

The image features a large-scale offshore wind farm in the ocean. The sky is a clear, light blue, and the water is a deep, dark blue with visible ripples. In the center, the RWE logo is displayed in a bold, dark blue font. A series of green, curved lines originate from the logo and sweep across the sky, creating a sense of movement and energy. The wind turbines are visible in the distance, their white towers and three-bladed rotors standing against the horizon.

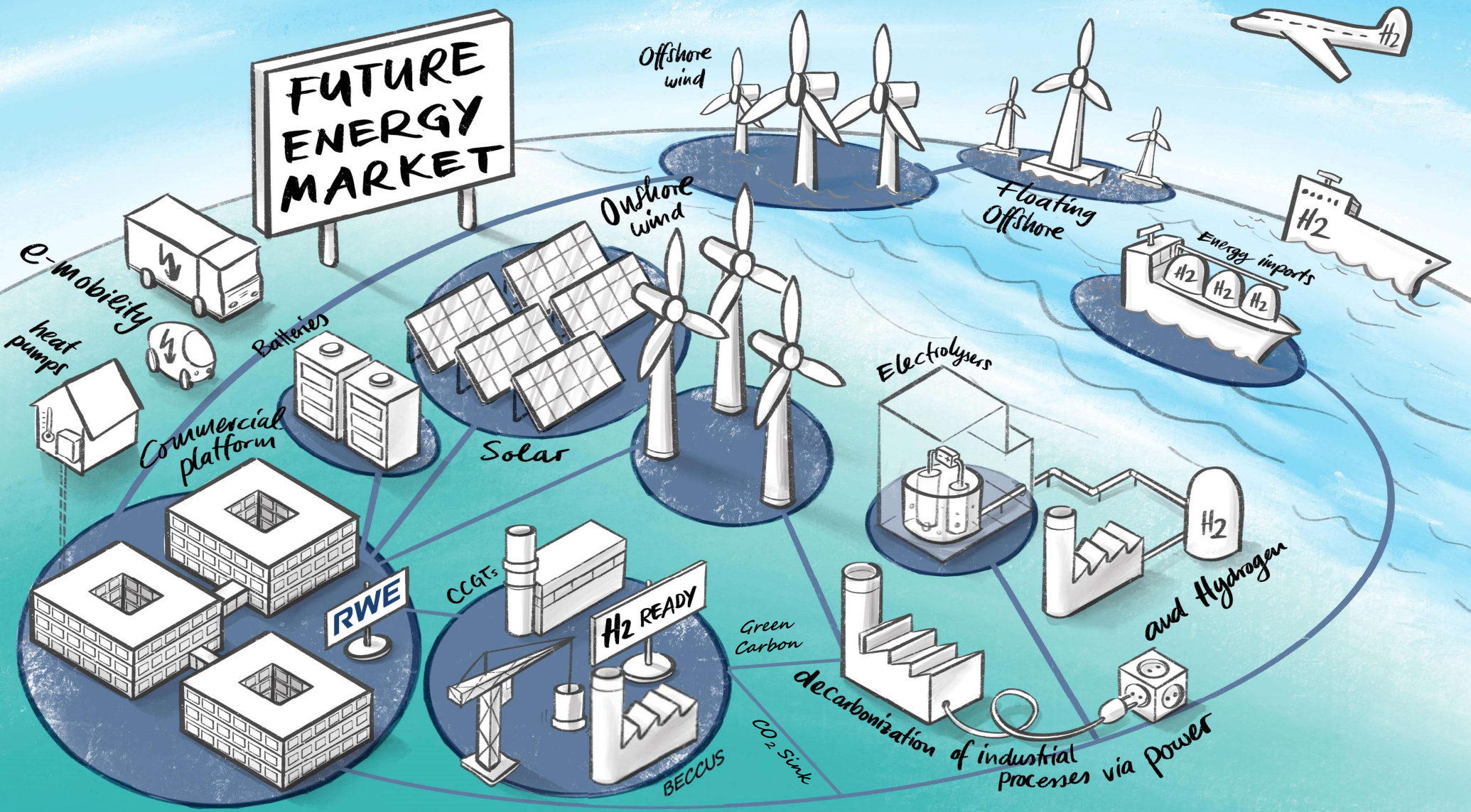
**RWE**

# Growing Green

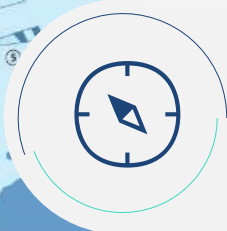
Our Energy for a Sustainable life

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# FUTURE ENERGY MARKET



# Offshore Wind Energy Roadmap



## Developing a North Sea Powerhouse

*“The North Sea is the opportunity for sustainable industry policy and answer to security of supply and affordability”*

Source: Dutch government Rijksoverheid.nl June 2022

June 2022

# 1 Acceleration of offshore wind deployment in the North-Sea

Netherlands  
Offshore wind  
capacity in GW



Key Challenges



System integration



Supply Chain



Human capital: without it  
mission impossible

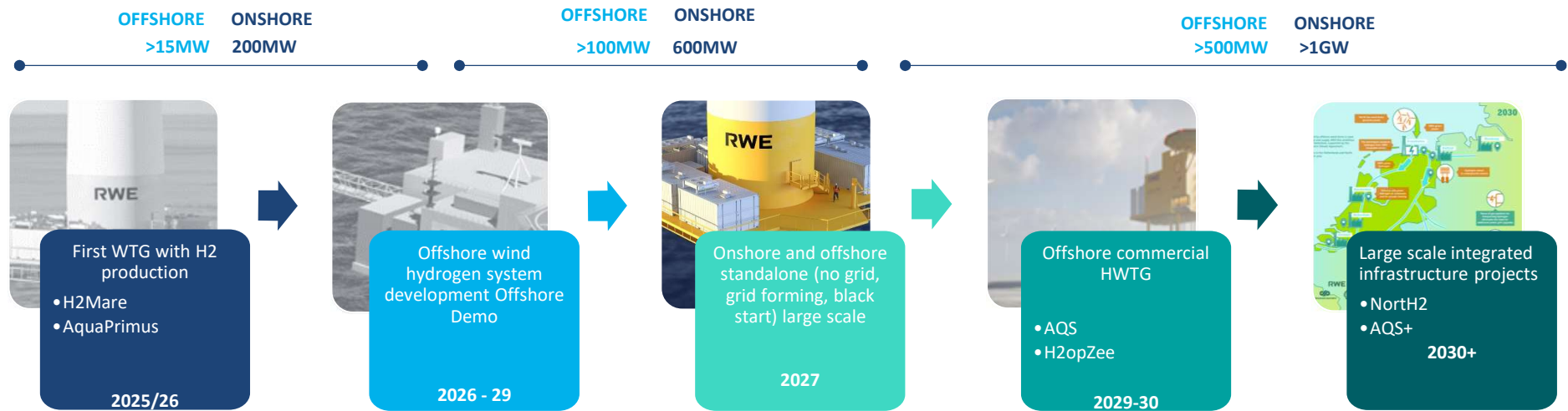


Ecology: footprint on the  
North-Sea



Innovation

## 2 Hydrogen Roadmap: rapid scale-up and deployment



Specific wind + hydrogen tenders are **crucial** to kick-start this development

### 3 Creation of energy hubs onshore and in future offshore

#### Groningen (Eemshaven) as example...



-  Hydrogen
  Heat
  Biomass
  Offshore wind landing
-  Batteries
  Solar
  CO2 capture
  LNG Terminal
-  Power Stations (5GW Existing)
  Import cable (Norway/Denmark/Gemini)

#### ...What is needed to develop this



**Space:** land is scarce, think about dedicated hydrogen hubs



**Infrastructure:** if we go to the North-Sea go there once! Pre-invest in infrastructure corridor



**Masterplan:** an integrated concept needs planning, like the H2 backbone this will solve chicken & egg problems



**Collaboration:** governments (Germany-Netherlands) Business and knowledge institutions



RWE

Energy-hub Eemshaven

# Energy-hub Eemshaven 2030: what is planned



**Besides RWE location Eemshaven:**  
NorthH2, Onshore Wind, Solar park Eemshaven

RWE



## Hydrogen

- Eemshydrogen phase I + II 50MW -100MW
- HKW 350MW up to 600MW



## Storage park

- Up to 100MW battery park
- Battery innovations: e.g. GFC



## Biomass conversion

- InCofi Eemshaven 30%
- 100% Biomass conversion



## Heat delivery LNG Terminal

- 200 MWth sustainable heat
- Enough sustainable heat for the North of the Netherlands



## CO<sub>2</sub> capture & transport

- CO<sub>2</sub> capture for BECCUS up to 10 Mton negative emissions
- CO<sub>2</sub> compression & transport



## Innovations

- H2 innovation hub: e.g. SOEC
- Battolyser concept
- VDL Redox flow battery



**Development >2030:** e.g. Hydrogen, batteries & cooperation with Gasunie





# Biomass conversion & Carbon Capture plant

Biomass conversion

Carbon Capture



~5 million ton biomass logistics

~10 million ton carbon capture plant



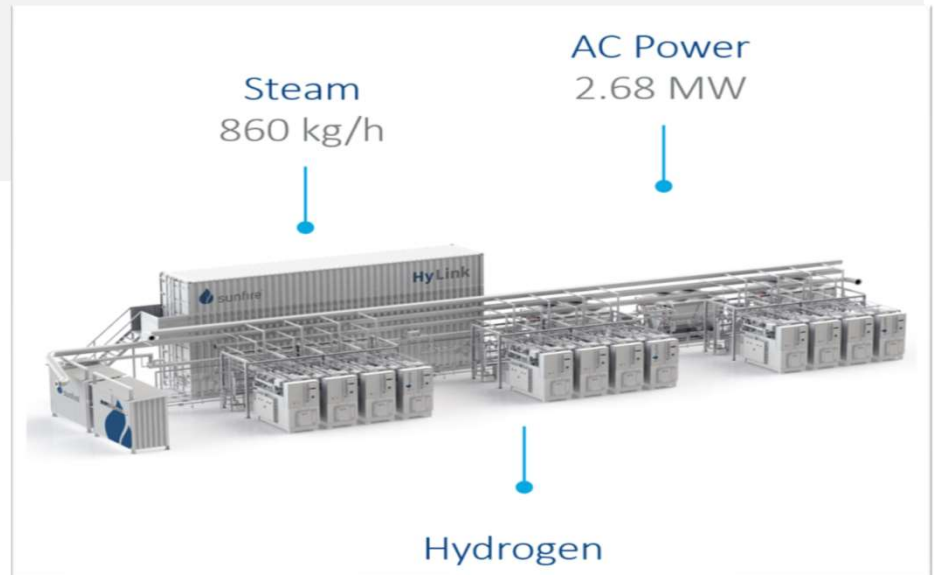
# Hydrogen investments and innovations

## Large scale electrolysis



~350 MW able to scale towards 600MW

## SOEC innovation plant



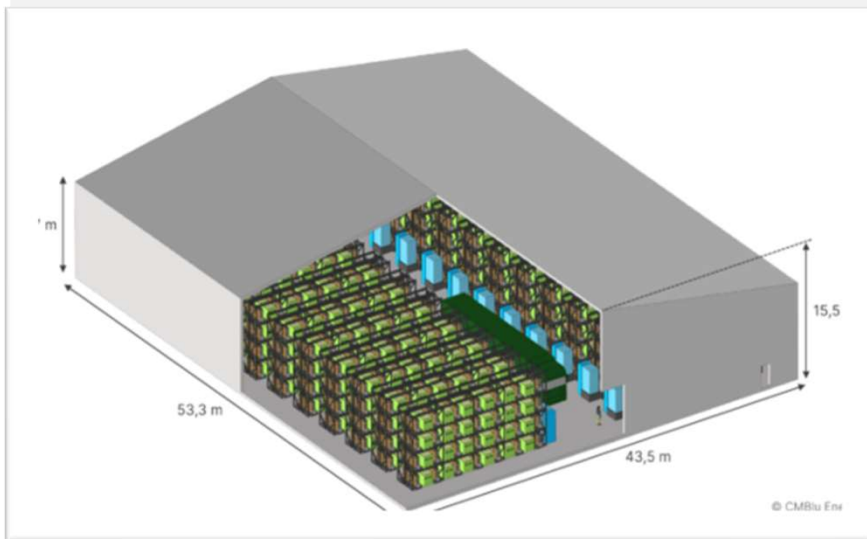
~10 MW able to scale towards 20MW



# Large Battery Projects at Eemshaven

Redox Flow

Demonstrator



~0,25 ha for 50 MW/400 MWh

Li-Ion technology

Conventional



~1,7 ha for 100 MW/400 MWh



# Questions

# Our goals for the energy system in 2050



## Secure & Affordable

Recent events show once more, that security of supply and affordability are **crucial for our prosperity**



## Sustainable

The system needs to be **sustainable, circular** and something we can give to our **future generations**



## System integration

With **wind and solar being the workhorse of the electricity system** we need clever system integration e.g. hydrogen, batteries and significant share of CO<sub>2</sub> free dispatchable power



## Neutral to Negative

All sectors become CO<sub>2</sub> neutral, the electricity sector needs to reach **net zero by 2035** and become **CO<sub>2</sub> negative** afterwards

Our bottom-line: the global electricity system needs to **grow by 400%** whilst balancing these goals