



# Quarterly report

Q1 2026



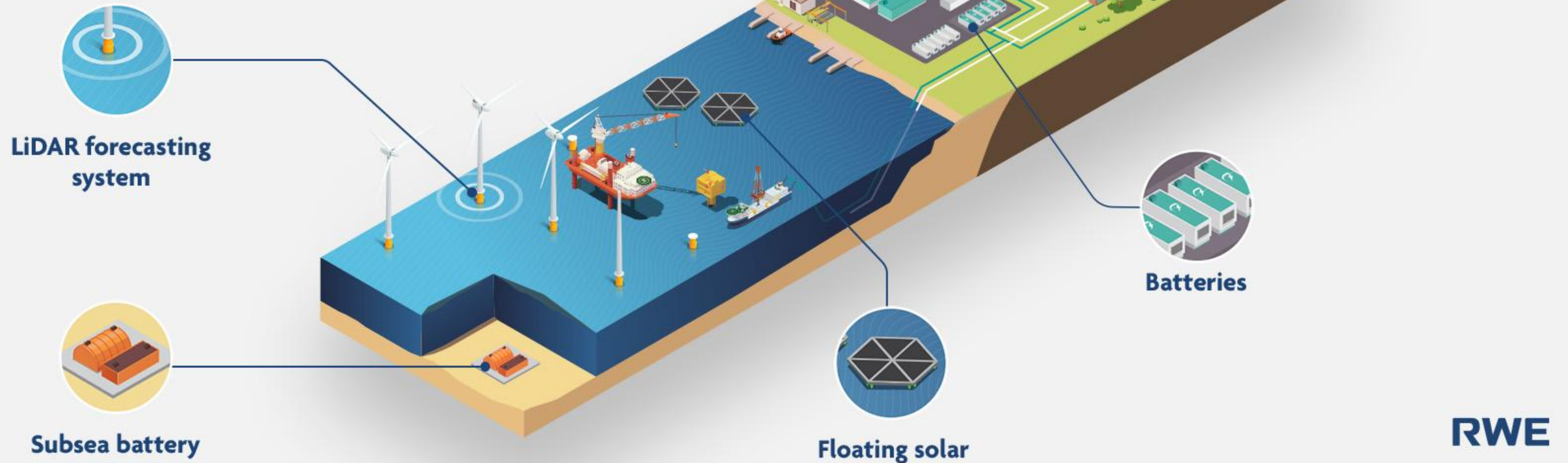
# The perfect match

## 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.



# What's happening with the wind farm?

## Construction update

The production of the wind farm components, such as cables, foundations and turbines, are well underway.

Recently the first site visit to one of the OranjeWind contractors was organized.

The scour protection offshore installation is being prepared and shall start in March.

In the past quarter, construction works for the O&M base in Den Helder became more visible.

Also, the OranjeWind offshore site has been cleared from UXO's, and potential archaeological objects have been investigated.



# Informative site visit to TKF Eemshaven

On 3 February, the OranjeWind project team, together with Rijkswaterstaat, Coast Guard, State Supervision of Mines and RVO, visited TKF Subsea Solutions in Eemshaven. TKF will produce the inter array cables that connect the wind turbines to each as well as the wind farm to Tennet's electricity grid. Prior to the tour, attendees were updated on the progress of the project and given an explanation of the construction preparations that are currently in full swing. During the tour, TKF provided a detailed explanation of the various steps and phases in the inter array cable production process.



[Read the full press release](#)



# 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 construction of the subsea battery with the umbilical cable and the cable protection systems are well on track and testing of components and subsystems is ongoing.
- The subsea battery will be installed in a more efficient design, and a new installation procedure was developed.



# Innovations at OranjeWind

## Floating solar

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.

## Status update

- No updates since previous quarter



# 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

- One of the 2 LiDAR's at Amrumbank West is still acquiring wind ramp data for developing “forward scanning” algorithms. These algorithms will be implemented at the OranjeWind project.
- The second LiDAR that was to be brought back to shore for an overhaul in Q4-2025. It shall be brought back offshore soon.
- The development of the XXL LiDAR with a measurement range up to 30 km was finished end of 2025 and the onshore testing is ongoing.



# Innovations and system integrations at OranjeWind

OranjeWind aims to achieve the perfect match between green electricity supply and demand. The project balances the intermittent power generation of offshore wind with a variety of innovative and flexible demand assets such as batteries, e-boilers and electrolyzers.

With these investments and innovations, OranjeWind serves as the blueprint for the future offshore wind farm.

## Status update

- Further planning and detailing works have been performed, and progress is being made as planned.



# 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 Knowledge



## Generating Knowledge

## Sharing Knowledge

PhD position System integration on North Sea region scale

PhD position Acceleration of implementation and future scale-up

System integration with demand side and industrial transformation

System integration on local/regional level of offshore wind parks

Technological learning potentials and pathways of advanced off-shore energy and balancing technologies

PhD position Spatial-temporal lay out of energy infrastructure

# OranjeWind PhDs

Universiteit Utrecht TU Delft TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY rijksuniversiteit groningen



# DEF LAME OESTER



MODES

SLDbatt

Phynix

CO2URAGE



# EnergyBASIN

Energy Balanced Assets System Integration Nexus

FlowMin requested by Co	600 l/min
FlowMax requested by Co	600 l/min
TempMin requested by Co	600 °C
TempMax requested by Co	600 °C
FlowMin requested by Co	600 l/min
FlowMax requested by Co	600 l/min
NacelleLiquidCoolPump1 D	600 V
x. NacelleLiquidCoolPump1 D	600 W
Maximum requested by Co	600 V
Conv1Group1Fan1 DC Link	600 V
Conv1Group2Fan1 DC Link	600 V
Conv1Group3Fan1 DC Link	600 V
x. Conv1Group1Fan1 Active	600 W
x. Conv1Group2Fan1 Active	600 W



Thesis Interns

PD Flex

North Sea Energy 6

# OranjeWind Knowlegde Research programme

- The CO2URAGE project, led by TU Eindhoven with OranjeWind as a partner, received NWO Perspectief funding to develop CO2 utilization via reactive adsorption using green electricity in a flexible manner. The consortium includes four Dutch technical universities and 26 partners.
- OranjeWind's PhD programme is progressing well, with initial papers submitted to scientific journals, installment of an Academic Reflection Board and preparations for the 2026 edition of the OranjeWind Symposium.
- The SLDbatt project, involving OranjeWind, secured funding to develop sustainable long-duration batteries from local materials, to alleviate grid congestion and enhance the Netherlands' battery market position.
- The sixth edition of the North Sea Energy consortium began in February, with OranjeWind as a key partner in this project to progress the North Sea energy transition.



## OranjeWind PhD programme



## 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

TotalEnergies is building a competitive portfolio that combines renewables (solar, onshore wind, offshore wind) and flexible assets (CCGT, storage) to deliver clean firm power to its customers. At the beginning of 2026, TotalEnergies has more than 34 GW of gross renewable power generation capacity and aims to achieve over 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.