

RWE



Quarterly report
Q2 2024



OranjeWind

Offshore wind farm

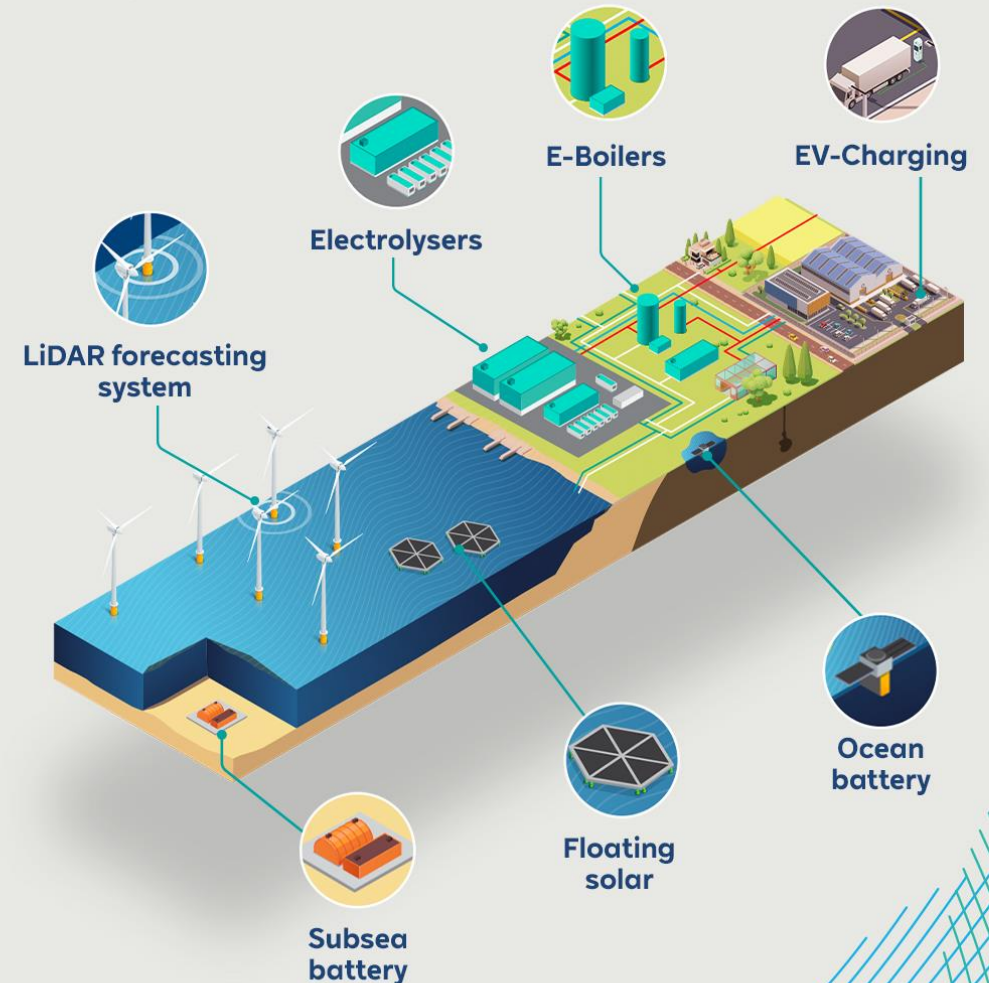
RWE's OranjeWind offshore wind farm will be located 53 kilometers from the Dutch coast. To tackle the challenges of fluctuating power generation from wind and flexible energy demand, RWE has developed a blueprint for the integration of offshore wind farms in the Dutch energy system.

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

Project status: in development

OranjeWind

The perfect match Unlocking full system integration



Innovations at OranjeWind (1)

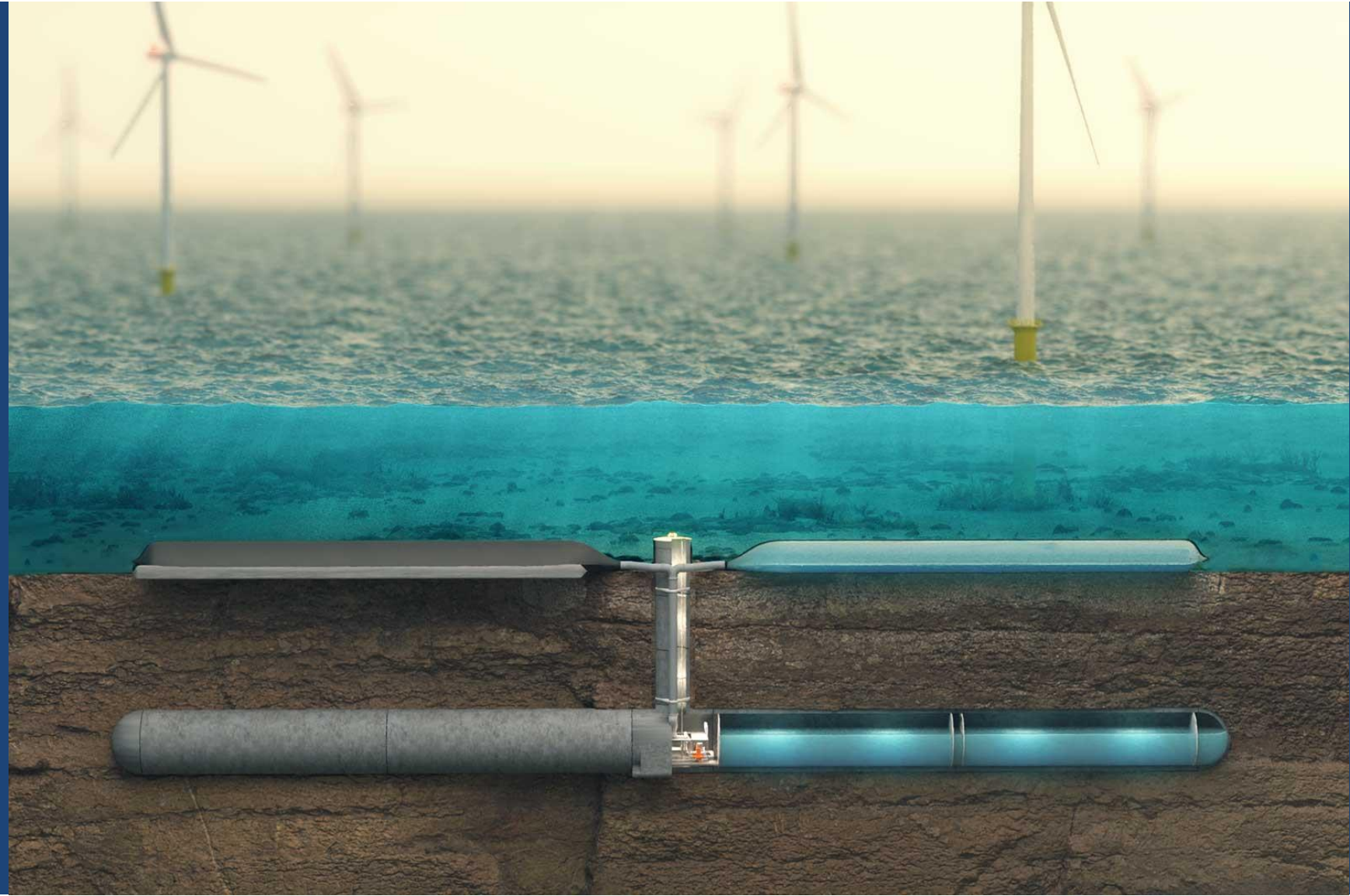
Subsea pumped hydro storage power plant (Ocean Grazer)

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. As part of project OranjeWind, Ocean Grazer will be further developed in an inland underwater testing location.

Status update

- Ocean Grazer is preparing the permit application .
- Ocean Grazer is working on the concept design and is executing a trade-off study for different design alternatives.
- Ocean Grazer has executed wave tank testing at Deltares.



Innovations at OranjeWind (2)



Intelligent Subsea Energy Storage (Verlume)

Verlume is bringing multi-purpose storage solutions offshore through a subsea lithium-ion battery with integrated intelligent energy management, which has a modular and highly scalable design 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). This will enable further reductions of the CO2 footprint of offshore wind farms and associated logistics.

Status update

- The design for installing the surface elements in the foundations is ready.
- RWE and Verlume have designed the solution to install the battery on the seabed, anticipating the sand waves and moving seabed.
- RWE and Verlume designed the electrical interfacing with the turbine.

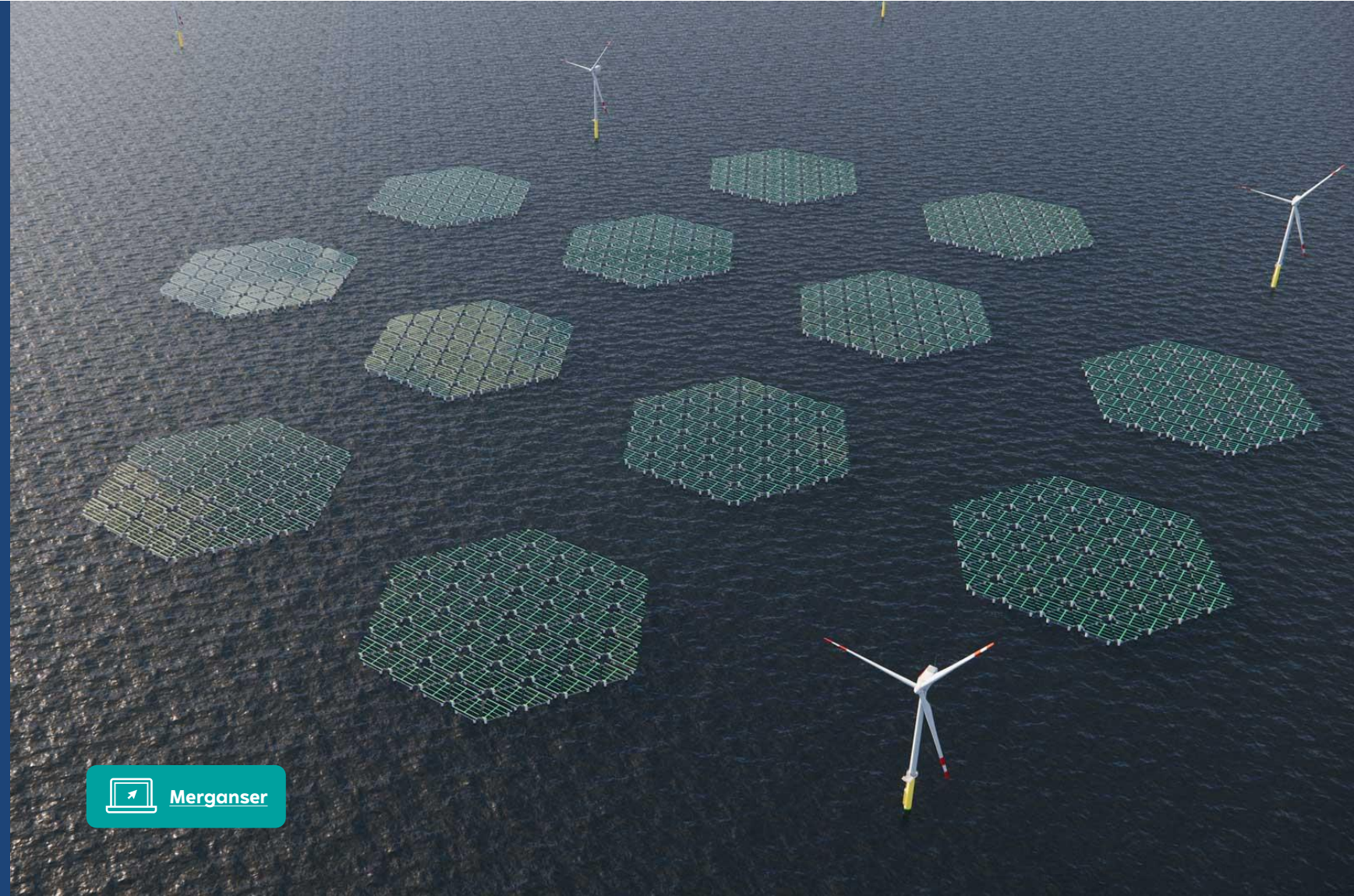
Innovations at OranjeWind (3)

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 the larger installation at OranjeWind.

Status update

- The Merganser Pilot was commissioned in June 2024 ([read more](#)).
- The basic design phase is ongoing and will be completed in August 2024.
- SolarDuck has been developing solutions for Transport, Installation and Operation & Maintenance.



Innovations at OranjeWind (4)



LiDAR power forecasting (ForWind – Oldenburg University)

The innovative power forecasting methodology based on LiDAR (Light Detection And Ranging) has the potential to support grid stability and significantly improve the integration of wind power in future energy systems, by accurately forecasting 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

- Two LiDARs were installed at the nacelles of 2 turbines at Amrumbank West. Data and learnings will be used for installing the LiDARs at the main access platforms of OranjeWind .
- RWE has designed the adaptations on the main access platform for installing the Lidars at 3 HKW turbines and has designed the electrical interfaces.

RWE

OranjeWind Knowledge

Research, communication and dissemination

Generating Knowledge



Collecting
In-house expertise



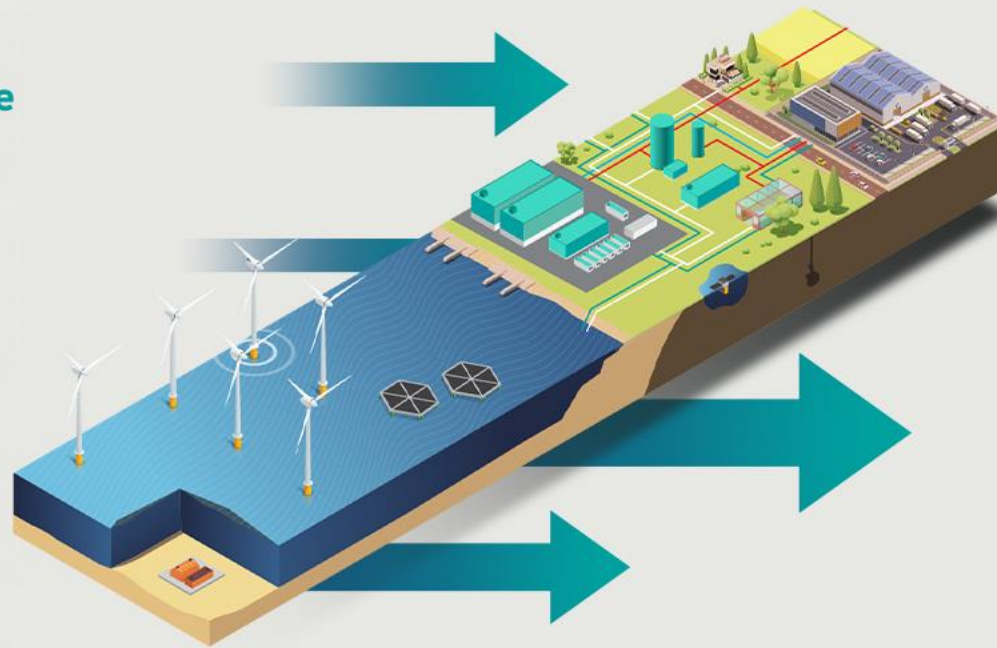
Learning from
OranjeWind



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 Knowledge (1)

How can energy companies strategically position themselves in a changing world?

We asked this question to 50 students Industrial Engineering and Management at Avans Hogeschool. In an 11-week project they developed strategic value propositions for RWE.

The students analyzed trends such as decarbonization, digitalization and the ageing population and translated these to concrete actions for RWE, such as a tidal power plant, using AI in maintenance and virtual sharing of a neighbourhood battery.

Partick Vercauteren, Teacher Industrial Engineering and Management at Avans: “Working together with RWE makes the curriculum more relevant and applied for Avans. Exposing Industrial Engineering and Management students to the energy transition creates awareness of their personal and professional role in this transition.



OranjeWind Knowledge (2)



***Energietalenten* joined in-house day to learn about energy transition**

Energietalenten is a community of students from various Dutch universities that follow an energy-related Master education. Within this community they build a network of energy professionals that work together on innovative solutions for the energy transition.

On May 15th, RWE invited the *Energietalenten* community to an in-house day at our Zuidwester wind farm on Urk. The students toured the wind farm and learned about RWE's energy portfolio, our history and vision for the future.

They also worked on a case study for placing a large solar farm. They had to consider not just the techno-economical aspects, but also grid congestion, ecology, owners of the land it would be built on and other local stakeholders.



[Learn more about Energietalenten](#)

OranjeWind Knowledge (3)

RWE presents cooperation with educational institutes in Groningen to Prime Minister Mark Rutte

Bas Jansen and Henry Mulder from RWE presented our cooperation with educational institutes in Groningen, during an interactive session with the acting Prime Minister Mark Rutte, while he visited the Campus Eemsdelta Groningen in Appingedam.

Contributing to the education of the future workforce is one of the pillars of our OranjeWind Knowledge programme. We can only do this in close cooperation with the institutes that are educating our future workforce and we were proud to showcase our efforts and strong cooperation with schools in the region.



OranjeWind Knowledge (4)



OffshoreWind4Kids workshop organized to inspire primary school children

On June 6th, RWE hosted an *OffshoreWind4Kids* workshop for a class of primary school children from the Dr. Jac P. Thijsseschool in Den Helder. The aim is to inspire children about engineering, technology and renewable energy.

The children were challenged to build their own offshore wind turbines on the beach. They built both bottom-fixed and floating turbines and were even responsible for the decommissioning.

“It was a wonderful day and great to see the kids so excited about renewable energy.” said Bas Jansen, Programme Manager OranjeWind Knowledge.



[Learn more about OffshoreWind4Kids](#)

OranjeWind Knowledge (5)

RWE joins NedZero covenant for vocational internships

On June 13th at WindDay 2024 in Vlissingen, RWE signed an agreement to support vocational education with guaranteed internship positions for offshore wind technician students and the necessary investments involved.

The Dutch wind energy industry association NedZero initiated the agreement, which was signed by partners from the offshore wind sector and vocational schools. With this agreement, the energy sector aims to take responsibility for the development of the future workforce for the energy transition. This workforce will be essential for the roll-out of renewable energy.



OranjeWind Knowledge (6)



Vocational schoolteachers tour Hydrogen facility at Lingen

On June 25th, RWE hosted a tour of our hydrogen facility in development in Lingen, for a group of teachers and stakeholders of vocational schools in the Netherlands.

Hydrogen plays a key role in the decarbonisation of energy-intensive sectors and could be used as a sustainable fuel in the future.

Because there is a large and growing demand for practically trained personnel in the energy sector, RWE is working closely with vocational schools. We also want to ensure that hydrogen becomes part of the vocational curriculum, as it will play an important role in the energy transition.



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.