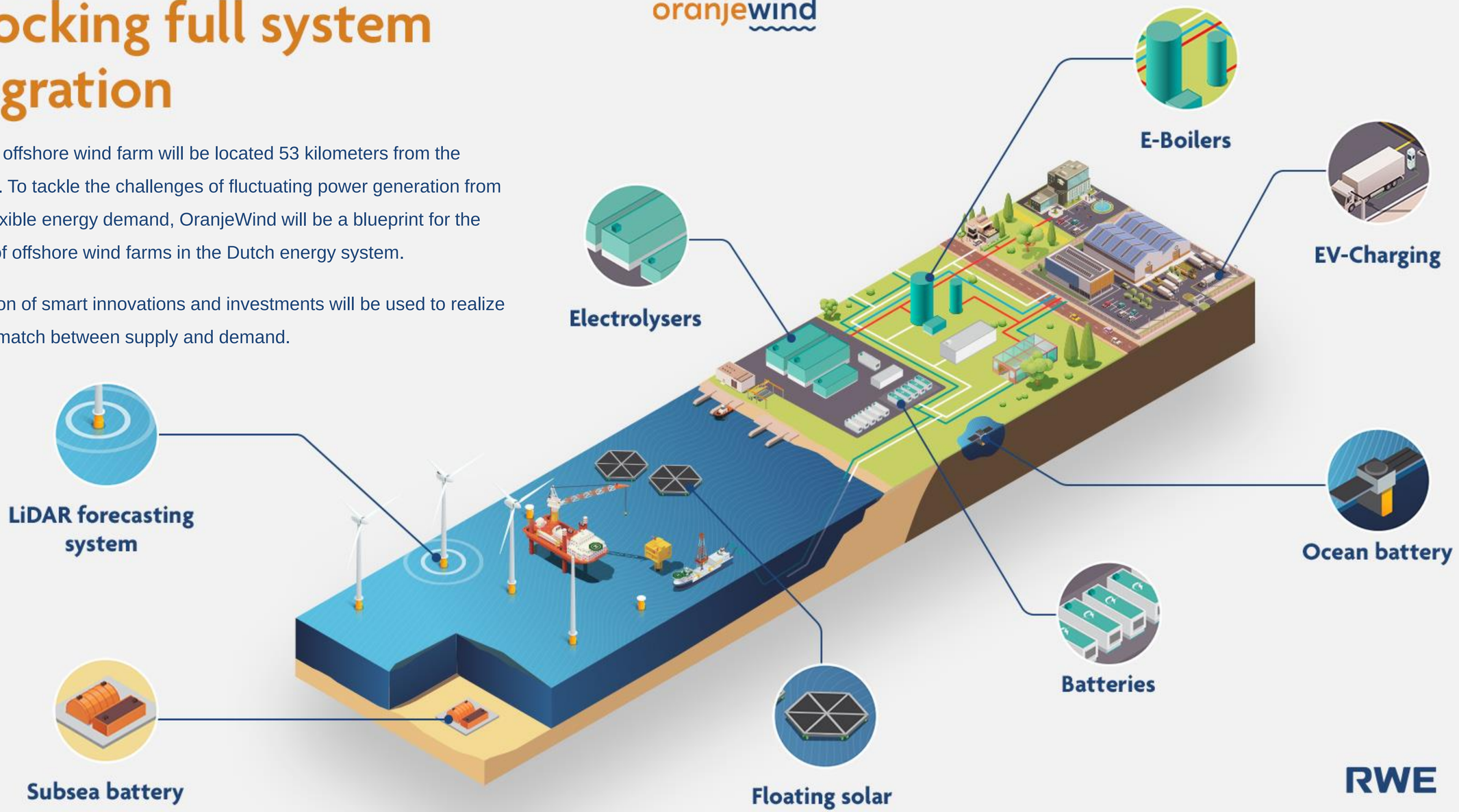
Quarterly report

Q1 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.



TotalEnergies Joins Forces with Air Liquide to Decarbonize its Refineries in Northern Europe with Green Hydrogen

In line with its 2030 ambition to decarbonize the hydrogen used in its European refineries, TotalEnergies has signed agreements with Air Liquide to develop two projects in the Netherlands, for the production and delivery of some 45,000 tons a year of green hydrogen produced using renewable power, generated mostly by the OranjeWind offshore wind farm, developed by TotalEnergies (50%) and RWE (50%). These projects will cut CO2 emissions from TotalEnergies' refineries in Belgium and the Netherlands by up to 450,000 tons a year and contribute to the European renewable energy targets in transport.

Read the full press release

RWE switches on large-scale battery energy storage system in Eemshaven

RWE has commissioned one of the largest Dutch battery storage systems in the Netherlands at its Eemshaven power station. With a total capacity of 35 megawatts (MW) and a storage capacity of 41 megawatt hours (MWh), the battery will be used to balance power supply and demand in the Dutch power grid.

Read the full press release

OranjeWind marks start of construction

The OranjeWind offshore wind project started 2025 not with a bang, but with a stakeholder event to mark the transition into construction phase for the 795MW offshore wind project. Hosted by OranjeWind joint venture partners RWE and TotalEnergies at RWE's Utrecht office, the celebration event was attended by project-related stakeholders, including partners involved in the realisation of the OranjeWind project.

Read the full story

OranjeWind receives Statements of compliance

OranjeWind has received the Statements of Compliance from DNV Energy Systems for the site conditions assessment, design basis, independent load analysis, and turbine and tower detailed design. To achieve this, DNV has validated the site conditions, reviewed the design and performed an independent load calculation. These are the first steps towards full project certification of our wind farm.

Project certification safeguards quality across all phases of the project, from development to commissioning. It ensures a safe design and overall quality throughout the project phases, providing confidence to all stakeholders.

Innovations at OranjeWind

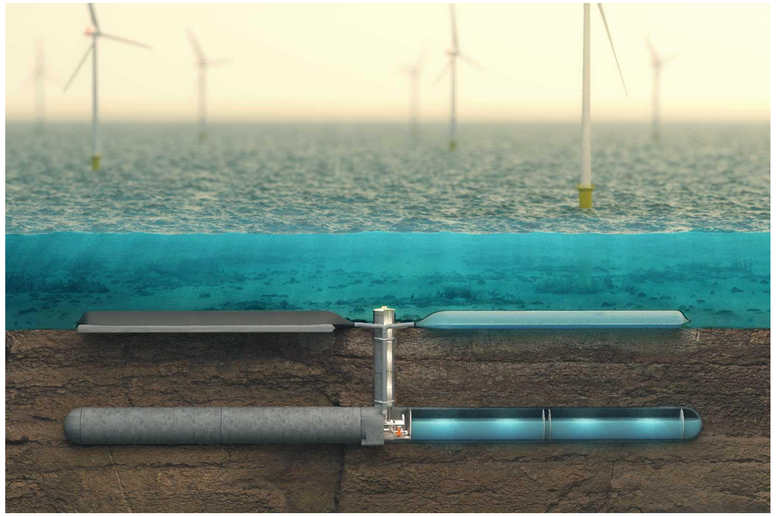
Subsea pumped hydro storage power plant (Ocean Grazer)

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.

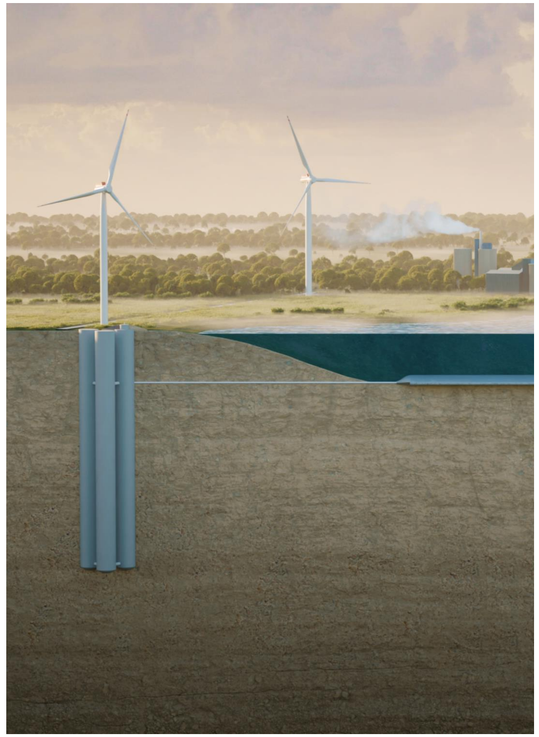
Status update

- Ocean Grazer has been preparing the permit application.
- Ocean Grazer has progressed with the concept design for the selected drilled design with vertical shaft near the excavation lake.



From horizontal

To vertical drilling



Innovations at OranjeWind

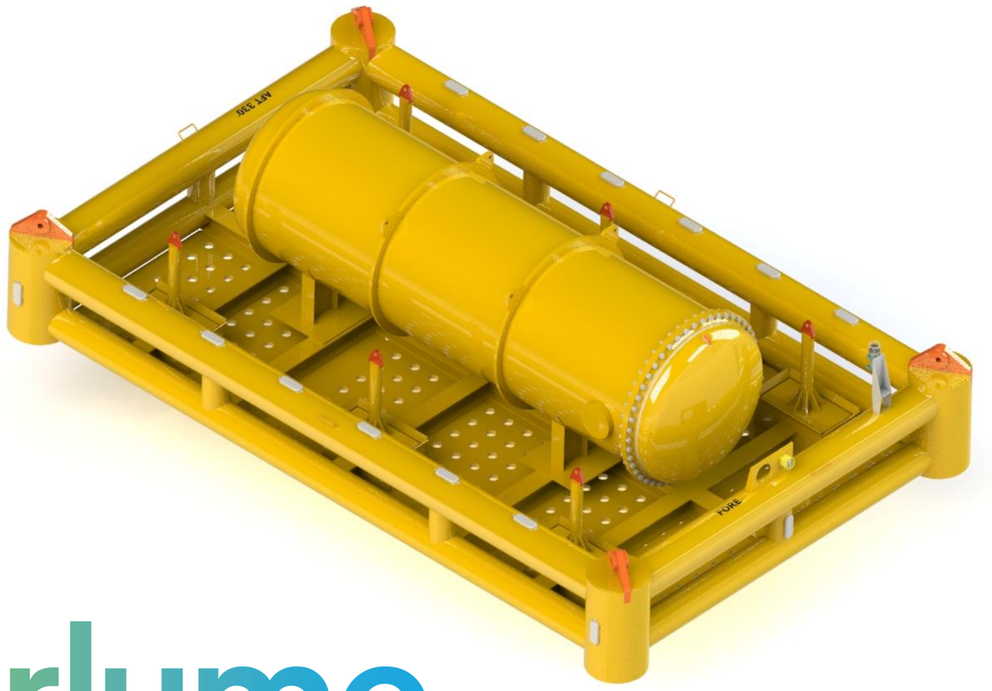
Intelligent Subsea Energy Storage (Verlume)

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 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 mechanical design is nearly ready. The electrical design will be completed in June 2025.
- The scour protection design is completed.
- OranjeWind and Verlume are developing the installation method.



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 cooperating for the first pilot installation off the Dutch coast; Project Merganser.

Status update

- Currently analysing data and taking important learnings, following the tow-in of Merganser in 2024 after having been tested offshore for 2 months.
- SolarDuck is processing the data to improve their design

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

- The wake measurements of the two LiDARs that were installed at the nacelles of 2 turbines at Amrumbank West are completed.
- In April the devices will be moved to the main access platforms of the at Amrumbank West and start generating “forward scanning” data as a trial for the OranjeWind project.
- Construction of the XXL LiDAR started, which, after successful trials, will also be installed in the OranjeWind wind farm.

Innovations at OranjeWind

Grid stabilizing battery

RWE is building a 7.5 MW/11 MWh inertia battery. 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 can have sudden fluctuations depending on wind force. 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. Transmission system operator TenneT will be a partner of the project to further develop its technical requirements and grid compliance procedures.

Status update

- Battery system in construction and entering commissioning phase
- Inertia testing scheduled to start in April 2025

OranjeWind Knowledge

Research, communication and dissemination

oranjewind

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

RWE

TotalEnergies

Project OESTER to advance offshore electricity storage

Initiated under OranjeWind Knowledge and led by TNO, sixteen partners from across the European offshore renewable energy sector have joined forces in project OESTER (Offshore Electricity Storage Technology Research). This three-year initiative, with major energy industry players such as RWE, Vattenfall and TNO, aims to accelerate the development and deployment of offshore electricity storage technologies.

In the OESTER project we will gain valuable insights into large scale offshore energy storage. OESTER will show under which conditions offshore energy storage is technologically and economically viable, so that we can implement it in future wind farms for better system integration. This will facilitate the roll-out of offshore wind and help to reach our sustainable energy goals.

Learn more about OESTER

TU Delft students visit Amercentrale to present solutions for system integration

Students from TU Delft visited the Amercentrale as part of their minor progamme Wind Energy.

For ten weeks, eight groups of students worked on solutions for integrating 50 GW of offshore wind into the Dutch energy system.

They presented their plans during the event on January 16th, which also included a tour of the power plant.

RWE hosts “Daar Brandt Nog Licht”-symposium at Amercentrale

RWE’s Arjan van der Stelt gave the keynote speech during an inspiring session for partners of the “Daar Brandt Nog Licht” project by Kennispact MBO Brabant.

The symposium, titled *Samen Leren en Innoveren*, focused on the energy transition and how to develop the future workforce with the right skills and competences.

Inhousedag Energietalenten hosted by RWE

On February 14th, 25 Energietalenten visited the Amercentrale.

After speeches by Arjan van der Stelt and Marinus Tabak, the students went on a tour of the power plant.

In the afternoon they presented their case for ‘The future of the Amer plant’. Their ideas varied from green data centers to algae farms. The winning idea was awarded with a RWE goodiebag!

Site visit for Avans students Industrial Engineering and Management

Together with students of Industrial Engineering and Management from Avans Hogeschool, we are starting a project to investigate the feasibility of a virtual home battery, a system where consumers can utilize capacity from our industrial sized battery for energy storage.

As an introduction to the project, the students visited the Amer power plant, to get a broad view of the energy transition and RWE’s strategy, as well as a tour of the site.

Klimaat en Energiekoepel visit Eemshaven power plant

25 enthusiasts from the energy sector visited RWE’s Eemshaven power plant to discuss RWE’s vision, the transition from coal to biomass and system integration.

After the session, the group went on a tour of the power plant and battery site, as well as a tour of the BUSS-terminal, where the monopiles for RWE’s offshore wind farm Thor in Denmark are currently stored.

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. By the end of 2024, TotalEnergies' gross renewable electricity generation installed capacity has reached over 24 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 and green gases, 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.