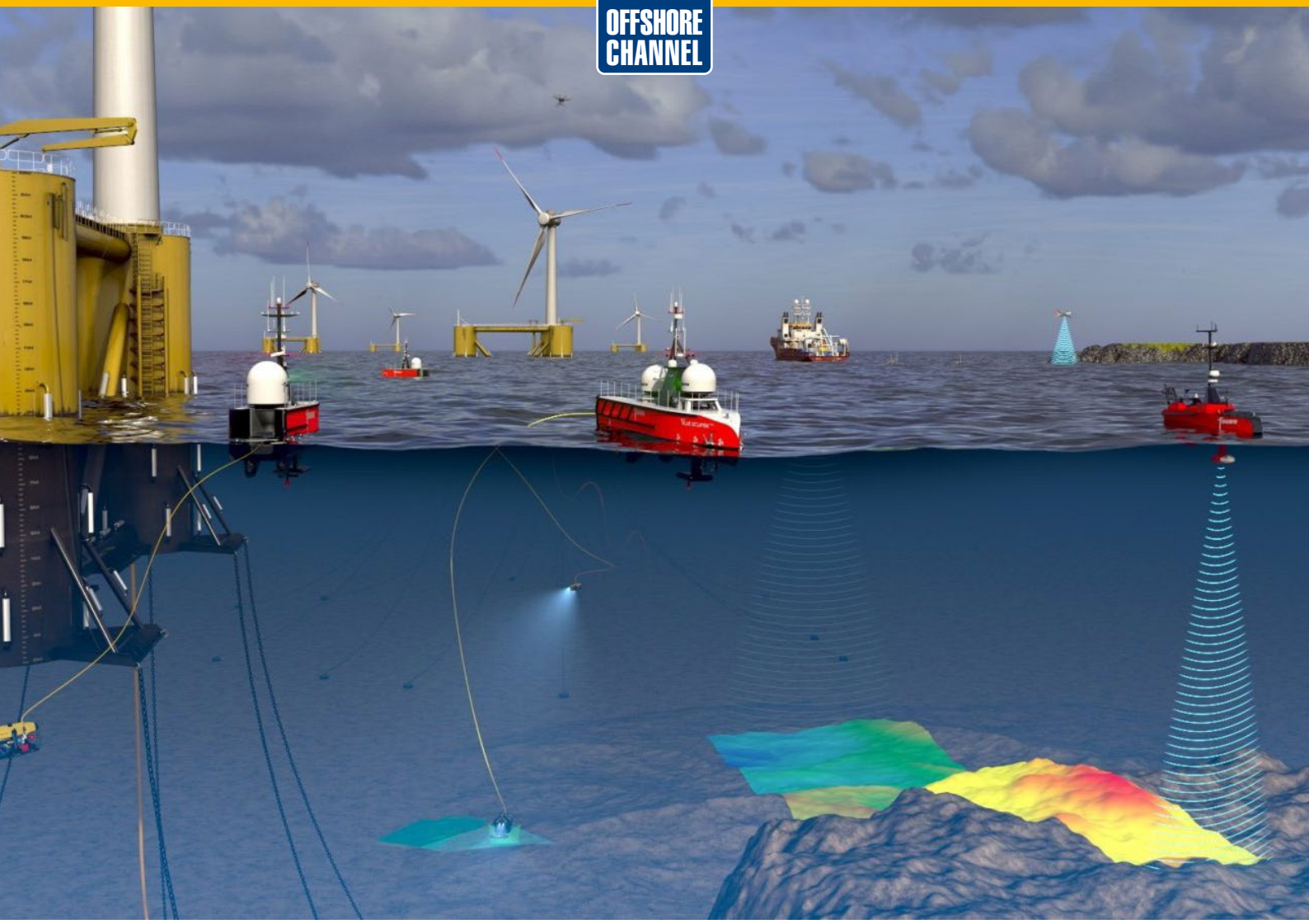
The first of the three giant foundations of floating wind turbines of the future Provence Grand Large pilot park was embarked Thursday, May 11 on a barge for its launch.

The transfer was carried out from the Eiffage Métal site in Fos-sur-Mer, in charge of producing these metal floats designed by SBM Offshore. They take the form of a metal tripod equipped at each of its three ends with two submersible buoys, between which is located an innovative taut line anchoring system (six in all) developed and installed by SBM and IFP Energies Nouvelles. The whole structure is 45 meters high, for about 80 meters on each side and a weight of nearly 3000 tons.

EDF renouvelables

The first float of the Provence Grand Large floating offshore wind farm launched!





BEWILD

USING EDNA TO MEASURE BIODIVERSITY AT OFFSHORE WIND FARMS

Fugro, together with project partners, will focus on developing innovative methodologies and technologies for remotely collecting environmental DNA (eDNA) samples in the North Sea. The collected data will assess the impact of offshore wind farms on biodiversity and explore ways to adapt existing infrastructure to enhance marine habitats.

Fugro will develop remote marine eDNA collection, analysis, and interpretation capabilities as part of its remote inspection solutions. By also integrating the eDNA sampling into its uncrewed surface vessels (USVs) and remotely operated vehicles (ROVs), Fugro aims to not only inspect subsea assets but also the broader subsea environment.

Daniel Smith, Fugro's Solution Owner Offshore Wind Farm Site Appraisal said "By integrating ecological monitoring with routine asset inspections, wind farm operators will not only reduce the risk of possible technical failures, but broader ecological failures such as habitat loss or habitat fragmentation. This is a crucial step in safeguarding our energy resources and our natural environment."

SUBSEA ROBOTICS SERVICES

PETRODIVE GROUP PLANS TO DEVELOP ITS ROV CAPABALITIES

Dubai-based subsea services provider PETRODIVE has recently acquired 5 ROVs.

The acquisition of these ROVs adds to PETRODIVE's capacity to undertake the broadest range of ROV requirements from O&G and Maritime Contractors. This includes high-quality survey work, inspection, repair, and maintenance (IRM), and heavy intervention tooling down to 1,000 meters.

PETRODIVE Teams are experts in providing the most effective solutions that can prolong the life of subsea assets.

PETRODIVE invested $5 million in its ROV fleet. The Company established its ROV Division in 2021, initially focusing on providing experienced personnel at all levels in observation and work class vehicles. It operates both in Africa and internationally.

It currently owns 3 ROVs with observation classes and 2 ROVs with work classes and is planning to acquire more ROVs in the future.

OBSERVATION CLASSES AND WORK CLASSES

ROVs are controlled by a ROV operator typically on a surface vessel, using a joystick like you would play a video game. A group of cables, or tethers, connects the ROV to the ship, sending electrical signals back and forth between the operator and the vehicle. They use external sensors that are mounted on the vehicle to measure things like conductivity, temperature, and depth.

Observation Class

PETRODIVE uses observation class ROVs to inspect infrastructure and the underwater area to help plan future projects for Oil and Gas Contractors. These ROVs are equipped with high-end cameras and lightweight sonar systems to avoid missing any small details like cracks. A manipulator (arms and hands) on one of these vehicles tends to be small with limited functionality (1-3 functions typically), and their thrusters can be either vectored or standard.

Work Class

PETRODIVE also uses Work class ROVs. They are used for ocean floor exploration, deep depths that divers cannot reach, and heavier construction tasks that take more time on the bottom than divers can spare. Due to their FO-equipped umbilicals, they can carry additional sensors and have multiple capabilities that allow for additional tools. Their sensor and sonar arrays can image large areas or provide minute details to specific structures. Most are equipped with a pair of manipulators—one for heavy lifting and grasping and the other with up to 7 individual functions that can be nearly as nimble as the human hand! The thrusters on these ROVs are vectored and very powerful, producing from 50 to over 200hp.

The Panther is a great alternative to heavier hydraulic vehicles, particularly where deck space is at a premium. These ROVs set the standard for electric light work class vehicles operating across a broad spectrum of subsea energy projects.

SEATRIUM TO BUILD OFFSHORE PLATFORMS FOR BP AND EQUINOR'S EMPIRE WIND PROJECTS

Seatrium Limited, a wholly-owned subsidiary of Sembcorp Marine Offshore Platforms (SMOP), has secured a contract from Empire Offshore Wind, a joint venture between Equinor and BP, to supply two offshore substations for the Empire Wind 1 and Empire Wind 2 offshore wind farms in the US.

The scope of the project involves the engineering, procurement, construction, offshore hook-up, and commissioning of two OSS platforms for the offshore wind farms located about 20 miles south of Long Island, east of the Rockaways.

Construction works on the 810 MW Empire Wind 1 platform and the 1,260 MW Empire Wind 2 platform are expected to begin in the fourth quarter of 2023 and the second half of 2024, respectively, at Seatrium's Singapore and Indonesia yards.

This contract, worth S USD 500 million (about USD 375 million), follows the completion of the Front-End Engineering and Design (FEED) contract which was secured by SMOP in 2022.

The company is also constructing a wind turbine installation vessel (WTIV) for deployment at the wind farms based on a design jointly developed with the customer Maersk Supply Service.

Maersk's newbuild, which will feature Steerprop's propulsion package, is scheduled to be completed in 2025.

FLOATING OFFSHORE WIND: AN INCREASINGLY MATURE MARKET

According to a study conducted by BVG Associates for EDF Pulse Ventures, floating offshore wind could produce three times more renewable energy than bottom-fixed offshore wind. This potential explains the enthusiasm of governments, energy companies and startups for this technology, which sees a growing number of projects materializing.

According to the same study, the installed capacity of floating offshore wind could reach 20 GW by 2032 and exceed 40 GW by 2035. Europe, the US and Asia are the most involved regions in the development of this renewable energy and BVG Associates estimates that 3.4 GW of capacity could be installed in France by 2035 and 5 GW in the UK.

4 main areas for developing floating wind power

It is not enough to have sites and projects to develop floating wind energy – mature and scalable technologies are also needed. Building competitive floating wind farms requires to have relevant solutions across the entire value chain, which is why EDF Pulse Ventures focused on 4 different aspects during its deep dive, which are particularly important for the performance and the competitiveness of floating offshore wind:

TOUCHWIND & MITSUI O.S.K. LINES PLAN TO STRENGTHEN THE ALLIANCE FOR FLOATING OFFSHORE WIND TECHNOLOGY

Last year TouchWind and MOL had already signed an MoU for the joint development of floating wind technology with a primary focus on the further development of TouchWind's tilting angled one-piece rotor floating wind turbine. Following the progress of development and testing by TouchWind, both parties agreed on closer collaboration towards the next-stage development of the floating turbine.

At this moment TouchWind is installing a small-scale prototype, with a rotor diameter of 6m, at Fieldlab Green Economy Westvoorne. Testing is scheduled to start from May onwards.

Founder and CEO of TouchWind, Rikus van de Klippe explains: 'during the field testing in the lake of Oostvoorne, we want to test in particular the installation, anchoring, mooring and ecological impact of the floating wind turbine. How does the small-scale prototype behave under the conditions on the lake? What influence does the wind turbine have on the existing underwater ecology and on avifauna?'

Masayuki Sugiyama, Executive Officer responsible for Wind Power Projects Unit in MOL states:

'These tests and their results will lead to the further optimization of TouchWind's floating wind turbine concept. The achievements from the tests will raise the project to the next stage. We see great potential in this innovative concept which can realize higher utilization rate and the efficiency of wind farms as well as lower-cost wind turbines.'


OilStates™
FTLP™ Floating Wind Platform

SEATWIRL SIGNS MOU WITH KONTIKI WINDS

The Energy-tech company SeaTwirl announces today on May 15th, that themselves and Kontiki Winds have signed a MoU (Memorandum of Understanding). The intention of the two companies will be to identify and discuss the upcoming opportunities to electrify offshore Oil and Gas assets and other offshore applications, with the use of SeaTwirl's floating wind turbines.

SeaTwirl has, together with Kontiki Winds, entered a MoU (Memorandum of Understanding) to explore new opportunities in the market, to implement offshore wind into new and existing Oil and Gas assets and micro grid applications such as the powering of fish farms, desalination plants and/or other small-scale applications that currently are based on fossil fuel electricity generation.

Kontiki Winds, a Havfram company, is an early-stage offshore wind technology developer and electrification enabler, focused on decarbonizing the global energy mix and driving a greener economy. Kontiki Winds recognises the increasing demands for electrification over a wide range of industries, and has over the past year, entered into collaboration with a range of complementary technology and service companies to enhance their electrification capabilities.

" In Kontiki Winds we have a collaboration partner that really is the perfect match for us. Kontiki Winds and their partners knows everything there is to know about electrifying offshore assets with wind power and we have wind turbine technology that is ideal for such applications. It will be truly exciting to launch this collaboration and accelerate the decarbonization off Oil & Gas, fish farms, desalination plants and other suitable assets." Johan Sandberg, CEO.

"With SeaTwirl we have found a field tested solution for Offshore Wind Generation that fills a gap in the current market offering. We believe decentralised, easily installed and locally produced power will play a key role in the future energy mix and can't wait to start exploring this further with SeaTwirl." Eyvin Svendsen, VP Electrification Kontiki Winds.

GAZELLE WIND POWER UNVEILS THIRD GENERATION FLOATING OFFSHORE WIND PLATFORM TECHNOLOGY

Gazelle Wind Power (Gazelle), the developer of a modular floating offshore wind platform, is unveiling third generation technology this week at WindEurope 2023 in Copenhagen, Denmark. The company's enhanced design further refines Gazelle's solution to address the primary challenges facing the offshore wind industry—such as cost, supply chain bottlenecks, and sustainability—by providing a lightweight, cheaper design that minimizes the impact on fragile marine environments while using existing port infrastructure.

As a third-generation technology, the platform delivers enhanced mooring innovation that enables serial production. The platform makes first generation technology—which was primarily designed to float and survive harsh ocean conditions—obsolete and improves on second generation designs that are focused on industrialization. Instead, Gazelle's platform moves away from archaic models that are stationary, heavy, bulky, and difficult to assemble and transport while reducing costs by 30% compared to conventional semi-submersible designs. Part of this improvement comes from the reduction in steel versus traditional offshore platforms. For example, a one-gigawatt offshore wind farm using Gazelle's solution would save 71 kt of steel and reduce emissions of approximately 100 kt of carbon dioxide.

The company's platform can be quickly and simply installed at project sites because it requires no specialist cranes or vessels thanks to a cost-effective, innovative design using globally available components and a modular assembly process.

X1 WIND disrupting offshore wind

X1 WIND WINS THE EOLO INNOVATION AWARD 2023 FOR THE PIVOTBUOY PROJECT!

The PivotBuoy Project, with a consortium led by X1 Wind including leading companies EDP NEW, DNV, INTECSEA, ESM, DEGIMA, and world-class research centers WavEC, DTU, and PLOCAN, won the Eolo Innovation Award 2023 organized by the Spanish Wind Energy Association (AEE).

The PivotBuoy Project, officially concluded in March 2023, included the design, fabrication, and testing of the X30 floater in the Canary Islands, Spain. The Project aims to substantially reduce the current Levelized Cost Of Electricity (LCOE) of floating wind through the validation of the "PivotBuoy" technology, an innovative subsystem that reduces the costs of mooring systems and floating platforms, allows faster and cheaper installation, and a more reliable and sustainable operation.

The project demonstrated the innovative mooring system configuration that combines the advantages of a SPM (single point mooring) with a TLP (Tension-Leg Platform) mooring system, allowing the ability to reach deeper waters and minimizing the footprint and impact on the seabed. The X30 floating platform, integrating a Vestas V29 turbine in a downwind configuration, became the world's first fully functional TLP floating wind platform to export power and Spain's first floating wind prototype to export electricity via a subsea cable.

The Eolo Innovation Award initiative is part of the action lines of the Spanis Wind Energy Association (AEE) and the Wind Energy Technology Platform - "Plataforma Tecnológica del Sector Eólico"-, REOLTEC, to support innovation and national technological development in a context of strong international competition, market globalization, and cost optimization.

The finalist projects of the Eolo Innovation Award 2023, which have had the support of REOLTEC's Management Body, show the dynamism and technological strength of companies in the Spanish wind energy sector.

The Awards Ceremony is scheduled to take place on June 29th at the Congreso Eolico Español in Madrid, Spain.

THE VIMFLO PROJECT HAS BEEN OFFICIALLY LAUNCHED IN MARCH 2023 IN TECHNIP ENERGIES HEADQUARTERS IN NANTERRE

This project is funded by the French State as part of France 2030 operated by ADEME/CORIMER.

Objective of this three years project is to develop a suitable and optimized O&M vessel concept to allow easy and secured replacement of Offshore Wind Turbine Major Component.

This project is a key element within Technip Energies Floating Offshore Wind technology development road map.

OFFSHORE WIND FOR KIDS

The final competition of the Floating Wind Challenge
11 teams participated to design and build the best floating wind support structure:

JP Fujiyama powered by The Nippon Foundation - Osaka, Hokkaido & Naggoia University
JP E&E powered by The Nippon Foundation - University of Tokyo & Akita
TW Orein (sponsored by NIRAS) - NCKU/NKUST
DKNL The Unsinkable 8 - DTU & TUDelft - winner of the best written report
GB Wind over Waves - University of Edinburgh
NL ROC Nova College
DK Titanic II - DTU
BE Seakings - KULeuven
BE Windboeren - KULeuven - winner of the best structure
AE UoBD Float - University of Birmingham Dubai
MY Helixa - University Malaysia Terengganu

The lifting of a monopile
by the bokalift 2

Transocean

TRANSOCEAN EXPLORING OFFSHORE WIND

While drilling is our core business, Transocean is exploring opportunities in the offshore-wind sector! Paul Johnson, VP of Technical Services and Head of Offshore Wind.

"Each and every day, I am inspired by the team that we have here at Transocean. As the industry's leading offshore driller, it would be easy to simply maintain the status quo. But, at Transocean, we continue to identify and realize new opportunities to further differentiate ourselves in the eyes of our customers."

JEREMY D. THIGPEN
Chief Executive Officer

ULSTEIN TO DESIGN CYAN RENEWABLES' OFFSHORE FOUNDATION INSTALLATION VESSELS

Singapore-based Cyan Renewables has contracted Ulstein Design & Solutions BV to design a series of new floating foundation installation vessels (FFIV) dedicated to offshore wind.

Singapore-based Cyan Renewables has contracted Ulstein Design & Solutions BV to design a series of new floating foundation installation vessels (FFIV) dedicated to offshore wind.

Ulstein said that the new FFIVs would feature adequate deck space and crane capacity to meet developments in foundation design, including monopiles and jackets.

In addition, they will also have low emission capability, using a hybrid power system consisting of dual-fuel engines (methanol), shore power and a battery energy storage

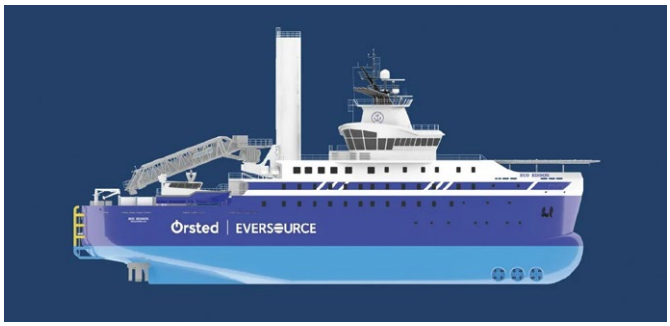
Torgeir E. Ramstad, Cyan's Managing Director FFIV Division, and former CEO of OHT, which merged with Seaway 7 in 2021, said:"With their strong track record in heavy lift vessel design and a good understanding of the market constraints and requirements, Ulstein is the preferred partner to design our new vessels.

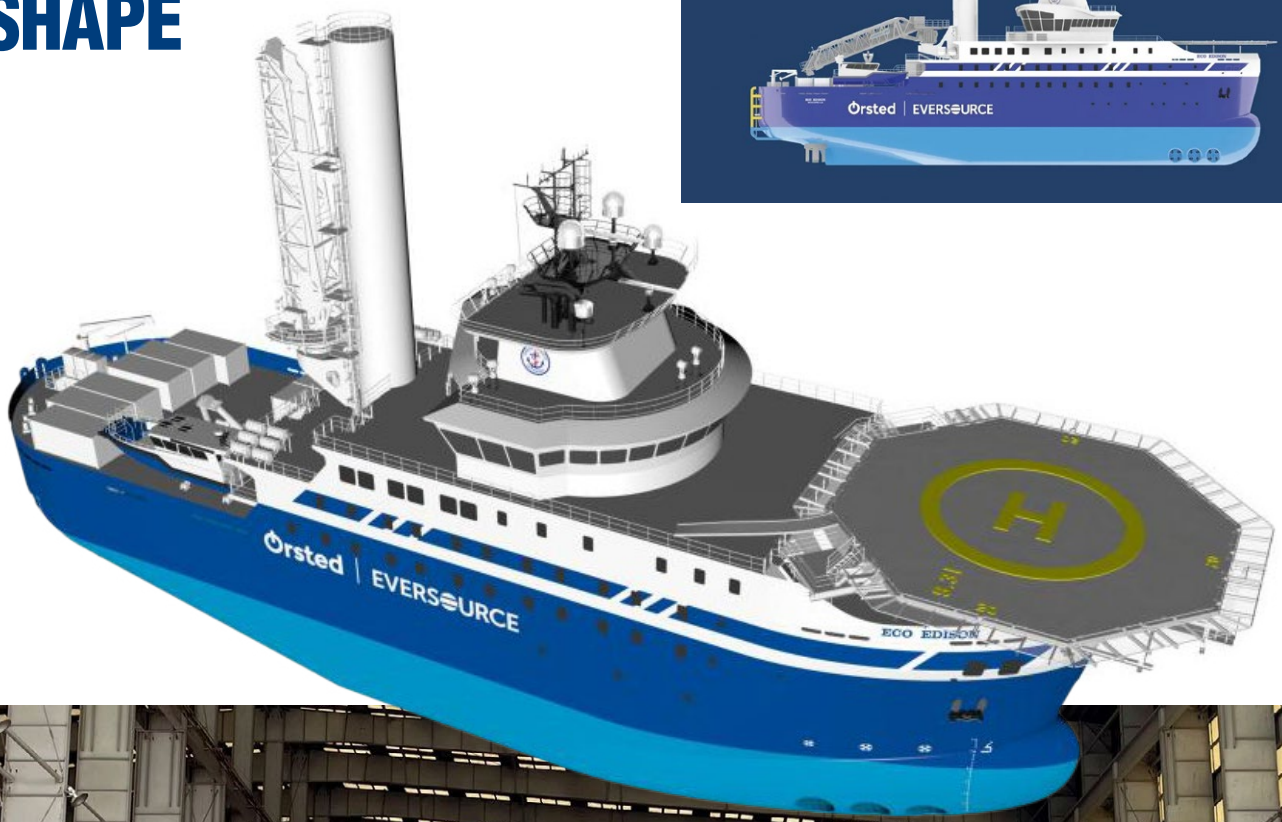
“Cyan Renewables will be a leading global vessel provider to offshore wind by partnering with Developers and EPCI and T&I contractors based on future-proof vessels in all categories.”

Edwin van Leeuwen, Managing Director at Ulstein Design & Solutions BV said: "We are very pleased that Cyan recognizes our added value and is placing their trust in us to realize their ambitions in offshore wind."

FIRST US-FLAGGED OFFSHORE WIND SERVICE OPERATIONS VESSEL TAKING SHAPE

Edison Chouest Offshore (ECO) has marked the 50-per cent completion milestone on ECO Edison, the first-ever US-flagged, Jones Act-compliant offshore wind service operations vessel (SOV), chartered by Ørsted and Eversource for their South Fork Wind, Revolution Wind and Sunrise Wind projects.





PORT ESBJERG

The jackup/installation vessel VOLTAIRE has called the port to mobilize for an offshore wind farm installation project in the North Sea.

Port Esbjerg is the North Sea's leading port for offshore wind, base to the Danish offshore industry and an international hub for multimodal transport with six regular RoRo liner services. More than 6,000 vessels calls the Port of Esbjerg every year, 4.5 million tonnes of cargo is handled at the port, 1,000 – 1,500 MW of offshore wind capacity was shipped out, and 70,000 cars were imported. The port is home to more than 200 companies that together employ approximately 10,000 people. Covering more than 4 million square meters, Port Esbjerg is the largest port in Denmark.

3060 WTIV-SERIES VESSEL WILL BE ONE OF LARGEST IN CHINA CAPABLE OF INSTALLING WIND TURBINES UP TO 20 MEGAWATTS

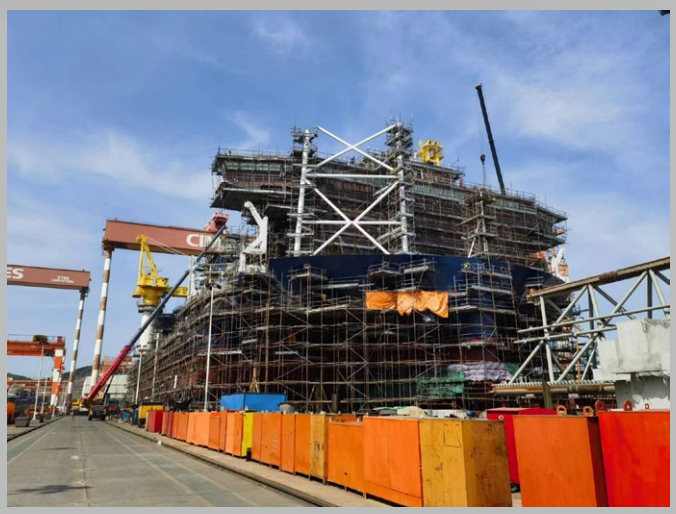
The vessel is costing 1.2 billion yuan ($184.8 million).

Huadian Heavy Industries is one of a number of Chinese offshore wind EPC contractors that have shown interest in the vessel.

Boqiang is also marketing the vessel for potential employment in Europe as the firm contract involves numerous options for similar units.

The vessel, with a dynamic positioning 2 (DP2) system, is designed to work in water depths of 65 metres, although this can be increased to around 80 metres if the legs are lengthened from 120 metres to 136 metres.

This vessel will be equipped with a giant crane — to be supplied by Husiman that will have lifting capacity of 2200 tonnes — a rack and pinion jacking system that will enable the vessel to operate in wave height of 2.5 metres.



FLYING FOCUS

For almost 40 years Flying Focus is specialized in maritime aerial photography. Since the company's start up in 1984 thousands of ships, sea trials, maiden voyages, special cargo transports, oil platforms etc. have been photographed.

Great exposure was generated by their photographic work of ships in heavy weather on the Northsea. The for this purpose especially acquired aircraft, the twin-engine Cessna Skymaster, can fly with winds up to 10 Beaufort!

All the 3 company owned photo aircraft are especially equipped with the required safety gear as well as the latest communication and navigation equipment. All flights are executed from Texel International Airport, where hangar and office are situated.

On a regular basis Flying Focus is operating for projects further away ranging from the Arctic Circle to the Atlantic Ocean.

A lot of their photo flights are executed for the offshore industry, both oil & gas and offshore wind, an industry far beyond the horizon for a lot of people.

Flying Focus recently published a photobook visualizing this impressive industry.

"The Dutch Offshore- beyond the horizon" contains 150 photos, 156 pages, 30x30 cm, hardcover. Price is € 34,50.
ISBN. 978-90-79716-28-9
The book can be seen and ordered via www.flyingfocus.nl

Boskalis' Bokalift 2 is a very impressive vessel, almost ready for its first project along the USA east coast. These days the vessel is testing the equipment near the Maasvlakte, like the lifting and transferring to the gripper of an enormous mono pile.

Photo: www.flyingfocus.nl

RIDGEWAY

ROCKBAGS®

100% RECYCLED

REGENERATION OF AQUACULTURE

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.

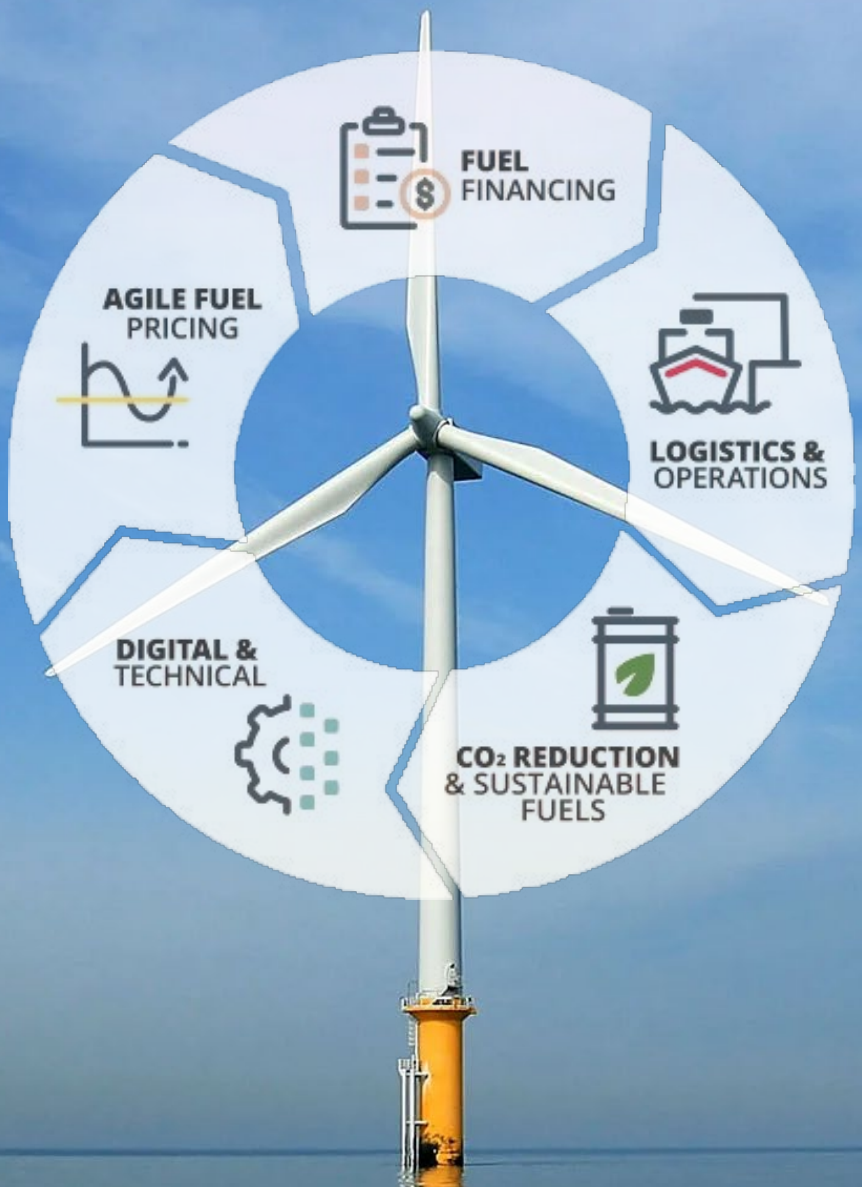
Once installed the filter unit Rockbags create their own mini ecosystem encouraging the regeneration of aquaculture environments, this aspect has become an important aspect for developers adding real value environmental engineering and sustainability in their subsea solutions.

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

Dan-Bunkering



Our concept Turnkey Fuel Solutions is an end-to-end solution for large scale offshore wind projects. We have a professional team who will be there every step along the way; from the initial stage concerning budgets and planning to the installation of the last wind turbine and the beginning of the maintenance work.

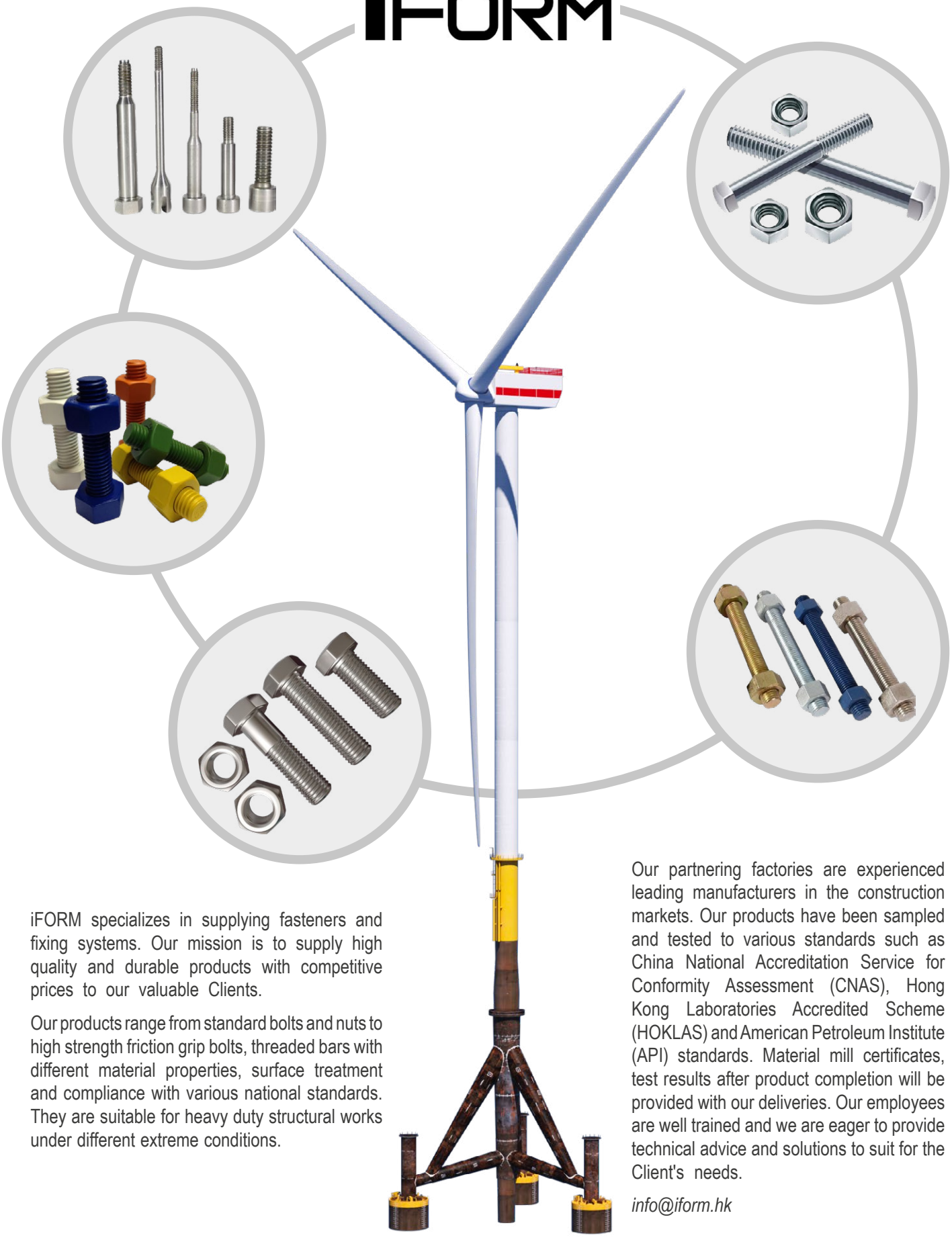
SYNERGYXR™

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.

iFORM



iFORM specializes in supplying fasteners and fixing systems. Our mission is to supply high quality and durable products with competitive prices to our valuable Clients.

Our products range from standard bolts and nuts to high strength friction grip bolts, threaded bars with different material properties, surface treatment and compliance with various national standards. They are suitable for heavy duty structural works under different extreme conditions.

Our partnering factories are experienced leading manufacturers in the construction markets. Our products have been sampled and tested to various standards such as China National Accreditation Service for Conformity Assessment (CNAS), Hong Kong Laboratories Accredited Scheme (HOKLAS) and American Petroleum Institute (API) standards. Material mill certificates, test results after product completion will be provided with our deliveries. Our employees are well trained and we are eager to provide technical advice and solutions to suit for the Client's needs.

info@iform.hk

OFFSHORE CHANNEL'S MOTTO IS TO LOVE NATURE

HAVKRAFT

THIS IS THE WAVE

BOOST FOR OMAN'S WAVE ENERGY VISION AS NORWAY'S HAVKRAFT RECEIVES FUNDING GRANT

Norwegian wave energy specialist Havkraft AS announced on Tuesday that it has received developmental funding for the world's premier nearshore-class wave power plant off the Scandinavian nation – a move that augurs well for the project's eventual replication off the Sultanate of Oman as well.

Globally recognised for its expertise in harnessing wave power for electricity generation, Havkraft said the development grant from Norwegian state-owned national development bank Innovation Norway will help accelerate the deployment of its maiden wave energy project off Western Norway next year. The venture will pave the way for the deployment of similar wave-energy based schemes elsewhere around the world, including Oman, it noted.

"We are currently involved in several energy-projects around the globe, from countries like Oman and India to Italy and the Philippines," said Havkraft in a statement. "We have an increasing pipeline of projects that is mobilizing to be deployed during this decade, securing high-quality energy from sustainable wave power plants provided by Havkraft," it added.

Earlier this year, Havkraft signed a partnership agreement with Translucidus, a UK-based consultancy with longstanding experience in Oman, to help harness wave energy as a clean and sustainable energy source off the Omani coast.

Given its lengthy coastline overlooking multiple seas as well as the Indian Ocean in the south, Oman is seen as offering promising opportunities for the generation of wave power by harnessing ocean surface waves. This renewable energy, billed as the largest estimated global resource form of ocean energy, can be harnessed for electricity generation, water desalination and water pumping, among other applications.

The partnership will work closely to provide wave energy power systems to Oman – a first for the country. Havkraft's N-Class near-shore wave power systems are billed as most suitable wave energy solutions for countries like Oman.

In Europe, Havkraft aims to be a notable contributor to the continent's goal of developing 40 GW of wave and tidal energy by 2050. "Our demonstration-project is progressing as planned," the company said. "We are now finalizing the general arrangement and are preparing to start the building-phase of this magnificent wave power plant. Through DNV-certification of the technology over the next year, we are getting ready for mass-production of power plants for the world market," Havkraft added.

PORTUGUESE METALWORKING INDUSTRY COSTA & REGO HAVE BEEN SELECTED AS CORPOWER OCEAN'S SUPPLIER OF THE YEAR FOR 2022.

The Viana do Castelo operation has played an integral role in the development of CorPower Ocean's first commercial-scale Wave Energy Converter, soon to be deployed in Aguçadoura as part of the HiWave-5 Project.

Established in 1982, Costa & Rego delivers metal structures and industrial support equipment for many sectors including renewable energy, shipbuilding, automotive, construction, water treatment, ports, fishing and sea transportation.

For CorPower Ocean, the advantage of having suitable materials in stock and offering flexible manufacturing processes to ensure high quality performance combined with very short delivery times, is highly valuable. Direct delivery to CorPower Ocean's purpose-built manufacturing hall in the Port of Viana, even saw some products arriving at a rapid speed, within a few hours after construction and purchasing

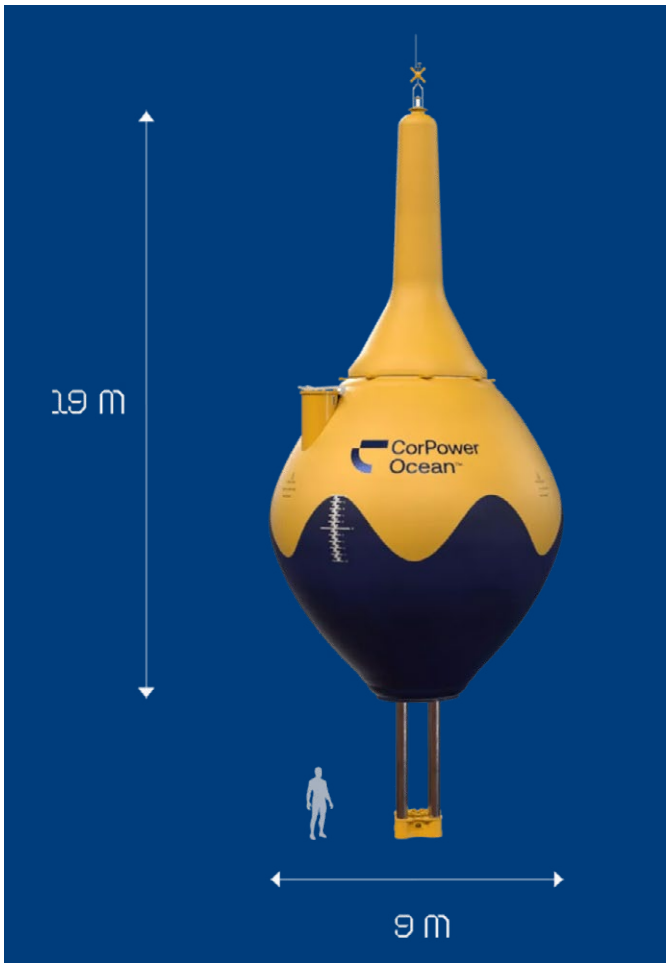
CorPower Ocean Supply Chain & Quality Control Manager Tord Jonsson said: "We rely on a global supply chain for products, materials and services. As such, we have a number of strategic suppliers who are continuously evaluated and rated in six main categories, including quality, responsiveness , cost competitiveness, cost reduction initiatives, lead-times and delivery performance. Over the last 18 months, Costa & Rego have demonstrated outstanding competence across all areas, and we would like to highlight this impressive performance as our Supplier of the Year for 2022. There are many examples where Costa & Rego went above and beyond to support our operations, including on one occasion delivering on-site welding support from midnight to 6am, on just a few hours' notice. This helped us maintain timeframes for the installation of our novel UMACK anchor system."

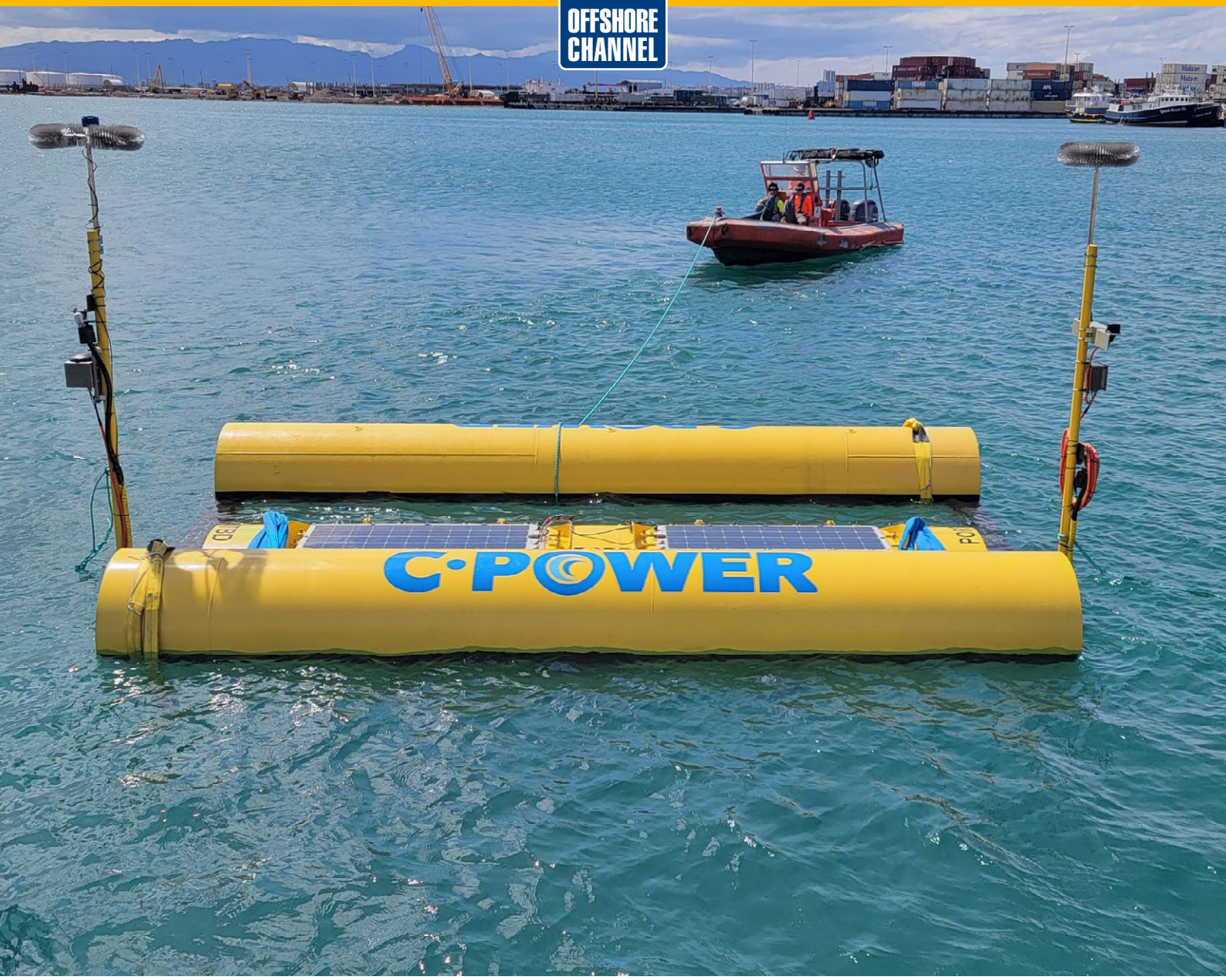
Costa & Rego is recognised as one of the most important local manufacturing companies in northern Portugal, delivering high-quality products nationally and overseas.

André Rego CEO of Costa & Rego said: "We are honoured to receive this accolade from CorPower Ocean, and to be supporting one of the world's leading wave energy developers. Marine energy is a hugely exciting sector, producing new and innovative technologies to accelerate the future energy transition. Here in Portugal, we are also witnessing firsthand its enormous potential to generate sustainable jobs and wealth creation for coastal communities, for generations to come."

Mr Jonsson added that CorPower Ocean's unique mobile factory cell concept allows for high volumes of on-site fabrication, ensuring strong engagement with local supply chains.

"A large share of system components of our WEC systems can be delivered by local supply chains. Driven by a competitive local supply chain, easy communication and efficient logistics for heavy parts" he said. "As demonstrated through our work in Viana do Castelo, and with partners such as Costa & Rego, this delivery concept guarantees high levels of local content, which in turn enables rapid roll-out on a global scale."





C·POWER

C-POWER HAS COMPLETED IN-HARBOR OPERATIONAL TRIALS OF THE SEARAY AUTONOMOUS OFFSHORE POWER SYSTEM AHEAD OF ITS DEPLOYMENT AT THE US NAVY'S WAVE ENERGY TEST SITE

This project aims to advance the SeaRAY k2 autonomous offshore power system (AOPS) to commercial readiness. The SeaRAY k2 AOPS consists of the SeaRAY k2 WEC with fully integrated station keeping (or the ability to perform adjustments to maintain its position) and the capacity to collect and send data and store energy. It is designed to support unmanned offshore activities and equipment, including subsea vehicles, sensor packages, and operating equipment.

TIDAL ENERGY:
A RENEWABLE ENERGY SOURCE
ENTIRELY PREDICTABLE

ORBITAL MARINE POWER UNVEILS NEW 30MW TIDAL ENERGY PROJECT IN ORKNEY WATERS

Orbital Marine Power (Orbital), the renewable energy company focused on the commercial deployment of its innovative floating tidal turbine technology, announced it has been awarded an Option Agreement from Crown Estate Scotland for a new tidal energy project in the Westray Firth.

Orkney-headquartered Orbital also confirmed it has a grid connection in place to service the pioneering project, which is located adjacent to the European Marine Energy Centre (EMEC) facility, where Orbital has already deployed the 2MW O2, the world's most powerful tidal turbine, under commercial operation. Renewable projects in Orkney were recently given a boost by Ofgem announcing it is minded to approve a new 220MW transmission connection, to be built from the Scottish mainland to service renewable power exports from the islands.

Following the award of contracts for difference (CfDs) in last year's AR4 process, Orbital is already targeting the installation of three more of its tidal turbines at the EMEC site, alongside the O2, to expand its tidal generation capacity in the coming years.

In keeping with the company's strategy of carrying out major aspects of its manufacturing within the UK, the construction of the Westray project would be expected to result in over £120m of domestic supply chain spend and create hundreds of jobs across construction and around a dozen new permanent jobs locally to provide operations and maintenance services.

The Option Agreement is for 30MW, which would equate to approximately 12 Orbital devices installed across the site. The waters around Orkney have significant wider tidal stream energy potential and the Westray site offers just one example of how this can be harnessed to provide clean, predictable power.

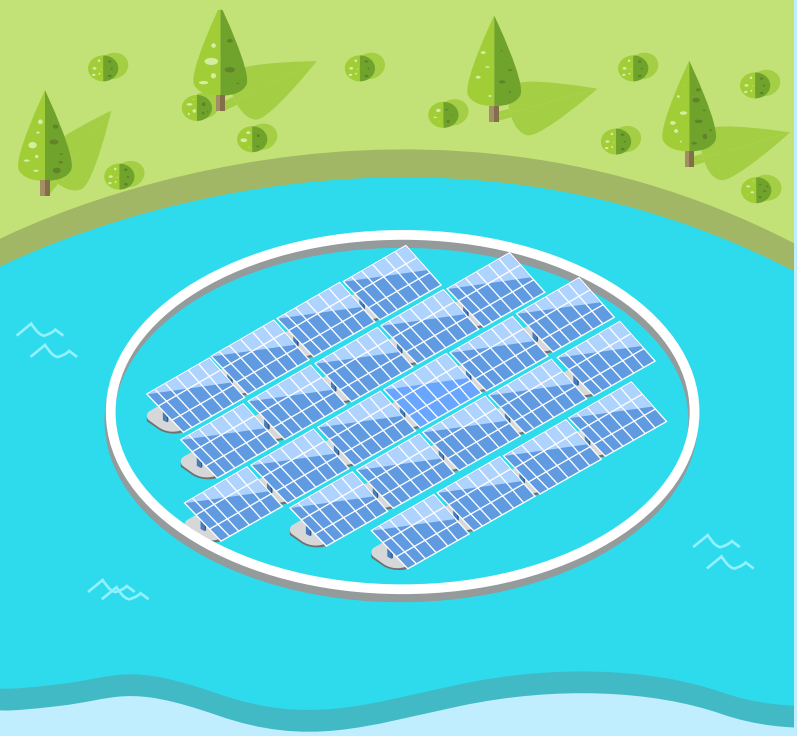
The Orbital team is engaged with stakeholders and is progressing environmental studies, with a view to reaching consent application as soon as possible. The company also brings the benefit of extensive local operational and environmental data to help shape and inform optimal project design, having successfully installed, operated and monitored multiple floating tidal projects on the neighbouring EMEC site since 2011.

Andrew Scott, CEO at Orbital Marine Power, said: "As the UK looks to accelerate the decarbonisation of its energy system, we firmly believe tidal projects can bring unique benefits while harnessing a perfectly predictable and secure source of renewable energy. We're proud to be building that vision in Orkney with this investment in our Westray Project."

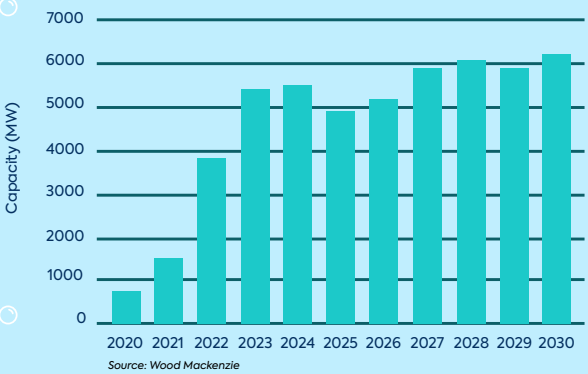
SOLARPLAZA SUMMIT
FLOATING PV

MARKET OVERVIEW

FLOATING SOLAR 2023



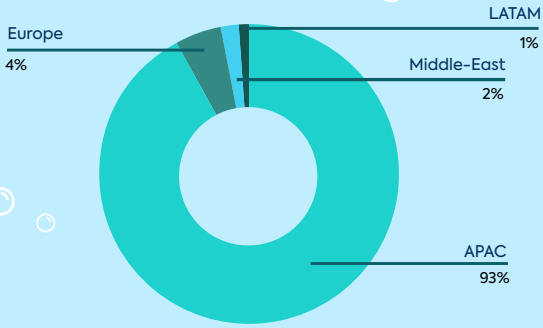
Historical and expected annual global floating solar installations



Source: Wood Mackenzie

- According to Wood Mackenzie, the global floating solar installations amounted to about **3.8 GW** in **2022.**[1]
- **In the next ten years**, cumulative global floating capacity is expected to surpass **58 GW.**

Market share



Source: Wood Mackenzie

The **Asia-Pacific (APAC) region** remains the **most dominant player** in the floating solar market, boasting over **93% of installations** in 2022 with a total capacity of **3 GW**.[1]

Financial landscape

The global floating solar market is expected to increase from **$2.5 bn** in **2021** to **$24.5** bn by **2031**.[2,3]

Market drivers

- **Land scarcity**
- **Increased land costs**
- **New market entrants**
- **Growing market maturity**

Potential

A recent study published in the journal Nature found that covering **30%** of the **world's reservoirs** (between 0.01 km² and 30 km²) with floating solar panels could yield **9,434 TWh** of electricity annually, a figure that is close to the electricity output of all the world's coal-fueled power plants.[4,5]

Top 3 countries for floating solar potential:

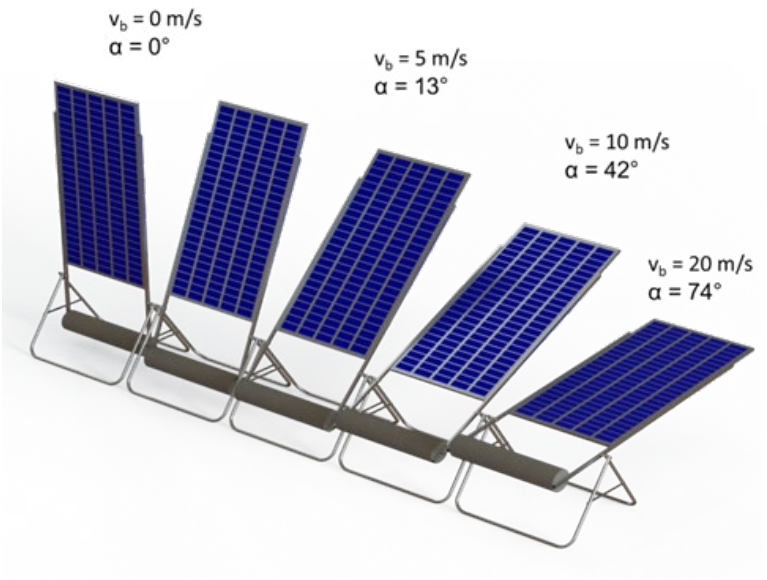
1,911 TWh per year

1,107 TWh per year

865 TWh per year

If implemented, the floating solar projects could preserve an estimated **106 km³ of water** annually, a quantity that is almost equivalent to the amount of water utilized by **300 million people** each year.

GERMAN STARTUP UNVEILS MOBILE, TILTABLE PV MODULES



SINNPOWER

Sinn Power is offering new tiltable solar panels for vertical PV systems in nature reserves and water-protection areas. They are not anchored to the ground and use a pendulum weight to return to their proper positions when hit by strong winds.

Sinn Power, a German startup specializing in floating PV, has presented its new SKipp mobile, tiltable photovoltaic solution.

The new product does not have to be anchored in the ground and is therefore particularly suitable for deployment in nature reserves and water-protection areas, where no ground anchoring or piling is permitted.

According to Sinn Power, its solar modules remain upright even in strong winds. The modules can be tilted and feature a pendulum weight to ensure they return to their vertical position, even in windy conditions.

“Tipping over can be ruled out, even without anchoring the modules to the ground,” the manufacturer stated.

Systems using this product can use bifacial solar modules oriented vertically in an east-west direction. This boosts output, especially during morning and evening hours, compared to traditional southern-oriented photovoltaic systems. The system also produces more solar power in winter, like other vertical PV installations deployed at high latitudes.

“With SKipp, we have redesigned open ground-mounted and agrivoltaic systems,” explained Philipp Sinn, founder and managing director of the German company. “This photovoltaic solution meets the highest technical requirements and at the same time offers our customers maximum flexibility and optimal electricity yield in terms of location and duration of use.”

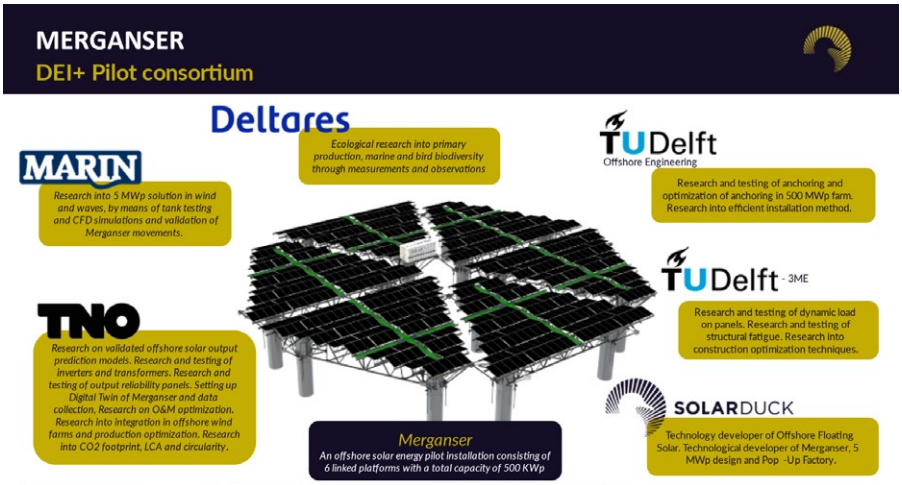
MERGANSER PILOT

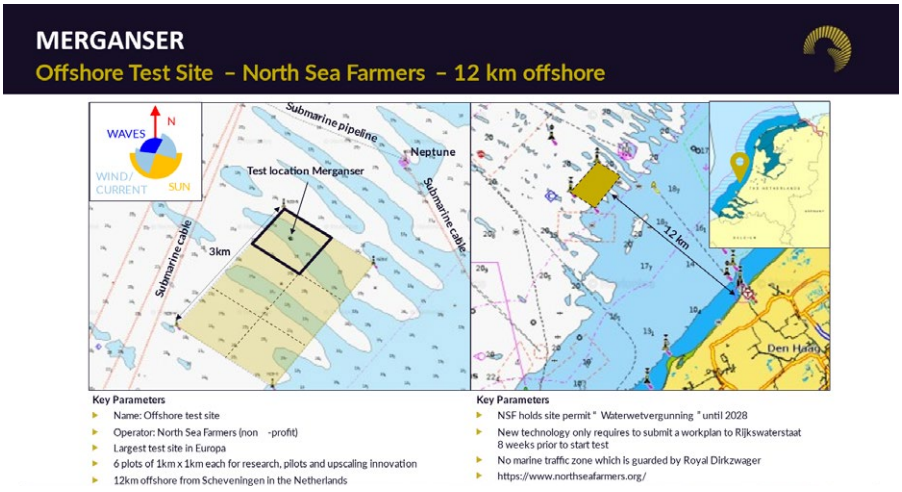
Merganser is an offshore floating solar (OFS) demonstrator plant with an installed capacity of 520 kWp. This new and scalable concept includes six interconnected platforms, which are designed for the extreme storm conditions occurring in the North Sea. This includes waves occurring once every 50-years reaching as high as 13,5 meters.

RWE, a leading offshore wind developer, is an important sponsor to the Merganser project and a strategic partner to SolarDuck. The supply chain for Merganser includes companies such as Norsk Hydro, Damen Shipyards and others that are all setting standards to build up the offshore floating solar industry. The platform floaters will be manufactured at a Damen Yard in Poland, while assembly takes place at a port site in Amsterdam in the Netherlands.

The pilot period will last 2-3 years and will take place at the offshore test site North Sea Farmers, which is located 12 km off the coast from The Hague, in the Netherlands. The test site offers SolarDuck a realistic operational environment to test Merganser's North Sea design capabilities.

Merganser will be an operational laboratory for SolarDuck, which together with research partners TU Delft, TNO, MARIN and Deltares will gather relevant data, such as platform motions, energy output and life below the water surface. This will allow TNO to make a validated digital twin of the concept and Deltares to gain insight on the ecological effects of offshore floating solar energy.





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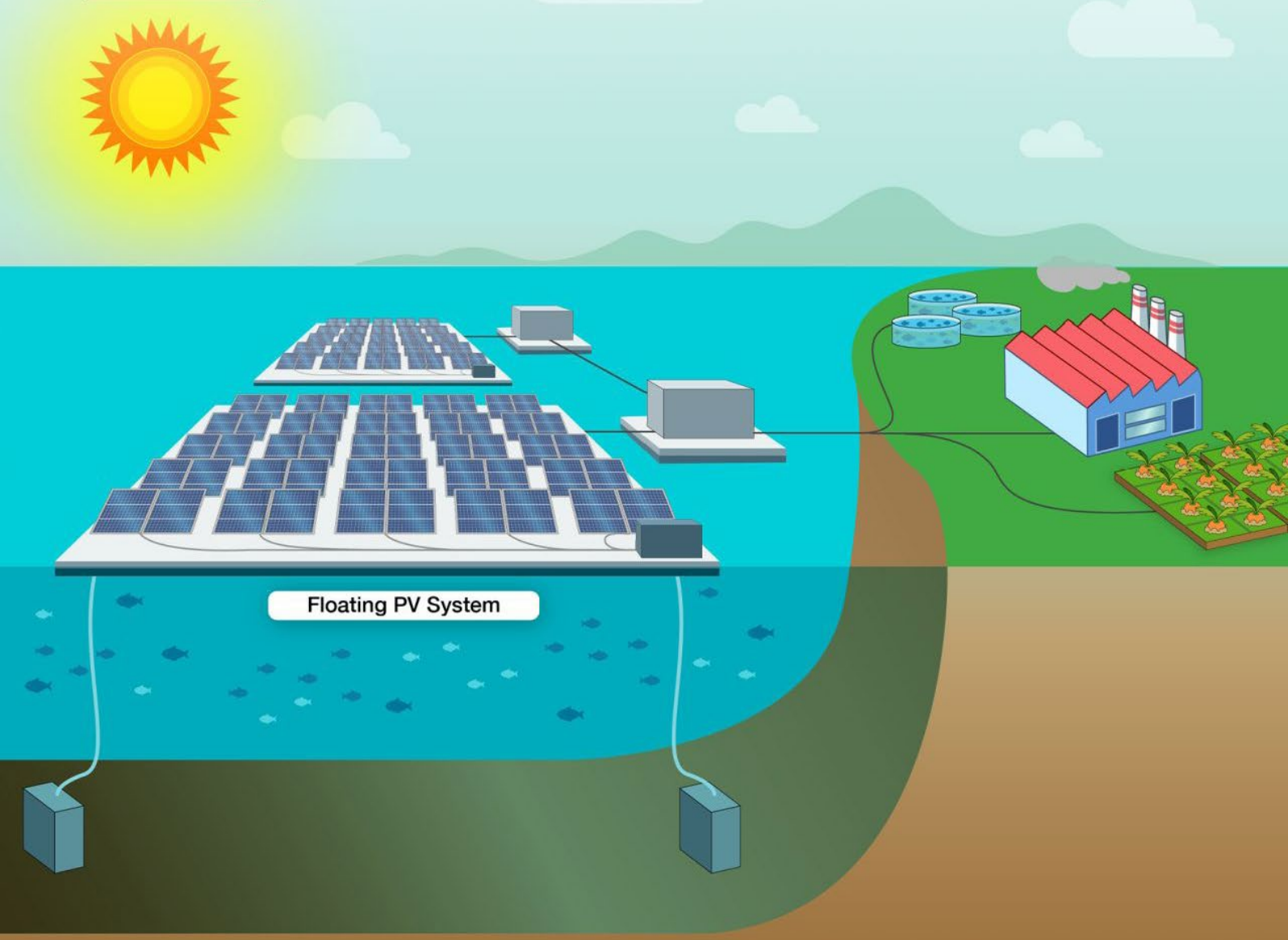

Overview of Solar Floating Photovoltaic Systems in the Offshore Industry

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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.

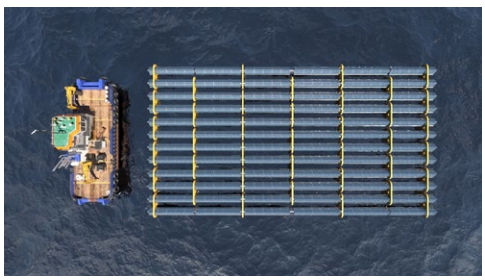
The round shape reduces the possible snow load. Wind and waves have less attack surface. Thus, many photovoltaic projects can from a static point of view with classic modules on land and on water realized only at high cost.

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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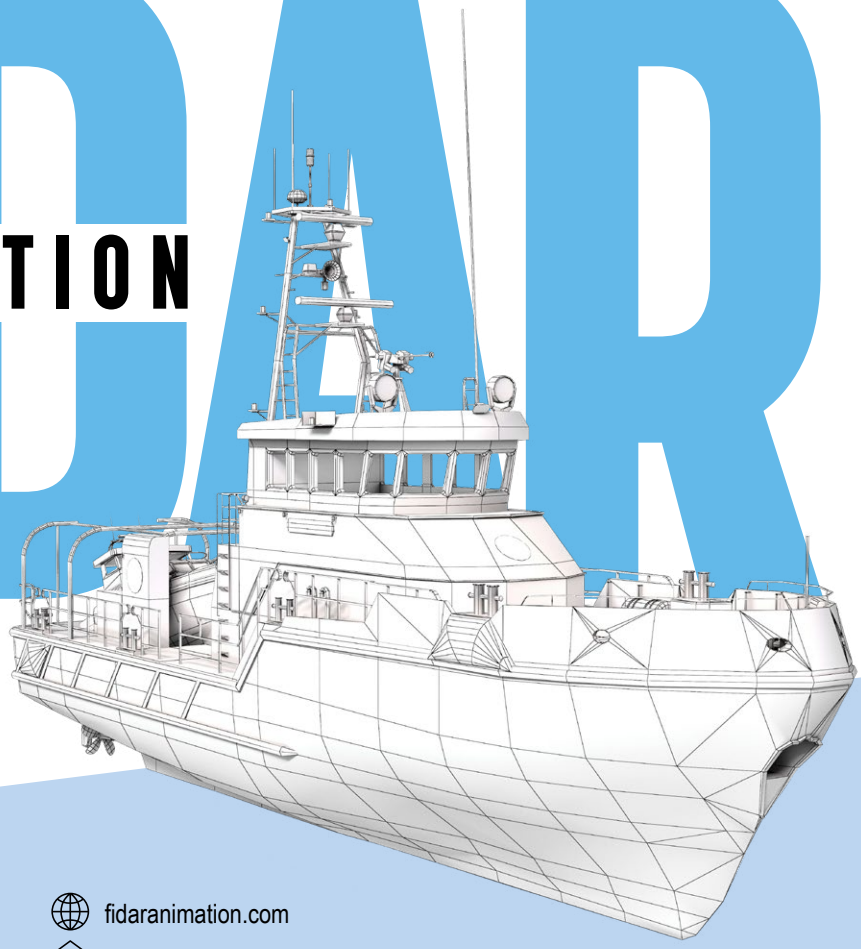

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OUR PROJECTS AROUND THE WORD

01	FLOWPOWER	Aarbakke Innovation AS	Norway	2021
02	RETRACTABLE BOW FOILS	Wavefoil	Norway	2021
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Client Country Year

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