# MOSS MARITIME NEWSLETTER

## OFFSHORE FLOATING SOLAR POWER

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# WHAT IS XOLARSURF?

Xolarsurf is a cutting edge floating solar platform developed by Moss Maritime. Its modular design can be adopted to operate in any offshore location under harsh environment conditions. The modular design also provides significant flexibility wrtsize and configurations of islands. One island consists of several smaller floaters, each providing a protected and safe space for the PV modules. Each floater may facilitate up to 35–45 kWp installed power, arranged in the way preferred by the customer.

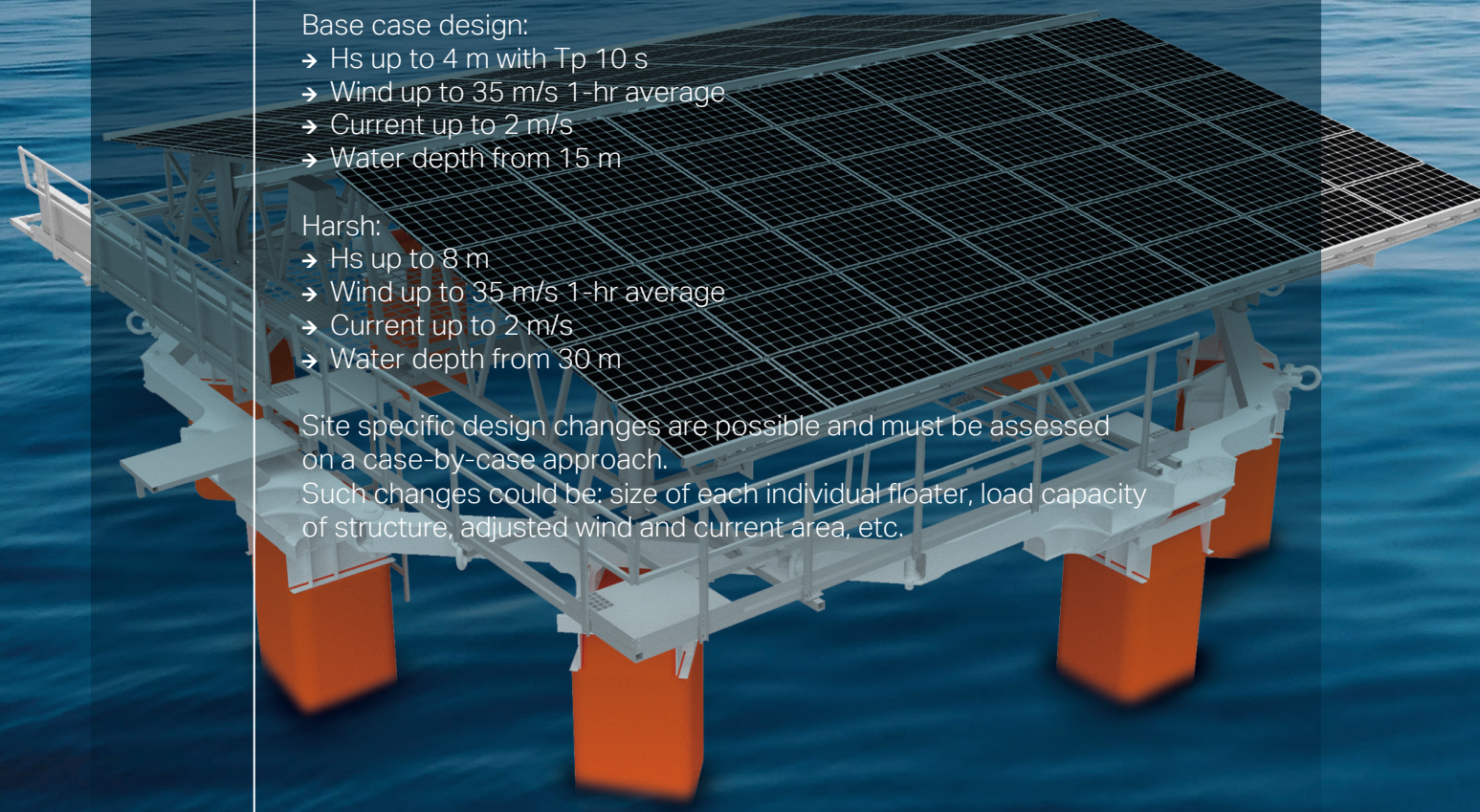
## WHERE CAN XOLARSURF BE INSTALLED?

Suitable for exposed locations, meaning sea water environment and wave action. Given the range of environment that XolarSurfbe may utilized in, two versions have been developed:

Base case design:
- Hs up to 4 m with Tp 10 s
- Wind up to 35 m/s 1-hr average
- Current up to 2 m/s
- Water depth from 15 m

Harsh:
- Hs up to 8 m
- Wind up to 35 m/s 1-hr average
- Current up to 2 m/s
- Water depth from 30 m

Site specific design changes are possible and must be assessed on a case-by-case approach.
Such changes could be: size of each individual floater, load capacity of structure, adjusted wind and current area, etc.



## FLOATER DETAILS

The Basic Design floaters typically consist of:

- Eight pontoons for buoyancy
- Flexible steel frame with pretensioned fibre ropes. The flexible frame absorbs the dynamic loads coming from the water acting on the structure
- A purpose made connector system between frame and PV mounting structure which allows for relative motions between the flexible frame and the rigid mounting structure
- Rigid PV mounting structure to keep the PV panels out of water and prevent panel torsion from environmental loads. This structure has gangways for easy access for inspection and maintenance of all floater components

The primary distinction between the Basic Design and the Harsh Environment version lies in their load and force absorption mechanisms. Unlike the flexible frame of the Basic Design, the Harsh Environment version features a robust, rigid frame and a bespoke connection joint between the floaters.
This design facilitates the handling of heavier loads with fewer components, making it particularly advantageous for operations in exceptionally harsh environments.

## DESIGN DEVELOPMENT

### 2017

Scatec **innovation contest**, first version of design

### 2018 - 2019

Concept development with internal funding and **FORREGION (RCN)** funding development of numerical models with theoretical support from **SINTEF Ocean**. First simplified model test as part of MSc thesis at NTNU

### 2020

**Partnership with Equinor (from 2020-end of 2023)**, concept phase, extensive model test campaign at SINTEF Ocean and first full size park analyses. Design improvements, e.g. flexible frame to prevent wave loads reaching the PV modules

### 2021 - 2022

Pilot engineering phase, for **1 (later 0.5) MW planned installation (6x6 floaters)**, in cooperation with supply chain to optimize design, export cable to shore and connection to grid

### 2023

Several assessments performed utilizing XolarSurf in different locations **around the world**

### 2023-2024

A Harsh Environment version developed as part of a concept study together with **RWE**

### 2024

**Floater prototype to be installed** in a benign location at Frøya, Norway, to test and improve assembly procedures and component functionality, equipped with instrumentation to give valuable full size floater data

## WHO WE ARE

Moss Maritime, part of Saipem SpA, provides leading technology and expertise within design and engineering services to the offshore energy sector as well as other ocean-based sectors. Moss Maritime specializes in frontier and technology advanced projects, providing a wide variety of design solutions for innovative floater designs for the energy industry in general, with focus on energy carriers such as LNG and hydrogen, as well as for the renewable energy sector.

Together with our owner, Saipem SpA, we can provide turnkey solutions to our clients for a fully integrated FPV plant.

## LATEST NEWS

Moss Maritime recently gained a Statement of Conformity and the following was stated in the press relased made by DNV.

*DNV has handed over a Statement of Conformity to Moss Maritime for their design brief outlining the design methodology for their concept called XolarSurf. This marks a significant milestone in the development of their technology. The recognition helps pave the way for further developments for floating solar in exposed waters and the opportunity of providing clean energy close to shore without the use of area on land.*

*The Statement of Conformity verifies that the design methodology complies with DNV general principles and requirements following the standard DNV-ST-0119.*
*DNV has conducted independent investigations to identify and reduce errors, deficiencies, and weaknesses in methods and analytical tools. Wind, waves, and currents affect structures in the sea, and DNV's input ensures that this is taken care of in the further development of the concept.*

*The independent confirmation of their design brief helps Moss Maritime reduce risks as well as attract the investments needed for further advancing their floating solar technology.*

*"We aim to have a prototype in the water by June. DNV's Statement of Conformity is a recognition and a stamp of quality that gives us a good basis for further work,"* ***says Alexander Minge Thøgersen, Vice President of Engineering at Moss Maritime*** *"Compared to floating wind turbines, floating solar power technology is simpler, engineering costs are lower, and structures are easier to build. Floating solar power is also well suited for mass production, which will have a positive impact on price and deployment", says Minge Thøgersen.*

*DNV's 2023 Energy Transition Outlook highlighted the staggering growth that solar photovoltaics (PV) has seen in recent years, moving from 1 GW installed annually in 2004 to 250 GW installed in 2022 alone. With land-based growth on this scale, the large amount of space required for development presents a challenge that may be addressed by floating solar.*

*Floating solar technology must overcome rough sea conditions that land-based solar farms are exempt from, the potential benefits, such as reduced land footprint and co-location with existing wind farms, present compelling opportunities. In fact, by combining floating solar with offshore wind farms and thereby leveraging the same energy infrastructure and export cables, the resulting energy production capacity per used area could be drastically improved. This greatly underscores the viability of floating solar PV as a key component of the renewable energy landscape and its relevance in the energy transition.*


**Moss Maritime**
Vollsveien 17 A
1366 Lysaker
Norway

**MOSSWW.COM**

**SAIPEM SpA**
Via Luigi Russolo 5
20138 - Milan
Italy

**SAIPEM.COM**