Promising results from case study of oil & gas platform electrification with wave energy

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Offshore oil & gas platforms require constant power supply and decarbonization of this power is a high priority. A case study with Lundin Energy Norway has shown that wave power is highly competitive with offshore wind power, both in terms of levelized cost of energy and providing a more stable power supply that requires only half as much power balancing.

To assess the sizing and power balancing requirements of the oil & gas platform, a one-year time series with sea state data was analysed. A design for a 100 MW wave farm was developed for on- and off-grid installations. The output power profile was compared with the output power profile from an equivalent wind farm and wind data for the same place and time period. The more consistent nature of waves was evident and wave power provided a significantly more stable power production.

An off-grid wind farm installation requires ~50% more energy storage compared to wave power, both in terms of power and energy ratings. And twice as much energy pass through the storage to balance the output. The cost for balancing the produced power is therefore considerably lower with wave power, by reducing both the cost of the energy storage system and the loss of produced electricity occurring when the energy storage is used.

Hydrogen was identified as the most viable solution for long-term seasonal balancing in an off-grid installation, due to the large quantities of storage required. It can also be noted that using depleted gas fields to provide hydrogen storage is considered an interesting opportunity for oil & gas companies to continue generating value from such assets.

“In addition to the very promising findings of this case study, it has also made it possible for Ocean Harvesting to develop a comprehensive array and system design, a handling plan, and a life cycle cost assessment for a 100 MW wave farm, all of which will be very valuable going forward towards sea trials and commercialization,” says Mikael Sidenmark, CEO.

For more information about the case study, please contact:

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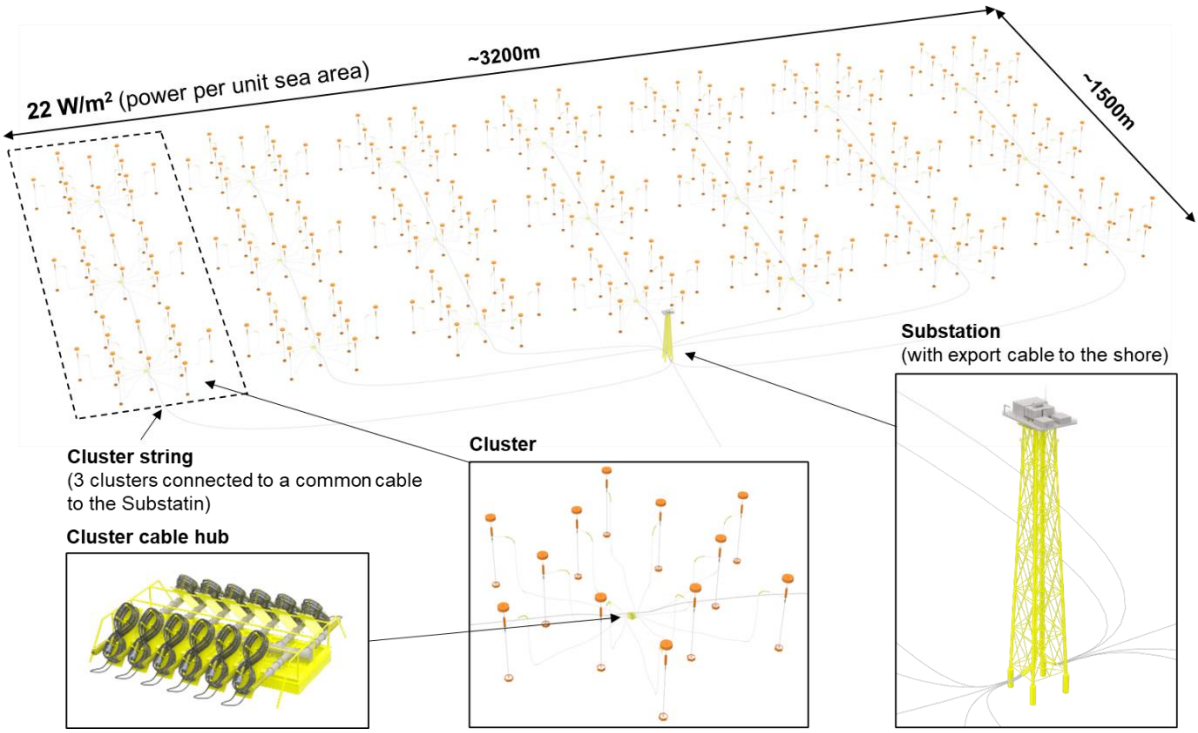
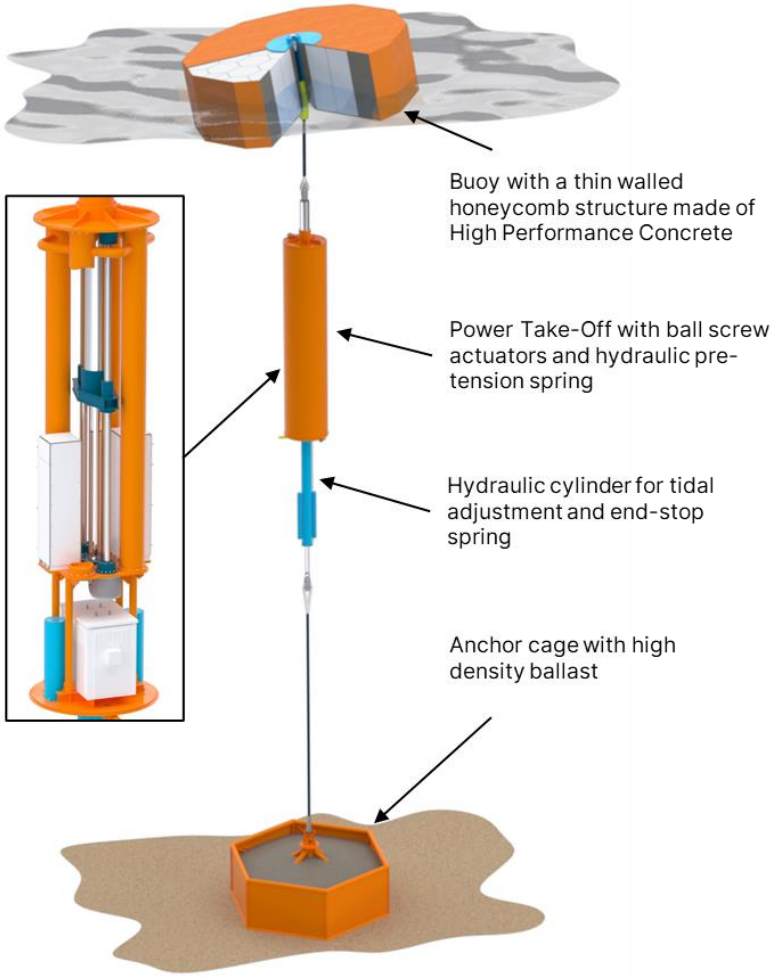
106 MW generic wave farm with InfinityWECs arranged in 6 MW clusters



500 kW InfinityWEC Wave Energy Converter



About Wave Power

The estimated global theoretical potential of wave power[1] exceeds the global use of electricity and is available in coastal areas where most of the population lives.

Wave power produces electricity more consistently and at different times compared to wind & solar power and therefore contributes to offset intermittency, reducing the total cost of carbon-free electricity. Wave power furthermore needs only half the amount of energy storage to balance the power production to a constant output throughout the whole year compared to wind power, further reducing the total cost of energy.

Wave power will be an important part of the future renewable energy mix, contributing both to lower cost of energy and a more stable energy system.

About Ocean Harvesting and InfinityWEC

Ocean Harvesting is a privately held company with offices in Karlskrona and Gothenburg, Sweden. After years of research within the wave energy sector, the company started in 2017 to develop the InfinityWEC wave energy converter.

InfinityWEC is:

- **Efficient -** Breakthrough power take-off ensuring maximum power output from every wave.
- **Reliable -** Holding the buoy submerged through the crest of large waves to secure survival and to enable continued power production also in the harshest wave conditions.
- **Scalable -** Proven subsystems, produced, assembled, and installed efficiently, allowing large scale roll-out. Highly recyclable.
- **Ideal partner for Wind & Solar -** Producing power at different times, improving balancing of electricity supply and demand. Shared infrastructure and operational costs.
- **Low Levelized Cost of Energy (LCOE) –** Estimated to 100 EUR/MWh at 100 MW deployed capacity and <35 EUR/MWh at 5 GW deployed capacity, highly competitive compared to all other energy production.

What makes InfinityWEC so competitive is the advanced power take-off system, which uses a combination of ball screw actuators and a hydraulic pre-tension system to provide instant control of the force applied on the buoy to control its motion (phase control) and capture energy. This enables the use of reactive force control to maximize the electricity production from every individual wave, which can provide up to 30% higher annual energy production, compared to the equivalent force control which is only tuned to the sea state. A unique survival function holds the buoy submerged through the crest of large waves, protecting the system from excessive load and enabling electricity to be produced also in the most severe wave conditions.

InfinityWEC is engineered for sustainable large-scale production and effective logistics. The power take-off uses proven subsystems. InfinityWEC's prime mover (buoy), is made of concrete casted with locally sourced materials at the installation site in a process common in civil engineering, minimizing transportation. A special high strength and sustainable concrete mix is being developed in collaboration with RISE Research Institutes of Sweden, enabling a prime mover with equivalent weight to a conventional steel hull, but at 1/4 of the cost, a 1/3 of the CO2 footprint, and which is 10x faster to manufacture.

The excellent performance and reliability, combined with a modular design where all critical parts are easily manufactured, transported, installed, and maintained, make InfinityWEC a very competitive solution for the future global energy market.

The market for InfinityWEC ranges from utility-scale wave farms for electricity and hydrogen production to the gas and power grid on the mainland, to off-grid power supply for island communities and other offshore industrial installations such as oil- & gas platforms and aquaculture.

Read more: oceanharvesting.com

1. OES An International Vision for Ocean Energy 2017