

OFFSHORE CHANNEL



WORLD TREND & TECHNOLOGY

FOR OFFSHORE ENERGY SECTOR

**Offshore
Renewable
Energy**

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

May & June 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.

SARENS PERFORMS MAJOR LIFTS AND LOAD-OUT FOR THE FIRST PILOT FLOATING WIND FARM IN FRANCE

Sarens performs major lifts, weighs, and loads out three floating foundations in Fos-sur-Mer, France.

Provence Grand Large offshore wind farm, off the coast of the Marseille region in France, is the first pilot floating wind farm in France. The project will comprise of three 8.4 MW wind turbines from Siemens Gamesa Renewable Energy, erected on pyramid-shaped floating foundations designed and built by SBM Offshore. This future-oriented floating facilities are a solution for previously unusable sea locations.

The sub components of the floating foundations were assembled at the Eiffage Métal's site in Fos-sur-Mer to form the 45-metre-high floating foundations. These tripod-shaped structures are based on a TLP design developed by SBM Offshore, have a central buoy and two submersible buoys at each end, between which is an innovative anchoring system with tensioned lines. These components were then loaded onto a submersible barge and finally transported to be installed at sea, 17km off the coast.

During the first phase of the project, Sarens was commissioned to lift the major components of three floating foundations for the account of Eiffage Métal at their fabrication yard in Fos-sur-Mer. For the work Sarens used:

- LR1800 (800T Crawler Crane)
- CC2500 (500T Crawler Crane)
- 20 axle-lines of SPMTs

LR1800 was transported from Cadiz in Spain and CC2500 and SPMTs came from Belgium. The cranes lifted and assembled the following components:

- 3 Central Buoys
- 3 Central Columns
- 3 Transition Piece
- 18 Side Buoys
- 9 Side Nodes
- Bracings

Once assembled, Sarens began the second phase of the project in the first week of March 2023 This phase included weighing and load-out of the three floating foundations onto the outgoing barge. Sarens used:

For March 2023 weighing:

- 9 Load cells 500T
- 9 hydraulic jacks 500T
- 3 hydraulic power packs
- Sarens weighing interface

For May 2023 load outs:

- K24ST SPMTs arranged in two trains
- 4 maxi powerpacks K24 operational
- Two spare powerpacks.
- Two 6-axle SPMTs for auxiliary works.
- Four 30-meter MB1500x1000 modular beams

The equipment was transported and assembled on site within a week. Each floating foundation weighed around 2800T and was around 45m high and 70m wide. These floating foundations had to be positioned on a semi-submersible barge.

The floating foundations were transported by the two SPMTs configurations over 50 to 150 meters to the quay wall. Crew worked in two shifts to keep up with vessel float-off operation and finally loaded out the floating foundations onto the barge.

All these operations were supervised by SBM Offshore's team who was responsible for the overall load-out and float-off activities.



THE FIRST SIEMENS GAMESA WIND TURBINE FOR THE 25 MW PROVENCE GRAND LARGE FLOATING OFFSHORE WIND FARM HAS BEEN ASSEMBLED IN FRANCE

The floating wind farm will comprise three Siemens Gamesa 8 MW wind turbines installed on tensioned line floats and designed by SBM Offshore and IFP Energies Nouvelles.

The turbine components, manufactured at Siemens Gamesa's factory in Le Havre, arrived in Port-Saint-Louis-du-Rhône in April this year.

The floating foundations that will house the wind turbines are being assembled at Eiffage Métal's site in Fos-sur-Mer by the French company and Smulders, its Belgian subsidiary.

The Provence Grand Large is located 40 kilometres west of Marseille and 17 kilometres off the coast of Port-Saint-Louis-du-Rhône, in water depths of around 100 metres.

The project is scheduled to be completed this year when it will produce the equivalent of the annual electricity consumption of 45,000 inhabitants.

The Provence Grand Large floating offshore wind farm is owned by Parc Eolien Offshore de Provence Grand Large – a subsidiary of EDF Renouvelables, and Enbridge Eolien France 2 S.à.r.l (EEF2), a subsidiary of Enbridge Inc. and CPP Investments.





sarens

XXL MONOPILES FOR MORAY WEST ARRIVE AT SARENS PSG FOR MARSHALLING

The first shipment of 8 XXL monopiles from Dajin Heavy Industry Co., Ltd, for Ocean Wind's Moray West offshore wind farm has arrived in the Sarens PSG facility at the Invergordon Service Base in Scotland.

Each of the monopiles weighs about 2,000t and has a diameter of 10m, they were shipped on the heavy lift vessel ZHEN HUA 33, having been loaded in the port of Penglai close to the Dajin fabrication yard. The voyage from China to Scotland took 46 days.

Unloading and marshalling will be carried out by the fleet of Sarens' SPMTs based at Invergordon.

In January Steve Clark, Managing Director at Sarens PSG, said, "The combination of strategically located deep-water heavy lift quaysides and vast adjacent laydown combined with Sarens PSG's heavy lift & transport experience, engineering capacities, and market leading equipment provision, makes Invergordon and Sarens PSG the ideal and compelling choice for this project and for the delivery of large-scale storage and marshalling of both fixed and floating offshore wind projects.





EEW ROLLS OUT FIRST OCEAN WIND 1 MONOPILE

The first monopile foundation has been completed at EEW American Offshore Structures' (EEW AOS) facility in Paulsboro, New Jersey, for the 1.1 GW Ocean Wind 1 offshore wind project.

The offshore wind farm will feature up to 98 GE Haliade-X 12 MW wind turbines and up to three offshore substations within its lease area.

At its closest point, the project will be at least 13 nautical miles (about 24 kilometres) southeast of Atlantic City, New Jersey.



XXL MONOPILES

The dimensions of the monopiles that Boskalis will be installing in some of the new offshore wind farms in the United States:

- Length: up to 114 meters
- Diameter: up to 10 meters
- Steel (wall) thickness: in excess of 200 millimeters
- Max. Weight per pile: 2,260,000 kilograms

*Photos: Herman IJsseling Ulrich Wirwa
Steelwind Nordenham GmbH*



THE FIRST MONOPILE FOUNDATION INSTALLED IN NEW YORK'S FIRST OFFSHORE WIND FARM

New York's first offshore wind farm has reached a significant milestone with the start of offshore construction.

Governor Kathy Hochul announced Thursday that South Fork Wind project has marked its first "steel in the water" with the installation of the project's first monopile foundation. In the coming days, crews will install the project's U.S.-built offshore substation.

The project remains on-track to become the first utility-scale offshore wind farm to be completed in U.S. federal waters when it begins operations by the end of this year. It is being developed by a 50/50 partnership between Ørsted and Eversource.

Once completed, the 132-megawatt (MW) wind farm, consisting of 12 wind turbines, will generate enough renewable energy to power roughly 70,000 homes.

The project's construction will support hundreds of U.S. jobs and involve three Northeast ports, including New London, Connecticut and New Bedford, Massachusetts, through late fall. Foundation components for South Fork Wind were fabricated in Providence, Rhode Island.

Foundation installation is being performed by Boskalis's Bokalift 2, a Cyprus-flagged DP-2 crane vessel. During the construction phase, construction and transport barges, tugboats, crew vessels, and protected special observer monitoring vessels will be active at the offshore construction site approximately 35 miles east of Montauk, New York.



BOSKALIS INSTALLS FIRST U.S.- MADE OFFSHORE SUBSTATION FOR SOUTH FORK WIND PROJECT

Kiewit built the 1,500-ton, 60-foot-tall substation at its Ingleside facility near Corpus Christi.

After installing the foundation and the modular support frame, this week at Ørsted and Eversource's South Fork Wind, Boskalis' Bokalift 2 offshore installation vessel completed the offshore substation installation work by lifting and installing the topside.

According to Boskalis, the operation was supported by a fleet of more than a dozen vessels.

South Fork Wind is on track to be the first completed utility-scale offshore wind farm in federal waters, with the project expected to be operational by the end of 2023. The project will be New York's first offshore wind farm and will power approximately 70,000 New York households each year.



THE FIRST AMERICAN-BUILT OFFSHORE SUBSTATION HAS BEEN INSTALLED AT THE SOUTH FORK WIND SITE OFFSHORE NEW YORK, THE STATE'S FIRST OFFSHORE WIND FARM.

The 1,500-tonne, 60-foot-tall offshore substation was built by Kiewit Offshore Services, the largest offshore fabricator in the US, at its Ingleside facility near Corpus Christi, Texas.

The substation departed from the facility in May and was transitioning across the Gulf of Mexico and then up the East Coast for installation at the South Fork Wind project site.

The monopile foundation was installed by Boskalis's offshore installation vessel Bokalift 2, which is responsible for transporting and installing the foundations, including the one for the substation.





DEME

Dredging, Environmental
& Marine Engineering

The first monopiles and
transition pieces were
installed in Vineyard Wind 1
field. (United States)





Installation, commissioning
and offshore operations of the
XXL monopile skidding and
upending system signed Remazel
Engineering





Installation, commissioning and offshore operations of the XXL monopile skidding and upending system signed Remazel Engineering



DEME GROUP INSTALLS VINEYARD WIND 1 OFFSHORE SUBSTATION, FIRST IN US

DEME's specialised floating installation vessel Orion has installed the offshore substation for the 800 MW Vineyard Wind 1 wind farm, a first in the US, said the Belgium-based company.

With a weight of more than 3,500 tonnes, this was the single heaviest lift of the entire construction campaign, according to Vineyard Wind, a joint venture between Copenhagen Infrastructure Partners (CIP) and Avangrid.

The offshore substation left the quay at Bladt Industries' production site in Southern Denmark in May and headed for its destination 35 miles from mainland Massachusetts.

Bladt handled the steel manufacturing of the substation. Design and engineering were carried out by Semco Maritime and ISC, and installation of the electrical system was also carried out by Semco Maritime.

WORLD'S LARGEST SINGLE CAPACITY OFFSHORE WIND TURBINE SUCCESSFULLY INSTALLED

The world's largest 16-megawatt offshore wind turbine was successfully installed off the coast of East China's Fujian Province on Wednesday and is about to be put into commercial operation soon, marking an important breakthrough in China's offshore wind power production in high-end equipment manufacturing capacity and far-reaching offshore wind power construction capacity.

Located approximately 35 kilometers from the shoreline of Pingtan county, the 16-megawatt offshore wind turbine is currently the largest single capacity wind turbine that has been installed in the world. The center height of the wind turbine hub is 152 meters, the weight of the engine room and the generator

combination is 385 tons, the blade is 123 meters long, and the impeller sweeping area is about 50,000 square meters, the equivalent of about seven standard soccer fields.

The Global Times learned that the main components of this 16-megawatt offshore wind turbine are completely independent development by China. The research and development teams of the China Three Gorges Corporation (CTG) and Xinjiang Goldwind Sci and Tech Co. have overcome a series of key technical challenges, including ultra-long flexible blades, large-scale main shaft bearings, and miniaturization of ultra-large capacity generators.

SSE RENEWABLES' & TOTALENERGIES' SEAGREEN 1100MW SEAGREEN OFFSHORE WIND FARM, OFF SCOTLAND, HAS ACHIEVED ANOTHER LANDMARK WITH THE INSTALLATION OF ITS FINAL TURBINE

At the wind farm, off Scotland, 76 of the 114 Vestas V164-10.0MW turbines are now energised at the site, which is located 27km from the Angus coast, now producing more than two thirds of Seagreen's full capacity power.

Once fully operational, Seagreen will be Scotland's largest offshore wind farm and will be capable of generating around 5000GWh of renewable energy annually.

The installation of the final wind turbine follows on from the completion of the successful turbine foundation jacket installation campaign which included the installation of the world's deepest wind turbine foundation at 58.6 metres.

Seagreen's project director John Hill said: "This latest project milestone further underlines the hard work by everyone involved in the project.

"The teams, including Vestas, operator of the Orca Cadeler, and our wind turbine marshalling team at Port of Nigg should be proud of what they have achieved.

"We will now continue with the commissioning of the final turbines and progress with the inter array cabling works.

"The project has already brought benefits to the local community, the UK supply chain and once fully operational in summer 2023, it will make a significant contribution to Scotland's and the UK's net zero targets."

SSE Renewables continues to lead the development and construction of the Seagreen project and will operate Seagreen on completion for the wind farm's expected 25-year lifetime.

SSE Renewables' and TotalEnergies' Seagreen 1100MW Seagreen offshore wind farm, off Scotland, has achieved another landmark with the installation of its final turbine.



FIRST CAMPAIGN TO INSTALL TURBINES AT WORLD'S LARGEST OFFSHORE WIND FARM IS UNDERWAY

The campaign to install the first of 277 turbines at the world's largest offshore wind farm is underway, marking a major advance in the industry and speeding up the transition to a cleaner, more secure energy system.

The 260m tall turbines – which are almost twice the height of the London Eye – will be installed c.80 miles off the coast of Yorkshire using a specialist vessel, the 'Voltaire', with a lifting capacity of 3,200 tonnes, the largest of its kind in the world.

The scale of Dogger Bank Wind Farm is immense, occupying an area almost as large as Greater London, on seabed that once formed a land bridge between the UK and Europe. When fully complete it will have an installed capacity of 3.6GW of renewable electricity – more than two and a half times the size of the next largest offshore wind farm* – and be capable of producing enough green energy to power the equivalent of 6 million homes annually[^].



HLC 295000

THE HEAVY LIFT GIANT



Illustration by: Christoph Kadur

LIEBHERR

Jochem Tacx
Cesare Meinardi

An aerial photograph of a large offshore supply vessel, likely a jack-up vessel, with a prominent red lattice crane extending from the deck. The vessel is positioned on a deep blue sea. The crane is angled towards the upper right of the frame. The vessel's deck is filled with various pieces of equipment, including pipes, containers, and structural elements. The overall scene is captured from a high angle, showing the layout of the vessel and its surroundings.

BUILDING AN OFFSHORE WIND FARM

OPERATIONAL GUIDE

Second edition

STARGATE SECURES GRANT FOR GREEN HYDROGEN PROJECT OFFSHORE GRAN CANARIA

Stargate Hydrogen Solutions OÜ (Stargate) has been awarded a grant from the European Commission under the Horizon Europe programme to deliver an electrolyser that will be part of an offshore wind energy project aiming to demonstrate the complete green hydrogen value chain on the Canary Islands.

Coordinated by the Oceanic Platform of the Canary Islands (PLOCAN), the project will receive EUR 10.7 million for demonstrating the full value chain of green hydrogen.

The project will utilise renewable energy from a 6 MW offshore wind facility to produce green hydrogen using a marinized high-efficiency electrolysis unit.

A 1 MW Gateway series electrolyser from Stargate will be installed in the onshore hydrogen production plant at the PLOCAN site on Gran Canaria. The generated green hydrogen

and oxygen will be used at the local hospital complex.

The EUR 3 million grant awarded to Stargate will include the delivery and installation of the company's 1 MW electrolyser system including Stargate Stellar series stacks as well as H₂/O₂ compression and storage equipment.

“Stargate looks forward to delivering our Gateway series electrolyser specifically developed for maritime applications. Being part of this important demonstration project brings Stargate to the technological forefront of the rapidly developing field of maritime electrolysis, paving the way for future on-shore and off-shore installations,” said Rainer Küngas, Stargate CTO.



HYDROGEN PRODUCED FROM SEAWATER AT CHINESE OFFSHORE PROJECT

Hydrogen has successfully been produced via the electrolysis of seawater on a floating offshore platform in east China's Fujian Province, according to multiple sources.

A test carried out by state-owned wind turbine manufacturer Dongfang Electric Corporation, saw a floating platform that hosted electrolysis capacity produce hydrogen for more than 240 hours.

China Global Television Network (CGTN) has reported that the test was verified by a team of experts from the Chinese Academy of Engineering (CAE).

H2 View has reached out to Dongfang Electric Corporation for more details of the test.

According to reports, the systems endured force eight wind speeds, meter high waves and rainstorms.

Electrolysis for hydrogen production typically requires ultra-pure water. In most projects using seawater, desalination equipment is normally established.

Writing for H2 View this year (2023), Stephen B. Harrison, Managing Director of sbh4, said, "The consequences of water supply issues are unacceptable. Impurities such as calcium ions in the water will rapidly damage a PEM electrolyser membrane due to the interaction with the catalyst coating. Alkaline electrolysers also have sensitivities to poisons in the water."



SHIMIZU'S BLUE WIND COMPLETES ITS FIRST INSTALLATION WORK AT TOYAMA NYUZEN IN JAPAN

The jack up vessel Blue Wind was delivered in October last year and has now completed its first monopile and turbine installation in Japan.

Toyama Nyuzen offshore wind farm is the second fixed offshore wind project to have finished construction in Japan recently. The project size is small with just 3 turbines and the turbines have only 3MW output. The Chinese turbine manufacturer MingYang Smart Energy provided the MySE3.0-135 model for the project and monopiles were supplied by Nantong ROC. The project is a sign of progress regardless of size where the Japanese showing a determined attitude to have a robust offshore wind industry. Blue Wind is a valuable asset for the offshore wind market as the vessel is highly capable and committed to the Japanese market, the vessel's next venture is turbine installation at Ishikari Bay in Hokkaido, where Blue Wind will install 14 Siemens Gamesa SG-8.0-167 turbines on jacket foundations manufactured by Nippon Steel.



subsea 7

SUBSEA 7'S NEW SEMI-SUBMERSIBLE VESSEL EQUIPPED FOR XXL OFFSHORE WIND FOUNDATIONS EN ROUTE TO EUROPE

Subsea 7's recently delivered Seaway Alfa Lift offshore wind foundation installation vessel is in transit to Europe and is expected to join Subsea 7's fleet in the third quarter of 2023.

The semi-submersible heavy installation vessel, designed by Ulstein, will be used to install the next-generation XXL offshore wind foundations.

The newbuild heavy lift crane vessel Seaway Alfa Lift (CMHI-207), was originally ordered in 2018 by OHT on speculation. OHT eventually became part of Subsea 7's Seaway 7 branch.





ØRSTED INVENTS & PATENTS UNCREWED SURFACE MEASURING VESSEL

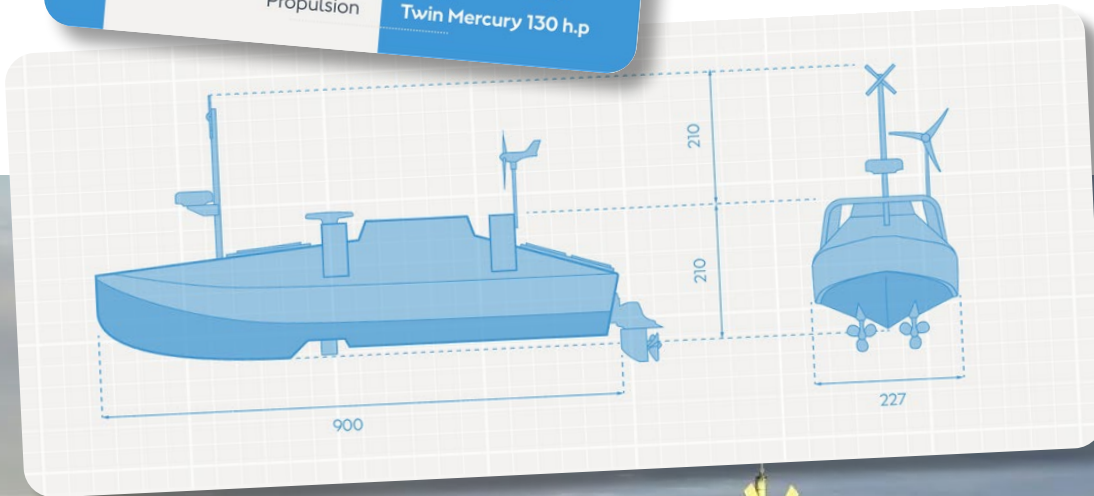
Ørsted, the world's leading developer of offshore wind farms, has designed and developed the first uncrewed surface vessel (USV) in the industry for offshore met-ocean measurement campaigns. The measurement data will help lower uncertainties in the expected annual energy production for new offshore wind farms. Ørsted, who has patented the USV concept, sees enormous potential in the technology and has initiated a serial production based on their successful prototype USV.

The prototype USV is named Hugin USV. It is designed for continuous operation in the harshest offshore conditions for a year at a time. The USV has a built-in navigation system, which enables it to transit from shore at various degrees of autonomy, and it can be controlled both in line-of-sight or from a beyond-line-of-sight remote control centre.

The USV is designed as a generic sensor platform and can collect large amounts of data on, among other things, the wind conditions, the state of the seabed, and biological and ecological measurements, all dependent on the sensor instrumentation chosen for a given operation. The broad range of measurements collected by the USV is essential for Ørsted's early-phase development activities prior to the construction of new wind farms.

Technical specifications

GENERAL		
Length x width x height		900 x 227 x 400 cm
Draft		0.8 m
Dry weight		6.8 T (fuelled)
Hull material		GRP construction
Propulsion		Twin Mercury 130 h.p



**RAMBOLL**

RAMBOLL WINS NEW MULTIMILLION ENERGY ISLAND CONTRACT

In a new project win, we will develop the electrical infrastructure for the planned energy island in the Danish North Sea. The contract has a value of DKK 225 million over 10 years.

Fully developed, the energy island will have a capacity of 10 GW

The Danish government has announced that the concept of Energy Island North Sea will be examined thoroughly. Before the government initiates a public tender, it must be analyzed if there is a better or cheaper way to realize the concept. One of the possibilities that will be examined in the coming analysis is a platform solution. The Danish government's ambitions of realizing an offshore infrastructure solution in the North Sea stands, and Ramboll's consultancy to the Danish transmission system operator Energinet on the artificial island's electricity

infrastructure continues.

The energy island in the North Sea will be key to powering Europe with renewable energy. By 2033, the island will have a capacity of 3 GW zero carbon electricity, equivalent to approximately half of Denmark's electricity consumption today. By 2040, this figure rises to 10 GW— enough to power 10 million homes in Northern Europe.

"The North Sea energy island positions Denmark as a frontrunner in the implementation of renewable energy at large scale. Not only will this transformative project be crucial in helping achieve Denmark's national climate targets, it will also serve as an energy hub for Europe," says Hannes Reuter, managing director for Ramboll's global Energy division.



BALMORAL UNVEILS SCOUR PROTECTION SOLUTION THAT REPLACES ROCK DUMPING

Aberdeen-based provider of buoyancy and protection systems to the fixed-bottom and floating offshore wind industries, Balmoral, has launched a new solution for which the company says can drastically reduce scour phenomena around fixed wind turbines that cause seabed erosion and a reduction in foundation strength and stiffness.

The scour protection system, called Balmoral HexDefence™, integrates seabed protection and flow reduction to minimise offshore operational costs and potential cable failure, according to the company.

The structure eliminates the requirement to dump rock, instead providing a non-invasive approach to protecting the monopile and the immediate surrounding area, Balmoral says.

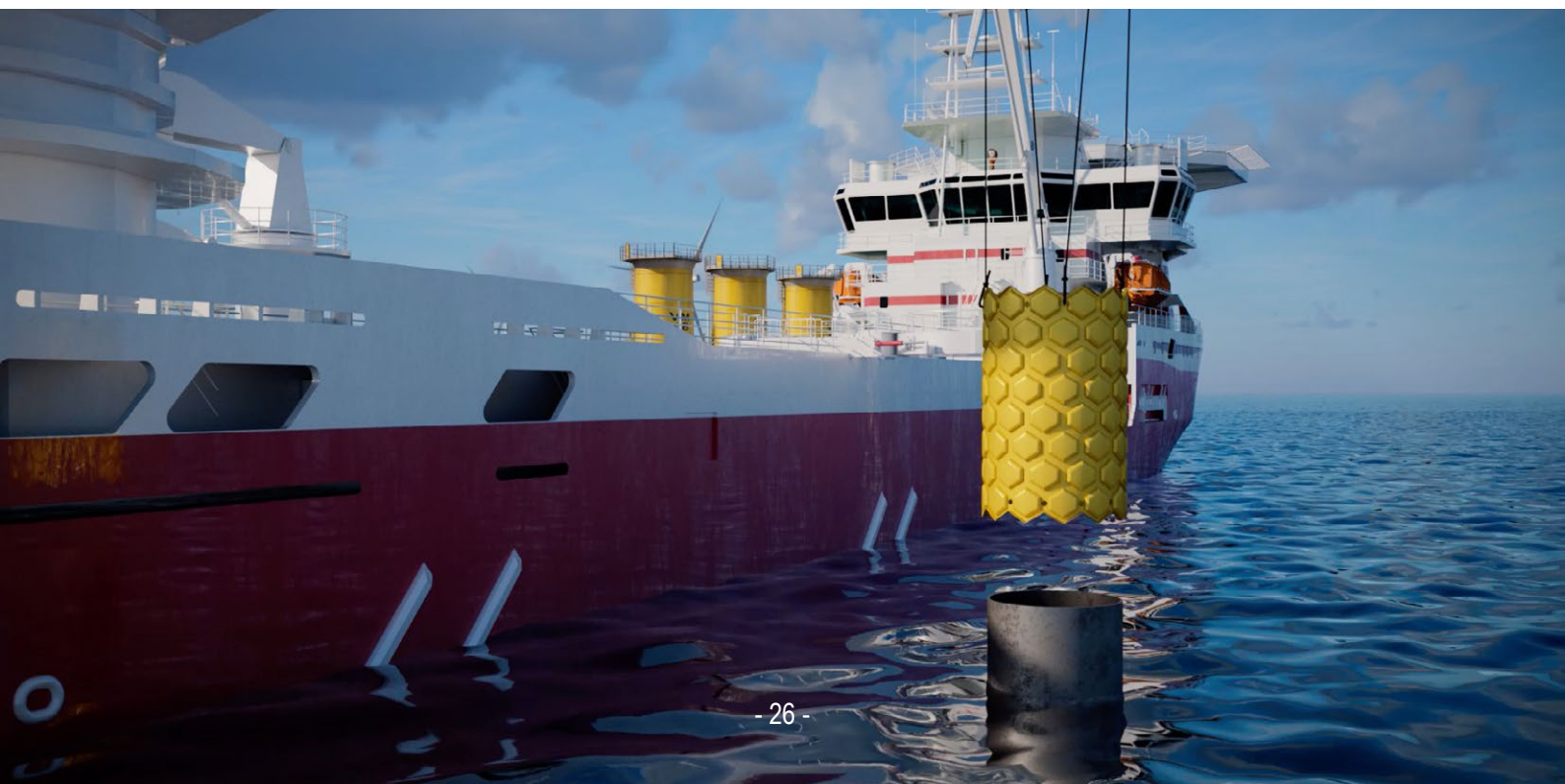
Furthermore, HexDefence has lightweight advanced composites construction and allows for streamlined installation method, which makes it easy to install without the need for additional vessels. This helps achieve an improved carbon footprint for all operations, the company pointed out.



Balmoral says its new system is also capable of use with antifouling coatings and does not require special equipment for end-of-life recovery.

“The interlocking panels are generally 10m long and customized to fit varying monopile diameters and feature integrated lifting and access points. In simple terms, the installation process involves sinking the foundation, sleeving it with HexDefence, fitting the transition piece and assembling the pylon and blades”, said Fraser Milne, Balmoral’s engineering and projects director.

“The system is also suitable for retrofitting to existing monopile structures.”




RIDGEWAY

ROCK BAGS
 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

RIDGEMAN

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	Germany	Parkwind	Cable protection	2022





Dan-Bunkering

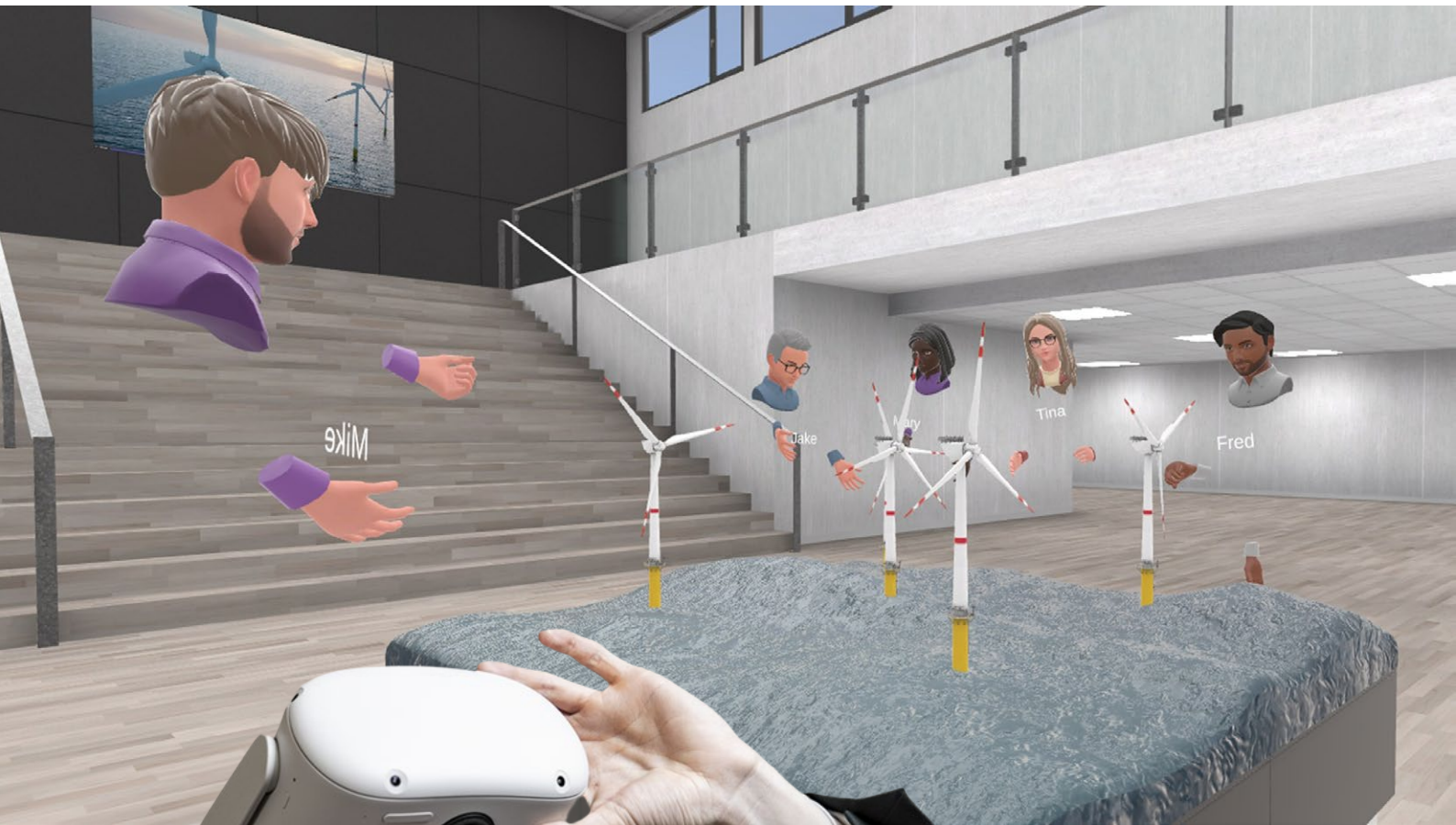


Our concept Turnkey Fuel Solutions is an end-to-end solution for large scale offshore wind projects. We have a professional team who will be there every step along the way; from the initial stage concerning budgets and planning to the installation of the last wind turbine and the beginning of the maintenance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



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.





SUBSEA ROBOTICS SERVICES

PETRODIVE GROUP PLANS TO DEVELOP ITS ROV CAPABILITIES

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.

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





World Ocean Day



CORPOWER OCEAN RESUMES C4 DEPLOYMENT PROGRAM



Earlier this year, CorPower Ocean identified cable damage at the offshore site. It initiated a series of operations to recover and refurbish the electrical export cable involving ROVs (Remote Operated Vehicles) and offshore construction vessels, which was successfully concluded in June. With the site infrastructure restored, CorPower Ocean has resumed the C4 deployment program by testing operational methods for connecting and disconnecting its C4 device. This follows the successful site installation of the UMACK anchor and subsea electrical export cables in mid-2022 and the completion of C4 assembly and successful Pre-Deployment Check (PDC) program at the quay-side launch pad in Viana do Castelo in December 2022.

During recent weeks innovative methods for pulling down and mating the C4 device to the UMACK anchor using a fully surface operated installation sequence have been verified. In the next phase of the program the C4 device will be taken

through cycles of testing safety, control and grid functions, followed by first power export to the Portuguese grid.

CorPower Ocean CEO Patrik Möller said: "We are pleased to progress the C4 deployment program, after having the Agucadoura site back in operation. Developing new and disruptive technology is an endurance sport and a discipline we have been honing through a carefully structured verification program for more than a decade. As we work to introduce a new power source to the world our everyday life consists of problem solving and removing various obstacles, both big and small. Often this involves auxiliary functions not directly related to the core technology, with the export cable being a recent example. We always try to plan for the un-plannable, and to be prepared to address new challenges along the way in a methodical manner."

OCEAN POWER TECHNOLOGIES EXPECTED TO DOUBLE ITS ORDER BOOK BY THE END OF 2024

Ocean Power Technologies Inc (OPT) expects its contract orders to more than double to \$15 million in the 2024 financial year, the intelligence maritime solutions and services provider highlighted when handing down its latest quarterly results.

Analysts at Water Tower Research noted this expected contract growth, which is projected to be driven by the ramp-up of OPT's data-as-a-service (DaaS) line, wave adaptive module vehicle (WAM-V) sales and leases, and consulting business inflows.

"Order pipeline stands at \$68 million compared to a pipeline order book of \$20 million to \$30 million last year," the analysts wrote in a note to clients.

"Typically, 60% to 70% of order activity is with government agencies and 20% to 25% is with energy companies. The pipeline consists of 30% to 40% WAM-Vs while 50% of the pipeline is PowerBuoys."

The analysts also noted that the company is building out its WAM-V inventory to enable the rental or lease of fleet vehicles for short-term client requirements.





HAVKRAFT O-CLASS AN OWC POWERPLANT FOR OFFSHORE LOCATIONS

The Havkraft O-CLASS is probably the world's most efficient OWC stand alone wave power plant, invented by Havkraft. The solution combines two efficient wave energy conversion methods for optimum power production and cost-efficiency. The market leading oscillating water column-technology (the Havkraft Wave Energy Converter – H-WEC) is boosted by a market leading point absorption unit



U.S. DEPARTMENT OF ENERGY INVESTS NEARLY \$10 MILLION TO ADVANCE MARINE ENERGY

The U.S. Department of Energy (DOE) today announced nearly \$10 million for seven innovative projects that will accelerate development and testing of marine energy technologies. Marine energy resources—such as wave, tidal, and ocean and river currents—are abundant, predictable, and complement other renewable energy sources. These investments advance research on wave-powered technology for use in seawater desalination and support a feasibility study for a potential ocean current test facility.

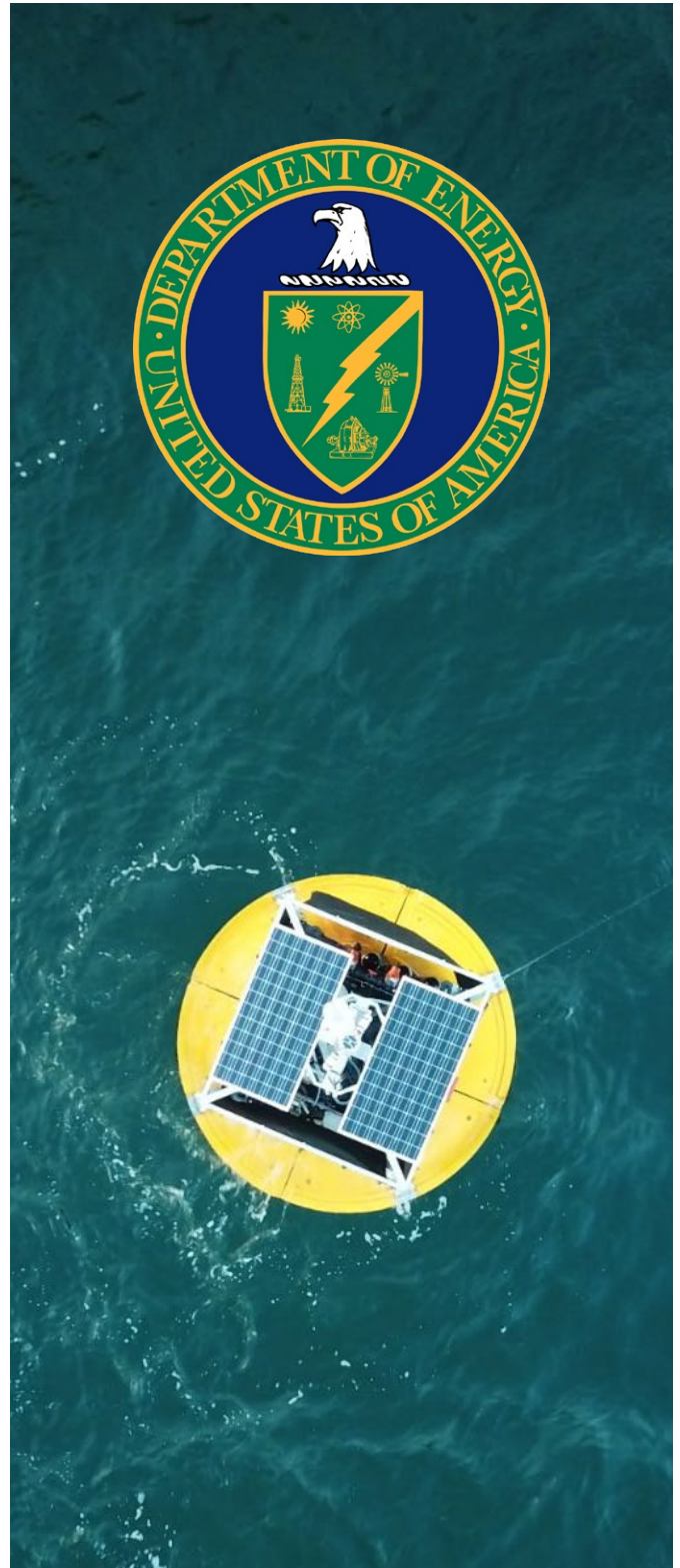
“Marine energy technologies have incredible potential to provide clean electricity as well as clean water,” said Alejandro Moreno, Acting Assistant Secretary for Energy Efficiency and Renewable Energy. “These projects represent DOE’s first significant investment in marine energy serving the blue economy market, and will advance technologies that can meet these needs and help achieve President Biden’s goal of a net-zero-emissions economy by 2050.”

The seven projects announced today are part DOE’s Water Power Technologies Office’s (WPTO) Powering the Blue Economy™ Initiative, and six advance solutions that could provide low-cost, emission-free, and drought-resistant drinking water in disaster-relief situations and to small communities.

The seven projects focus on four areas:

Proving robust and reliable designs of wave-powered desalination systems.

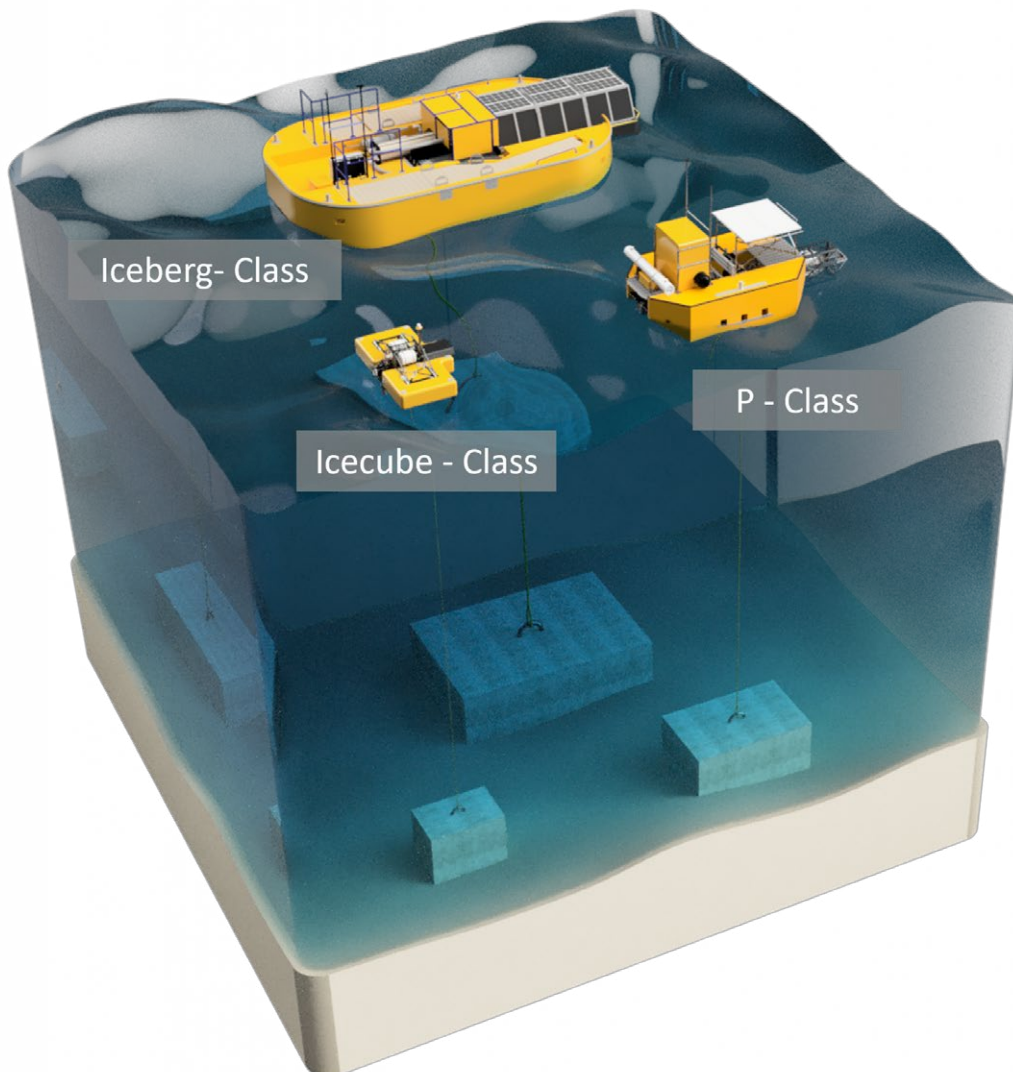
- Oneka Technologies USA, Inc.’s Oneka IceCube—Emergency Relief Wave-Powered Desalination (Fort Pierce, FL). This project will optimize the Oneka IceCube, a wave-powered desalination device specifically designed for emergency relief applications and the grand prize winner of WPTO’s Waves to Water Prize. The team aims to reduce costs and improve technical performance, durability, and reliability to maximize water output, ease deployment and manufacturability, and prepare for commercialization. (Award amount: \$1,996,849)
- Sea Potential, LLC’s DUO-DS Wave-Powered Desalination System Sea Trials (New Canaan, CT). This project will deploy, test, and accelerate commercialization of the DUO-DS wave-powered desalination device, which pumps seawater through a reverse osmosis membrane to generate freshwater. The team proposes a deployment off the coast of Massachusetts to capture performance data. (Award amount: \$1,789,178)





**ONEKA TECHNOLOGIES
RECEIVES US\$3.4 M
FROM DOE'S POWERING
THE BLUE ECONOMY™
INITIATIVE**

In the relentless pursuit of a sustainable and cleaner future, technological advancements in renewable energy sources are crucial for mitigating climate change and reducing our carbon footprint. Oneka Technologies, a company using exclusively renewable energy from the waves to turn seawater into freshwater, has recently received a significant allocation of US\$3.4 M from DOE's Water Power Technologies Office's (WPTO) Powering the Blue Economy™ Initiative to further develop its Icecube project and marine energy subsystem solutions.



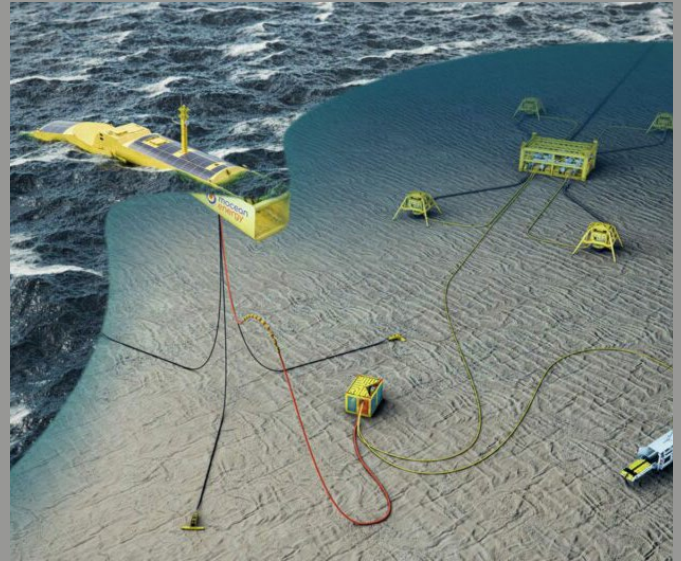
MOCEAN, VERLUME AND BAKER HUGHES ANNOUNCE SUBSEA WAVE ENERGY LINK-UP

Scottish firms Mocean Energy and Verlume have announced an agreement with oilfield services giant Baker Hughes on subsea wave power.

The trio have signed a memorandum of understanding to collaborate on opportunities for integrated wave power and energy storage, particularly around electrification of subsea assets.

Over a two-year period, they will share capabilities on deployment of “reliable, uninterrupted power supply” for applications like charging systems for underwater vehicles and subsea control systems.

Cameron McNatt, managing director at Mocean Energy added:



“For Mocean Energy, partners like Baker Hughes and Verlume, who have complementary technologies and skills, are essential to delivering complete solutions to address growing customer demand.

“The signing of the MoU marks a key milestone in our supportive relationship with these partners, and in our growth journey.”

All parties are currently involved in Renewables for Subsea Power, a project combining Edinburgh-headquartered Mocean Energy’s wave energy converter and Aberdeen-based Verlume’s Halo to deliver low carbon power and communication to subsea infrastructure such as Baker Hughes’ subsea controls equipment.



Baker Hughes



BOOSTING WAVE POWER IN SOUTHEAST ASIA



Havkraft AS, a pioneering Norwegian corporation in renewable energy technology, and Neuto Pte Ltd, a leading Singapore-based renewable technology company, have joined forces to spearhead a green transition in Southeast Asia through the harnessing of ocean energies, particularly the Havkraft N-class wave power plant. The strategic partnership was formalized with the signing of a Memorandum of Understanding (MOU) in August 2023, marking the commencement of a transformative collaboration.

Havkraft's proprietary Havkraft Wave Energy Converter (H-WEC) technology, which includes revolutionary wave power products like the Havkraft N-class, holds immense promise for the renewable energy sector in Southeast Asia. By capitalizing on Neuto's extensive expertise and regional presence, the Parties aim to accelerate the adoption and integration of this advanced technology within local markets, fostering a greener and more sustainable future.

Geir Arne Solheim, the inventor, founder and CEO of Havkraft AS, expressed his enthusiasm for the strategic partnership, stating, "At Havkraft, we firmly believe in the potential of ocean energies, particularly wave power, to drive sustainable development and address pressing environmental challenges. Partnering with Neuto, a prominent player in the Southeast Asian market, is a significant milestone that will enable us to take our innovative Technology to new horizons, making a profound impact on the region's renewable energy landscape."

Andy Low, the founder and CEO of Neuto Pte Ltd, highlighted the importance of this collaboration for the green transition in Southeast Asia, stating, "Southeast Asia presents vast opportunities for renewable energy growth, and wave power holds tremendous potential as a clean and reliable source. By aligning our strengths with Havkraft, we are poised to deliver innovative solutions to our region, accelerate sustainable development, and play a vital role in realizing a green future for Southeast Asia."





ENERGY TEST



In the turquoise waters of Honolulu, C-Power recently completed an in-water harbor test of the SeaRAY autonomous offshore power system (AOPS) that will soon be deployed for a six-month pilot project at the U.S. Navy's Wave Energy Test Site (WETS) off the Hawaii coast.

With support from Sea Engineering Inc., C-Power tested the components of the AOPS — a SeaRAY wave power system and the Halo subsea battery storage system and gravity anchor from Verlume — in the water to ensure proper system deployment and operation. The successful test marks the final milestone before C-Power's groundbreaking pilot project begins.

In partnership with the U.S. Department of Energy (DOE) and Navy, C-Power is launching the world's first field test of an ocean energy device purpose built to provide power and real-time data communications to both mobile and static assets. The SeaRAY AOPS being deployed at WETS is a charging station, data server, and cell tower enabling remote, autonomous operation of offshore assets. The field test includes plans for the system to serve several assets including:

- A Saab Sabertooth autonomous underwater vehicle (AUV) operating in untethered mode, without a top side vessel. From shore, operator Hibbard Inshore will remotely program and monitor the AUV. Equipped with the R2Sonic Sonic 2024 multibeam echosounder, the untethered Sabertooth will patrol the surrounding area to collect sonar imagery of the sea floor and underwater infrastructure. After each survey mission, that imagery will be communicated back to shore and the Sabertooth recharged via the SeaRAY AOPS.
- A BioSonics long-range subsea environmental monitoring system deployed for the entire six months, sending data real time to the cloud. The system will also serve as an intrusion detection system during the trial.

Saab and BioSonics are partners in C-Power's Partner Engagement and Co-Development (PEC) Program, which allows companies to participate in C-Power demonstrations in a number of ways. C-Power is currently expanding membership in the PEC Program ahead of its upcoming demonstration of a next generation SeaRAY AOPS at the new PacWave South site off the Oregon coast. The DOE-sponsored demonstration has a primary goal of simultaneously demonstrating applications critical to offshore operations. Visit the PEC Program webpage to learn how your company can join to receive detailed information about the SeaRAY Hawaii demonstration results and participate in future demonstrations.

TIDAL ENERGY:
A RENEWABLE ENERGY SOURCE
ENTIRELY PREDICTABLE



**SIMEC ATLANTIS
ENERGY**

The power sales from the MeyGen tidal energy project have reached €4.5 million in 2022, according to the developer of the project SIMEC Atlantis Energy, which also unveiled plans for potential combination of the tidal power scheme with its battery energy storage systems (BESS) business.

According to the financial statement from SIMEC Atlantis for the full year ended December 31, 2022, the power sales from the MeyGen project rose from €2.7 million in 2021 to €4.5 million in 2022.



FRANCE BOOSTS TIDAL SECTOR WITH €65M AND REVENUE SUPPORT FOR FLOWATT

Ocean Energy Europe hails the French government announcement of at least €65 million of funding, plus dedicated revenue support, for the pioneering tidal energy pilot farm FloWatt. Announced today by the Minister for the Energy Transition, Agnès Pannier-Runacher, the move signals a huge step forward for the tidal energy sector in France, and lights the way for other EU Member States to follow. Flowatt will be the biggest tidal farm in the world, with the most turbines and largest capacity – a true flagship project.

This announcement demonstrates France's trust in tidal energy as both an industrial opportunity and a key part of the energy transition. It is a timely response to increased activity

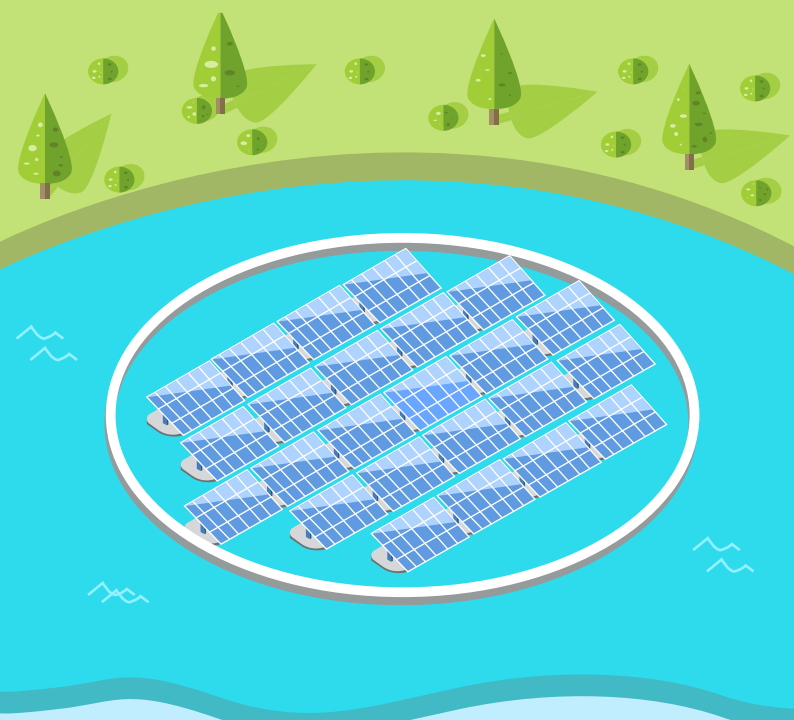
and investment in ocean energy in the US and China, and part of a broader push that needs to happen at EU level to secure Europe's electricity supply with more indigenous production.

With an EU objective of 40 GW of ocean energy by 2050, a new target for innovative renewables in the 2023 EU Renewable Energy Directive, and the inclusion of ocean energy as a strategic Net Zero technology, the past few years have seen an increase in political momentum. This must now be translated into concrete action by Member States, who have the power to roll out ocean energy on a large scale and reap the rewards, both at home and abroad.

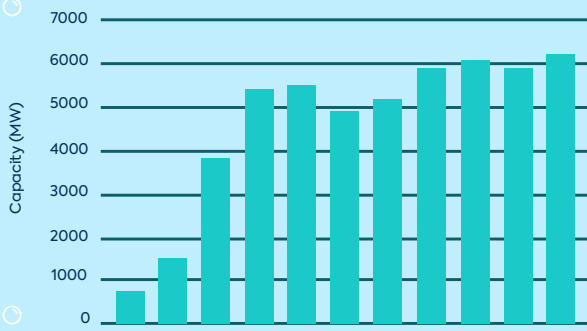


MARKET OVERVIEW

FLOATING SOLAR 2023



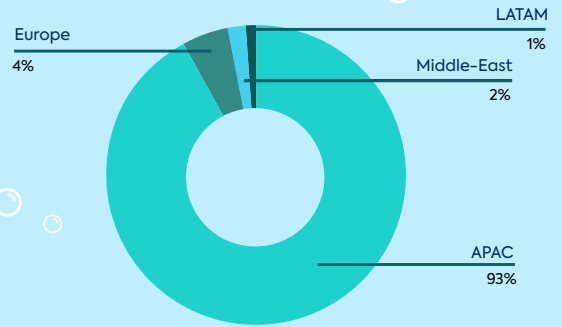
Historical and expected annual global floating solar installations



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.

SEAVOLT

LAUNCHES A FIRST OF A KIND SOLAR ENERGY TEST PLATFORM

OSTEND, BELGIUM – SeaVolt, a collaboration between Tractebel, DEME, and Jan De Nul, gets ready for its first floating solar energy test platform to be installed offshore. The platform floatation system is currently located in the port of Ostend, on the Belgian North Sea coast, where main contractor Equans is finalizing assembly. The test platform will be the first installation in the Belgian North Sea aimed at the large-scale development of offshore solar energy and is scheduled to be towed offshore, anchored, and put into operation to gather data for at least a year starting in August.



 Fred. Olsen 1848

INTRODUCING BOLETTE – THE TECHNOLOGY TO UNLOCK THE POTENTIAL OF NEAR- AND OFFSHORE FLOATING SOLAR

The main challenge for floating solar, particularly in marine environments, is how to handle wave loads in combination with wind. Fred. Olsen 1848 now launches its proprietary solution to this challenge; BOLETTE.

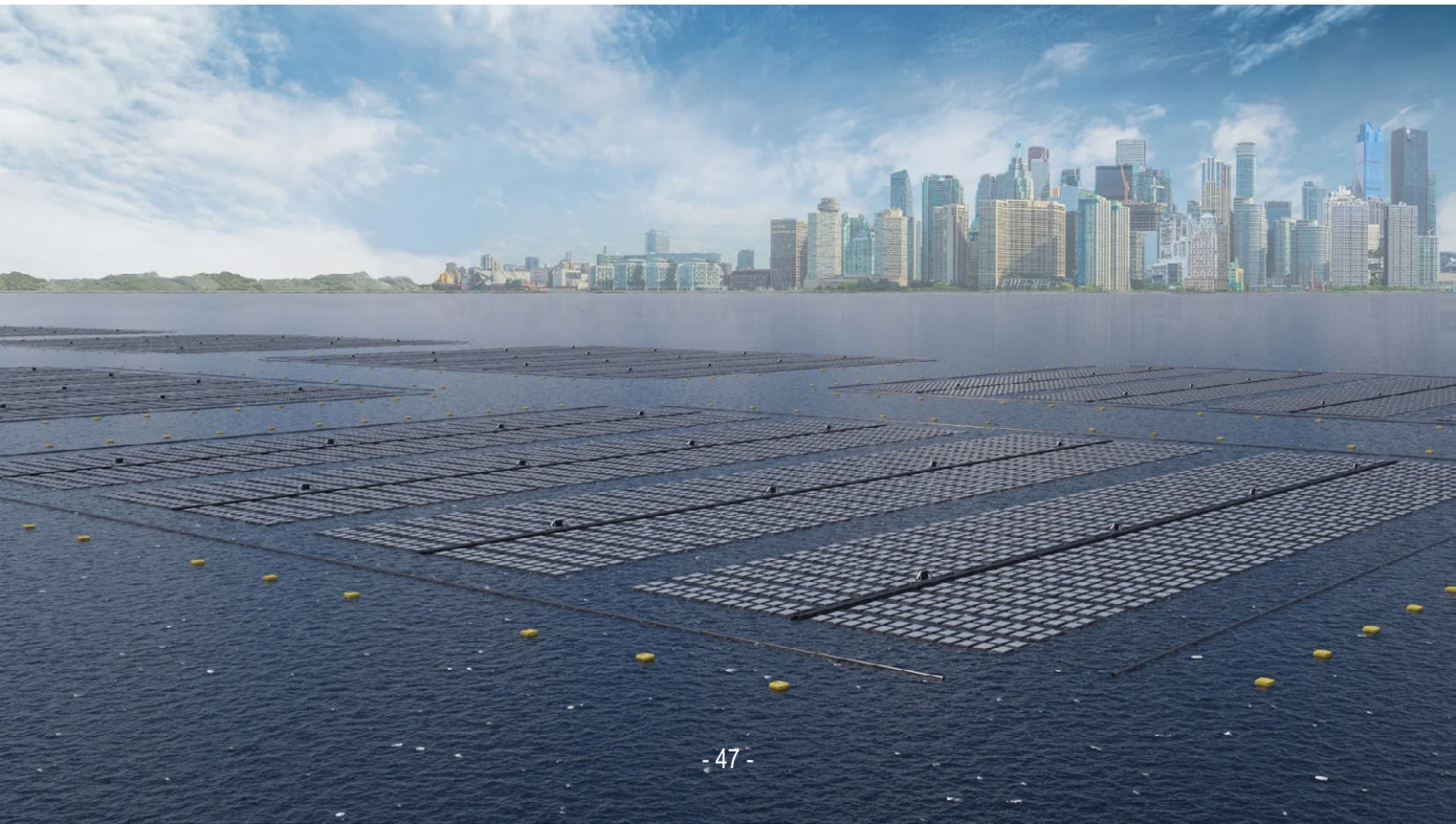
BOLETTE allows the PV modules to move freely and independently within a rope mesh, distributing the forces to the mooring system. As a result, BOLETTE handles both wave and wind loads.

BOLETTE is designed with an integrated solution for operation and maintenance. It is easily scalable and can be tailored to each individual project. All components are easily sourced, and as such, BOLETTE leverages an existing global supply chain and supports a sustainable industry.

“BOLETTE is designed in a very cost-efficient manner to follow the motion of the ocean, even in offshore conditions. We believe BOLETTE’s elegant simplicity is a game-changer unlocking the potential of floating solar”



*Sofie Olsen Jebsen,
CEO Fred. Olsen 1848*





TNB RENEWABLES & TNB RESEARCH HAVE SIGNED A LETTER OF INTENT WITH SOLARDUCK & HYDRO

This signing marks the beginning of a partnership to advance solar energy solutions in Malaysia and Southeast Asia

- SolarDuck will install a 780kW offshore floating solar (OFS) plant off the coast of Tioman island in Malaysia as a research project to assess technical and economic feasibility of OFS in Malaysia.
- Installation targeted to be completed by 2025.
- New distributed energy generation methods like OFS will provide additional pathway for TNB to diversify its RE portfolio and achieve its net zero aspiration.
- Hydro contributes with engineering and production of the aluminium profiles which the solar plant is constructed from.
- Tioman island is the starting point of a renewable future for Malaysia, opening a large potential for OFS in the entire region as OFS is set to become the most affordable marine energy technology by 2030.

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

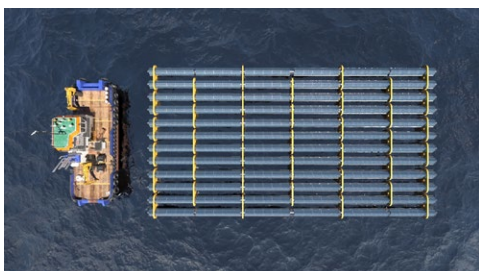
waves have less attack surface. Thus, many photovoltaic projects can from a static point of view with classic modules on land and on water realized only at high cost.

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



FIDAR OFFSHORE ANIMATION COMPANY



Fidar Offshore Animation Company is ready to advertise your company with the best quality and the lowest price. In fact, we are a young and creative team that specializes in producing industrial animation (Offshore Energy Sector), Architectural animation, motion graphics and web design. The Fidar Offshore Animation works in the business world with the message "Pay less, Get the best".

Fidar Offshore Animation offers:

- Lower prices
- Excellent quality and customer satisfaction
- On time Delivery

If you are convinced, contact me now

www.fidaranimation.com

info@fidaranimation.com

Torslanda, Gothenburg, Sweden



OUR PROJECTS AROUND THE WORLD



- 01 **FLOWPOWER** Aarbakke Innovation AS Norway 2021
- 02 **RETRACTABLE BOW FOILS** Wavefoil Norway 2021
- 03 **OFFSHORE FLOATING SEAWEED FARM** WyndTek Netherland 2021
- 04 **SOUTH BROOKLYN MARINE TERMINAL** SEA.O.G Company USA 2021
- 05 **CONTROLLED FLOW EXCAVATION** Seajet UAE 2021
- 06 **OFFSHORE FLOATING SOLAR PANEL** Agnespower Italy 2021
- 07 **OFFSHORE INSTALLATION VESSELS** Offshoretronic Spain 2021
- 08 **SMT ROV** Hughes Subsea England 2021
- 09 **LOAD REDUCTION MOORING TECHNOLOGY** TFI Marine Ireland 2021
- 10 **LRD SYSTEMS FOR FLOATING OFFSHORE WIND TURBINES** Dublin Offshore Ireland 2021
- 11 **OFFSHORE CREW VESSEL** Us offshore USA 2022
- 12 **OFFSHORE STEEL SUPPLIER** SPS England 2022
- 13 **OFFSHORE VESSELS** Western Baltic Engineering Lithuania 2022
- 14 **SUBSEA CATHODIC PROTECTION** Imenco Norway 2022
- 15 **FLOATING OFFSHORE WIND MOORING SYSTEMS** Mooreast Singapore 2022
- 16 **OFFSHORE WIND INSTALLATION VESSEL** Xperk Netherland 2022
- 17 **OFFSHORE CRANES** KenzFiguee Netherland 2022
- 18 **OFFSHORE H2 PLATFORM** ElenEnergy SouthKorea 2022
- 19 **MONO PILE INSTALATION VESSEL** Windecom Spain 2022
- 20 **OFFSHORE ROCK BAGS** Ridgeway England 2022

FIDAR ANIMATION

Digital Marketing Agency

- Offshore 3D Animation
- Single Frame Rendering
- Web Design & SEO

We are a creative international team of Storyboard writers, 3D artists, offshore structural specialists and animators with one goal – creating memorable and sophisticated visual stories that can boost your brand in no time. Our focus is on Offshore Renewable Energy sector. In our team, work quality is given utmost importance. Each work is carefully crafted and undergoes strict Quality Control to ensure results that go beyond expectations.



fidaranimation.com

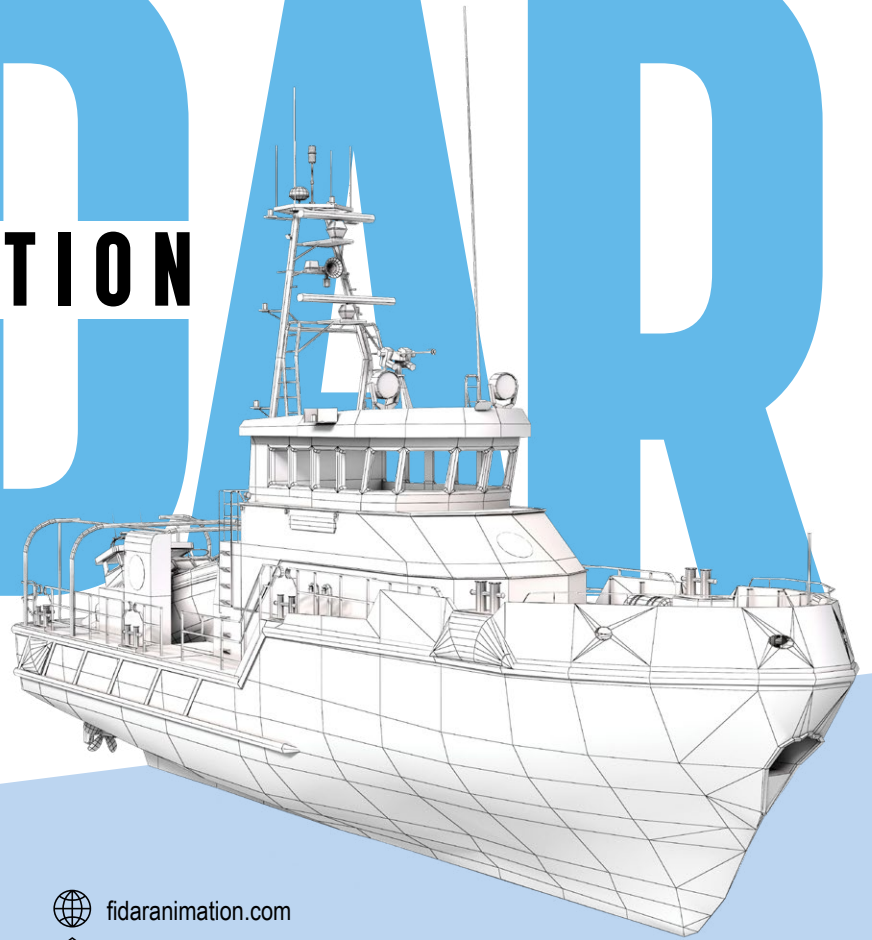


info@fidaranimation.com



Add1: 2 Frederick Street, London, WC1X 0ND

Add2: Osmağça Mah. Reşitefendi Sk. No: 11
34000 Kadıköy İstanbul



OFFSHORE CHANNEL

Issue
05/2023
06/2023

Imprint

Publisher

Offshore Channel

Editor-in-Chief

Farshid Ebrahimi

Project Manager

Hossein Eskandari

Editorial Office

Head of Editorial Office: Jochem Tacx

Project Management: Morteza HosseinPour Fazel

Image Editing: Mahya Kian Taheri

Financial Department: Niloofar Ahmadi

Authors

Alireza Ghaemi, Naiem Eslami, Sajad Shahverdi,
Pooya Shojaadini, Reza Derakhshandeh, Alireza Amjad,
Behnam Medghalchi

Art Direction

Alireza Jafarpour, Saide Hassani

Translation

Naser Mostafavi

Business Development Manager

Tayebeh Foroozesh

Contact

Offshore Channel Magazine
Torslanda, Gothenburg, Sweden
info@offshore-channel.com
Tel. +46-76-904-0095