



Quarterly report

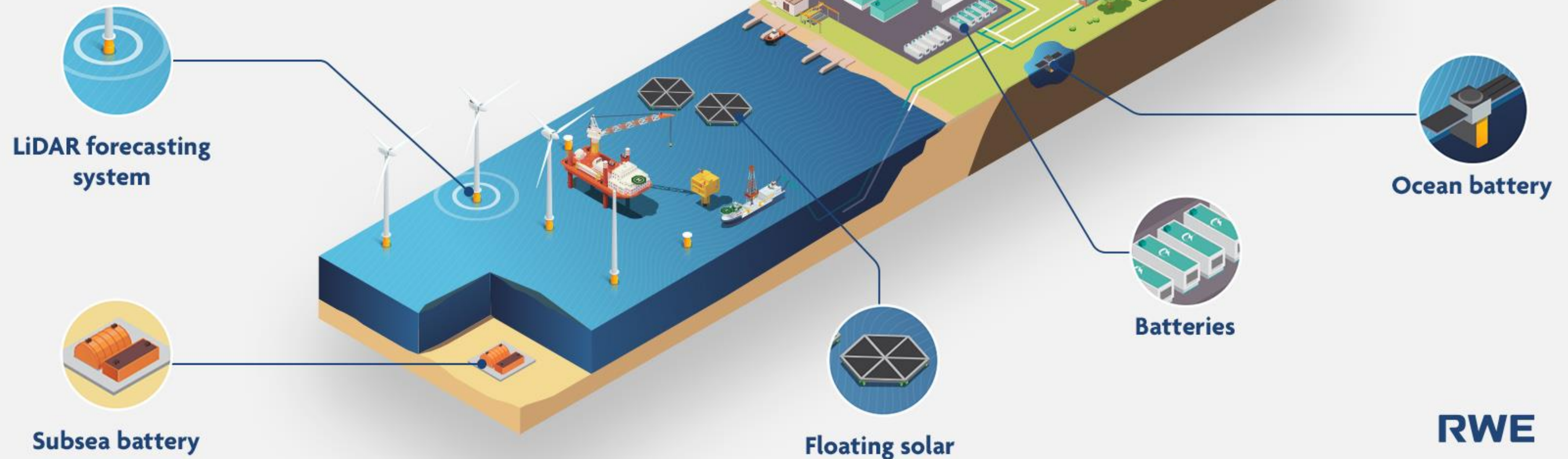
Q2 2025

The perfect match

Unlocking full system integration

OranjeWind offshore wind farm will be located 53 kilometers from the Dutch coast. To tackle the challenges of fluctuating power generation from wind and flexible energy demand, OranjeWind will be a blueprint for the integration of offshore wind farms in the Dutch energy system.

A combination of smart innovations and investments will be used to realize this perfect match between supply and demand.



RWE



'Offshore socket' for OranjeWind successfully installed by TenneT

On Saturday, May 17th, the ready-to-install topside departed from the port of Antwerp on a floating pontoon. The structure was then towed via the Scheldt River into Dutch waters and sailed into the North Sea near Vlissingen. On Wednesday, May 21, TenneT successfully installed the topside. The jacket was already installed last year, along with two 220kV AC export cables connecting to shore and one 66kV AC interlink cable connected to the platform in the neighboring wind farm Ecowende.



[Read the full press release](#) 

First OranjeWind Symposium provides insights into system integration



On May 22nd, the first OranjeWind Symposium was held in Barneveld. More than 100 participants listened to keynote speakers Olof van der Gaag (NVDE) and André Faaij (TNO/UU), actively discussed current standings and participated in four sessions about the topics of the OranjeWind PhDs given by leading professors from Dutch technical universities.



[Read the full press release](#)



Blueprint: the OranjeWind technology report



Blueprint, OranjeWind's technology report, was published on May 22. This report describes the latest developments and technologies involved in OranjeWind. For example, it includes an in-depth article about an inertia battery in Moerdijk. Additionally, we provide insights into the development of TotalEnergies' Zeeland Hydrogen Project, one of Europe's largest electrolyzers. The report will now be published annually and is available on our website.

[Read Blueprint here](#)



Inertia-ready: RWE's innovative battery energy storage system in Moerdijk starts commercial operation

RWE's first inertia-ready battery energy storage system (BESS) has started commercial operation on the site of the company's power plant in Moerdijk, the Netherlands. It is the first of its kind in operation in the Central European grid.

Highly responsive control technology and inverters with grid-forming functionality enable the system to supply or absorb power within milliseconds, helping to stabilise the power grid. This service is called inertia.

The project is part of the system integration solutions within the OranjeWind offshore project.



[Read the full press release](#) 

Innovations at OranjeWind

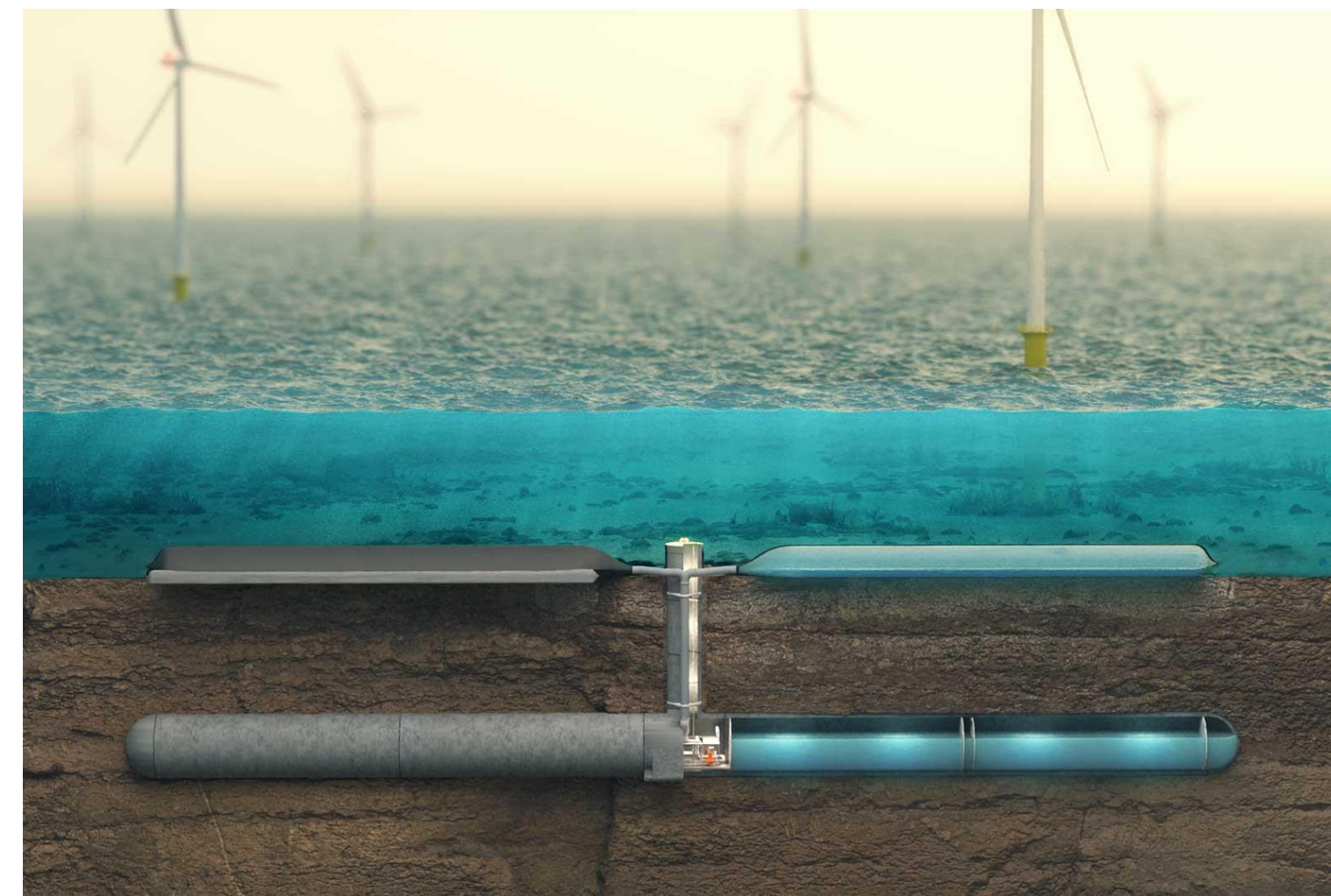
Subsea pumped hydro storage power plant (Ocean Grazer)

Ocean Grazer's Ocean Battery is a concept for storing energy that is produced by offshore renewable sources. The concept is similar to pumped hydro storage (PHS).

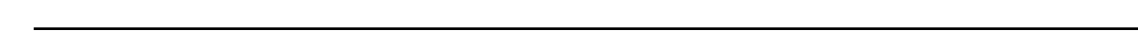
For the OranjeWind project, Ocean Grazer will develop a first demonstrator which will be installed near an excavation lake in the Netherlands.

Status update

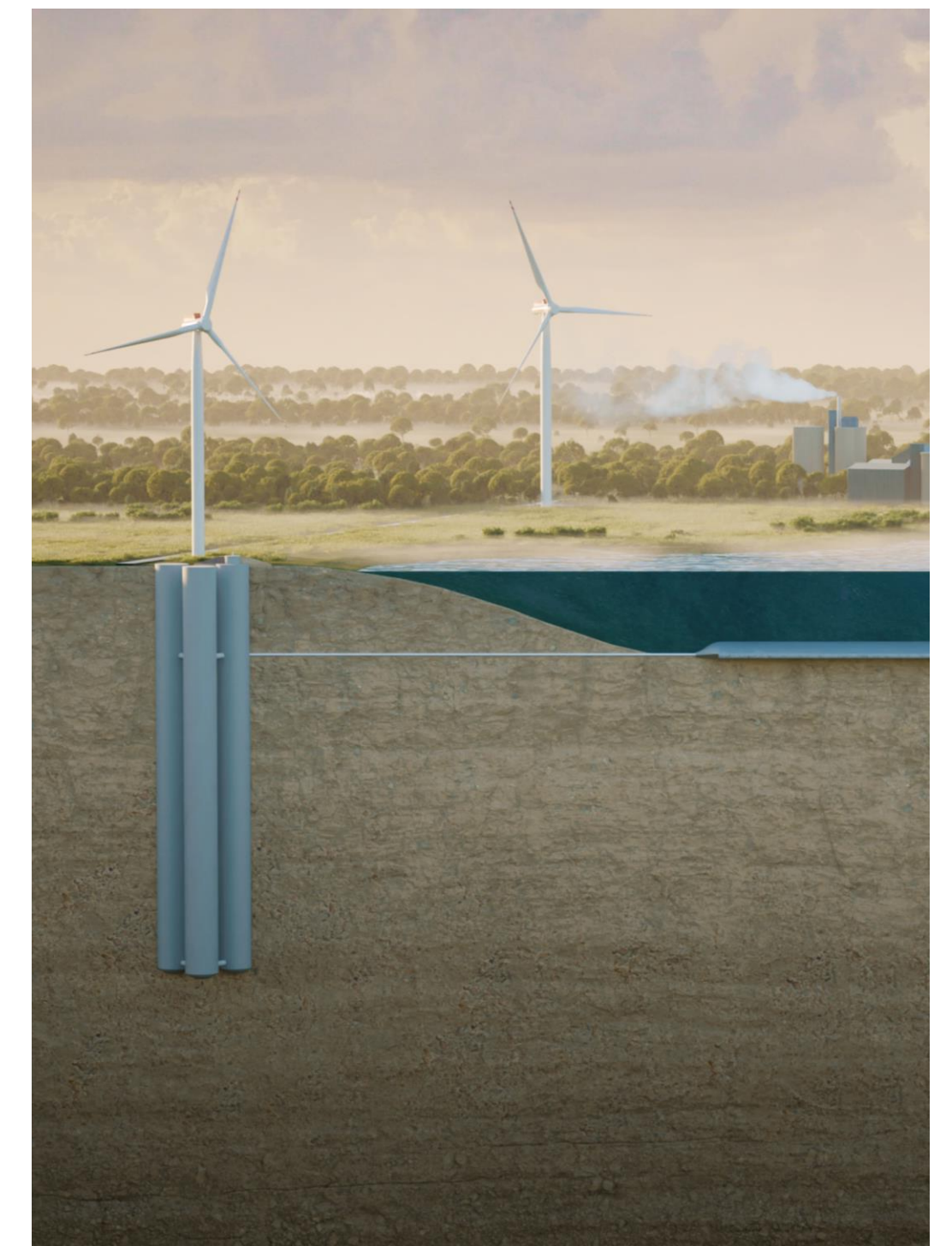
- No updates since previous quarter



From horizontal



To vertical drilling



Innovations at OranjeWind

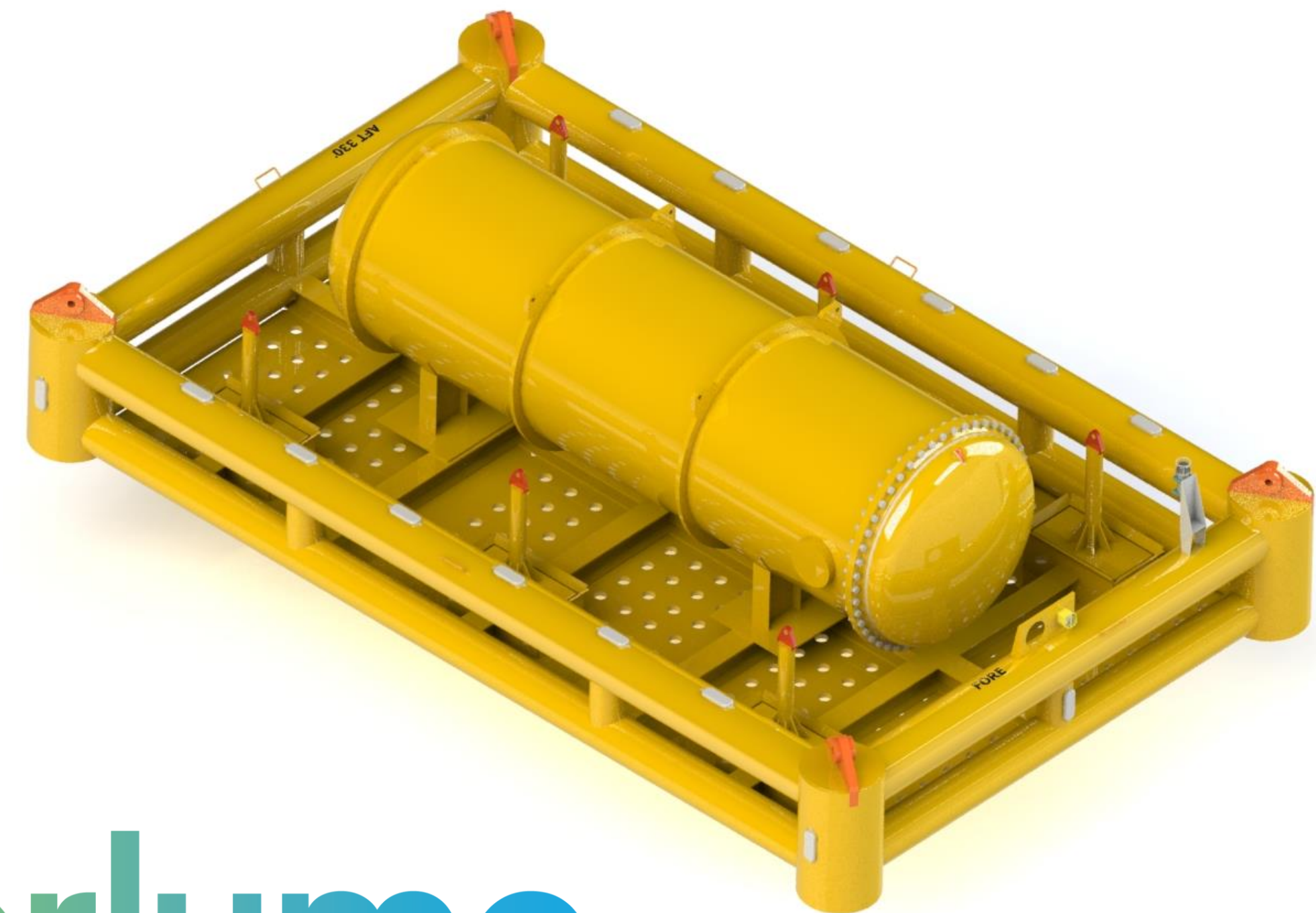
Intelligent Subsea Energy Storage (Verlume)

Verlume is bringing multi-purpose storage solutions offshore through a subsea lithium-ion battery with integrated intelligent energy management. Ultimately, this technology may contribute to a more balanced power output by shaving the peak power production offshore. Additionally, the storage solution may provide multiple offshore services, such as charging of hybrid or fully electric service vessels and providing residency for Autonomous Underwater Vehicles (AUVs).

For the OranjeWind project, the goal is to further mature this technology aiming installation of a small version of such a subsea storage system. When successfully operated such technology could potentially be integrated in an offshore wind farm as part of the energy transition.

Status update

- The detailed design is nearly ready and the procurement of long lead items has started.
- The concept for the transport and installation of the battery is being developed.



verlume

Innovations at OranjeWind

Floating solar (SolarDuck)

Offshore floating solar technology can be part of the solution to increasing land scarcity for the generation of renewable energy. The integration of offshore floating solar into an offshore wind farm can lead to a more efficient use of ocean space for energy generation and allow for synergies in construction and maintenance of the multi-source renewable energy plant. This could result in a more balanced production profile due to the complementary nature of wind and solar resources.

RWE and SolarDuck are evaluating the first pilot installation off the Dutch coast (Project Merganser) to prepare for the next steps.

Status update

- No updates since previous quarter



Merganser



Innovations at OranjeWind

LiDAR power forecasting (ForWind – Oldenburg University)

The innovative power forecasting methodology based on LiDAR (Light Detection And Ranging) accurately forecasts sudden changes in power production caused by wind ramp events - strong variations of wind speed over a short period of time. These may cause sudden and strong changes in power leading to a significant and unexpected drop or increase of energy supply to the grid. If not forecasted accurately, these can result in critical grid imbalances and hamper the further implementation of wind energy. With OranjeWind, we aim to demonstrate and further develop this innovative technology.

Status update

- In 2 LiDAR's at Amrumbank West were installed at the MAP (Main Access Platform) and are acquiring wind ramp data for developing "forward scanning" algorithms. These measurements are a predecessor for the campaigns at the OranjeWind project.
- The development and construction of the XXL LiDAR with a measurement range up to 30 km is ongoing. After successful trials, it will also be installed in the OranjeWind wind farm.



Innovations at OranjeWind

Grid stabilizing battery

RWE is testing a 7.5 MW/11 MWh inertia battery with TenneT. With its ability to provide or absorb electricity within milliseconds, the system will help to safeguard the electricity grid. This function is called inertia.

Sustainable electricity sources are intermittent and can have sudden fluctuations. As they take a bigger part of the electricity mix, our grid risks not being suited to handle these sudden fluctuations. This battery's technology can help with this issue, by quickly injecting power into the grid when there is a sudden drop in generation. This is called synthetic inertia. This technology is now being tested for the first time in the continental European grid. Testing will be done in collaboration with system operator TenneT to further develop the technical requirements and grid compliance procedures.

Status update

- Completed commissioning and grid compliance process.
- Started 2-year R&D period with TenneT and completed first set of tests.

[Read the press release](#)



OranjeWind Knowledge

Research, communication and dissemination



Generating Knowledge



Collecting
In-house expertise



Learning from
OranjeWind



Facilitating
research



Stimulating
innovations



Sharing Knowledge



Initiating and joining
learning communities



Hosting on-site
demonstrations
and events



Developing workshops,
webinars and teaching
material



Contributing to education
of the future workforce



Publishing in scientific
journals and conferences

OranjeWind Insights: Podcast & Masterclass series

Learn about system integration with OranjeWind Insights

A series of podcasts and masterclasses was launched, aiming to give insights in system integration. In the series we learn from experts in the energy transition, from organizations such as RVO, TNO and TenneT, about various challenges and potential solutions in system integration.

The podcasts are available online on our website and all your favourite podcast media.

The masterclasses can be joined in-person, online or on demand via the New Energy Academy website.



[Visit the OranjeWind Insights page](#) 

About RWE

RWE is leading the way to a clean energy world. With its investment and growth strategy Growing Green, RWE is contributing significantly to the success of the energy transition and the decarbonisation of the energy system. Around 20,000 employees work for the company in almost 30 countries worldwide. RWE is already one of the leading companies in the field of renewable energy. RWE is investing billions of euros in expanding its generation portfolio, in particular in offshore and onshore wind, solar energy and batteries. It is perfectly complemented by its global energy trading business. RWE is decarbonising its business in line with the 1.5-degree reduction pathway and will phase out coal by 2030. RWE will be net zero by 2040. Fully in line with the company's purpose - Our energy for a sustainable life.

TotalEnergies and electricity

As part of its ambition to get to net zero by 2050, TotalEnergies is building a world class cost-competitive portfolio combining renewables (solar, onshore and offshore wind) and flexible assets (CCGT, storage) to deliver clean firm power to its customers. As of early 2025, TotalEnergies' gross renewable electricity generation installed capacity had reached 28 GW. TotalEnergies will continue to expand this business to reach 35 GW in 2025 and more than 100 TWh of net electricity production by 2030.

About TotalEnergies

TotalEnergies is a global integrated energy company that produces and markets energies: oil and biofuels, natural gas, biogas and low-carbon hydrogen, renewables and electricity. Our more than 100,000 employees are committed to provide as many people as possible with energy that is more reliable, more affordable and more sustainable. Active in about 120 countries, TotalEnergies places sustainability at the heart of its strategy, its projects and its operations.