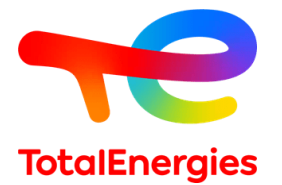




Quarterly report
Q3 2024



OranjeWind

Offshore wind farm

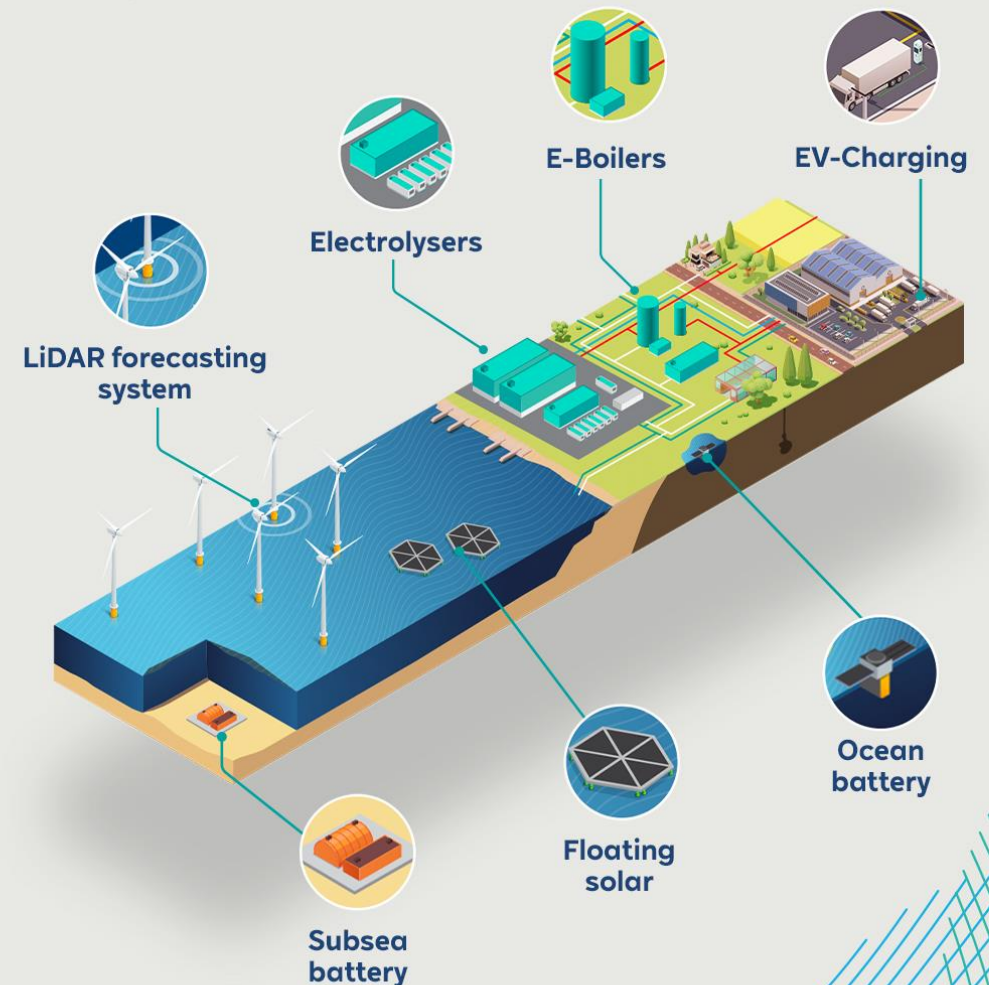
OranjeWind offshore wind farm will be located 53 kilometers from the Dutch coast. To tackle the challenges of fluctuating power generation from wind and flexible energy demand, OranjeWind will be a blueprint for the integration of offshore wind farms in the Dutch energy system.

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

Project status: under construction

OranjeWind

The perfect match Unlocking full system integration



TotalEnergies and RWE join forces to implement OranjeWind project as blueprint for Dutch energy system of the future

Synergies are leveraged to realise OranjeWind offshore wind farm. Each partner has a 50% stake in OranjeWind offshore wind farm, for which final investment decision has now been taken.

The partners are committed to delivering their allocated part of flexible system integration solutions, including electrolysers, battery storage, e-boilers and smart charging solutions to perfectly match intermittent wind power generation with flexible demand.

TotalEnergies will dedicate its share of the renewable electricity production from this project to power 350 MW electrolyzer projects. These will produce about 40,000 tons per year of green hydrogen for the decarbonization of TotalEnergies' refineries in Northern Europe.



[Read the full press release](#)

RWE builds ultra-fast, innovative battery storage system in the Netherlands to help safeguard the grid



RWE is expanding its battery storage business with an innovative technology for grid stability. The company has begun construction of an ultra-fast battery storage system with an installed capacity of 7.5 megawatts (MW) and a storage capacity of 11 megawatt hours (MWh) on the site of its power plant in Moerdijk, in the Netherlands.

With its ability to provide or absorb electricity within milliseconds, the system will help to safeguard the electricity grid. This function is called inertia.

The Moerdijk battery storage project is part of the system integration solutions for OranjeWind, which aims to establish new ways to integrate intermittent renewable energy generation into the Dutch energy system.



[Read the full press release](#)

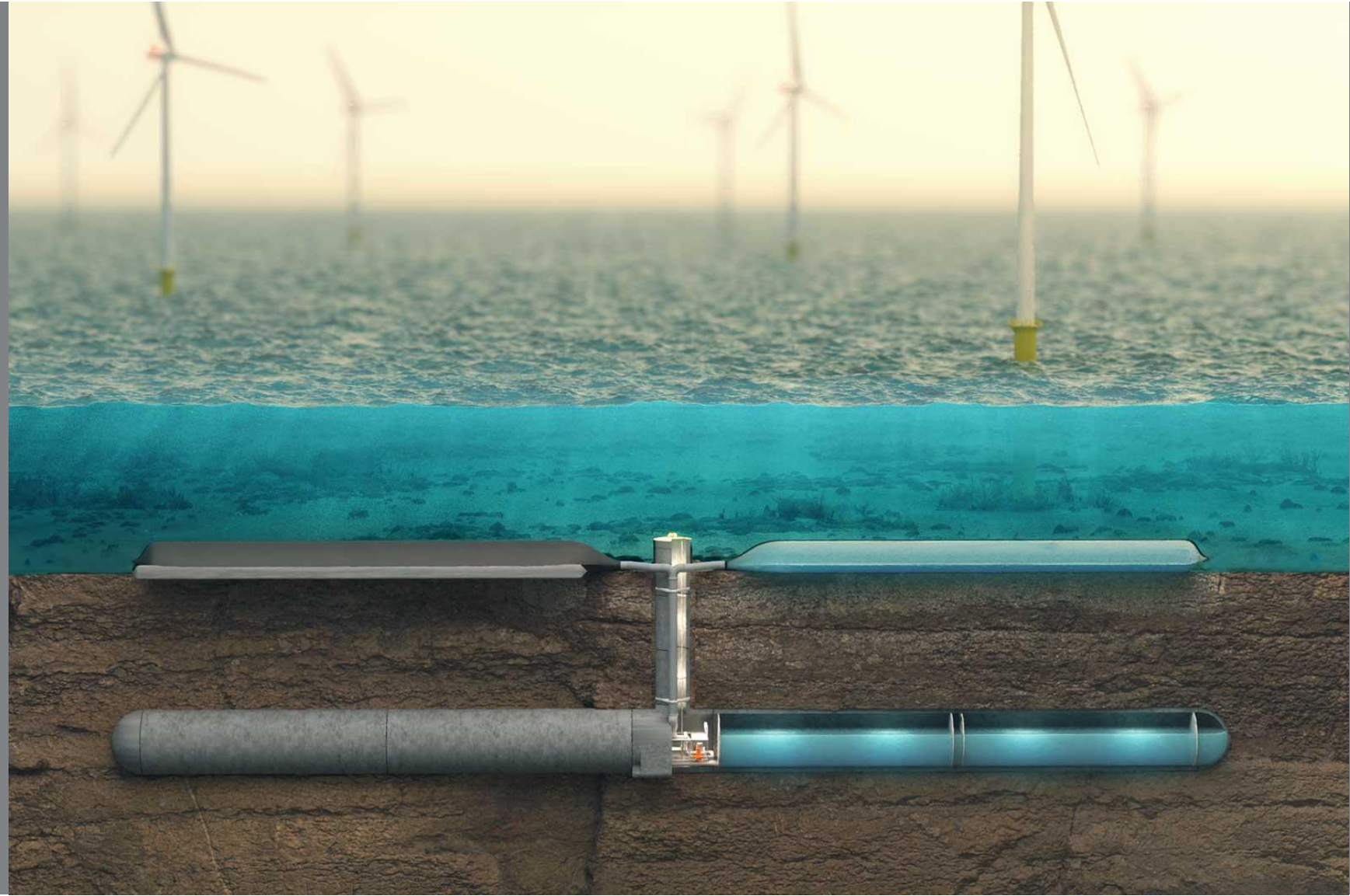
Innovations at OranjeWind

Subsea pumped hydro storage power plant (Ocean Grazer)

Ocean Grazer's Ocean Battery is a scalable, modular solution for energy storage that is produced by renewable sources such as wind turbines and floating solar farms at sea. To store energy, the system pumps water from the rigid reservoirs into the flexible bladders on the seabed to store it under high pressure. When there is demand for power, water flows back from the flexible bladders to the low-pressure rigid reservoirs, driving multiple hydro turbines to generate electricity.

Status update

- Ocean Grazer has been preparing the permit application .
- Ocean Grazer had 4 optional concept designs and selected the drilled design with vertical shaft as the most promising option for the excavation lake. (*Dredging based solutions have been assessed as economically infeasible.*)
- Ocean Grazer has been working on further designing the buried design with the vertical shaft.



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, that will lead to a more balanced power output by shaving the peak power production offshore. Beyond preventing grid curtailment, the storage solution can provide multiple offshore services, such as frequency response, black start capability for wind turbines and charging of hybrid or fully electric service vessels and providing residency for Autonomous Underwater Vehicles (AUVs).

Status update

- The design for installing the surface elements in the foundations is ready.
- RWE and Verlume have designed the seabed stability platform with rock backs for shielding from strong currents.
- RWE and Verlume designed the interface with the SCADA system of the wind farm.
- In September, the FEED phase was finished, and the Detailed Design Phase will start in October.

Innovations at OranjeWind

Floating solar (SolarDuck)

The offshore floating solar technology, as developed by SolarDuck, provides an answer to increasing land scarcity for the generation of renewable energy. The integration of offshore floating solar into an offshore wind farm is a more efficient use of ocean space for energy generation and allows for synergies with regards to the construction and maintenance of the multi-source renewable energy plant. The result is 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. This will lay the foundation for a larger installation at OranjeWind.

Status update

- The Merganser Pilot was commissioned in June 2024 ([read more](#)).
- The basic design phase was finished in August 2024.



[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. Wind ramp events 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, both in timing and amplitude, these can result in critical grid imbalances and on the longer term hamper the further implementation of wind energy. With OranjeWind, we aim to demonstrate and further develop this innovative technology.

Status update

- The two LiDARs that were installed at the nacelles of 2 turbines at Amrumbank West have been generating data which will be for installing the LiDARs at the main access platforms of OranjeWind .
- RWE has been working on purchasing an prototype XXL LiDAR to run trials. If the trials are successful, this XXL LiDAR will be installed also in the OranjeWind wind farm.

RWE

OranjeWind Knowledge

Research, communication and dissemination

Generating Knowledge



Collecting
In-house expertise



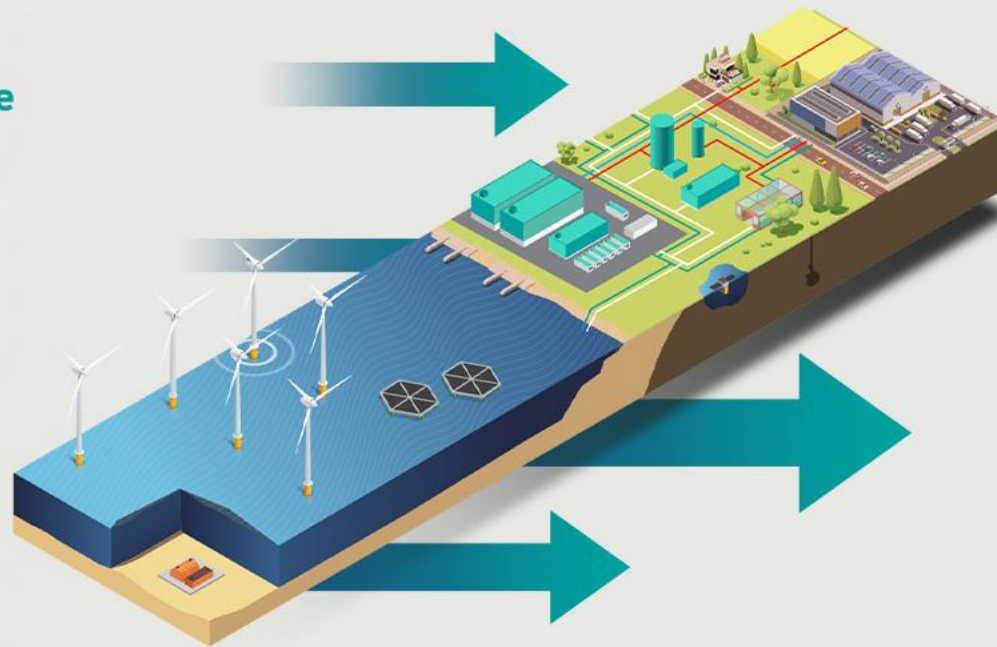
Learning from
OranjeWind



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 launched: 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](#).





About RWE

RWE is leading the way to a green 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. Between 2024 and 2030, RWE will invest 55 billion euros worldwide in offshore and onshore wind, solar energy, batteries, flexible generation, and hydrogen projects. By the end of the decade, the company's green portfolio will grow to more than 65 gigawatts of generation capacity, which will be perfectly complemented by global energy trading. 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.

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.