

Enabling the Future of Offshore Renewables with Energy Storage

MDES: Policy and Markets Event, Vincent Bonnin

A surfer in a black wetsuit is riding a wave at sunset. The sun is low on the horizon, casting a warm orange glow over the scene. The water is a deep blue, and the wave is breaking with white foam. The surfer is positioned in the middle ground, leaning forward on their surfboard. The overall mood is dynamic and energetic.

Accelerating Offshore Renewable Energy Solutions

Advancing offshore innovations that provide benefits to the renewable energy system & natural environment, promoting a sustainable future for all

Advancing Offshore Innovations



Industry

Support use cases across the value chain



Innovation

Advance technologies & business cases



Research

Advance scientific knowledge base & tools



Public Affairs

Advise policy makers on best practices

>170

Innovative technology Companies

€ 180_M

Public & Private Investments

>150

Collaboration Partners

Offshore Innovations



Renewable Energy

Wave, tidal, offshore solar & offshore floating wind energy



System Integration

Offshore storage, power-to-X, offshore charging & grid



Nature+

Nature-inclusive design (NID), mitigation & environmental monitoring

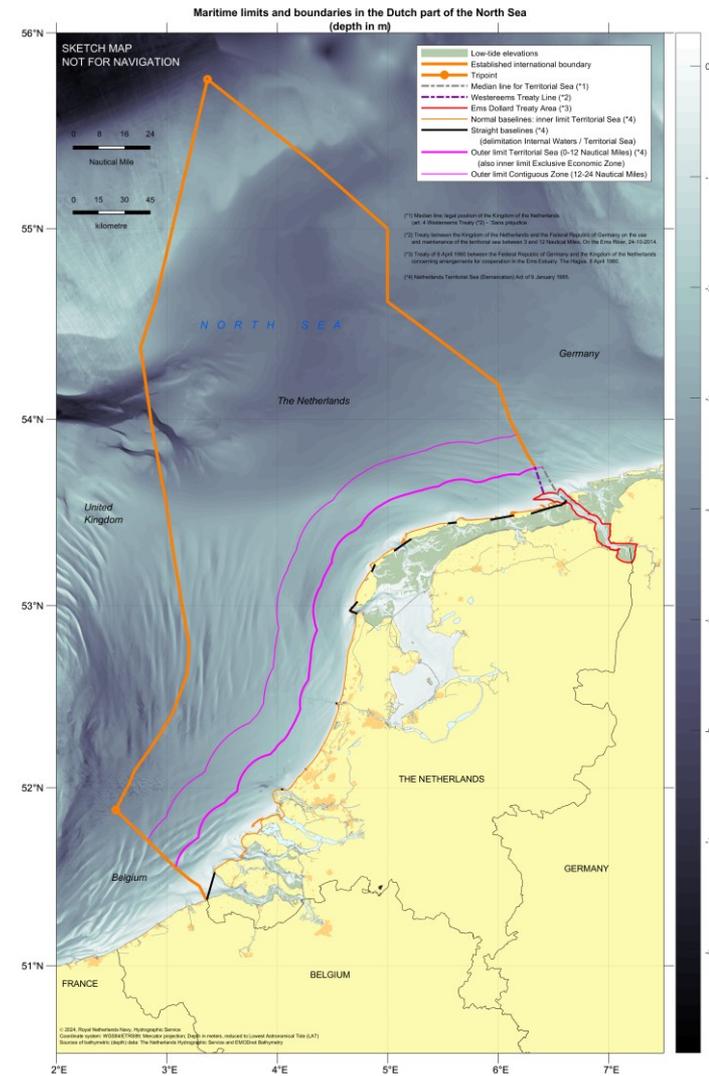
Offshore wind in NL

NL 2024 electricity mix: 55% renewables, 36% gas, 6% coal

Planted Capacity [GW] in NL

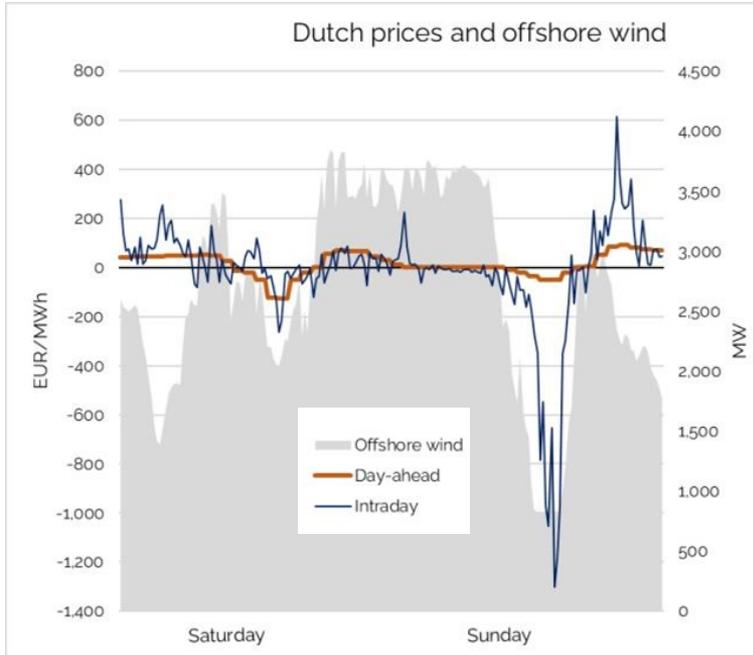
	2018	2025	2032	2040
Onshore wind	3.4	7	~8	~8
Offshore wind	~1	4.7	21	30-40

+5-6 GW tendered
...10 GW missing



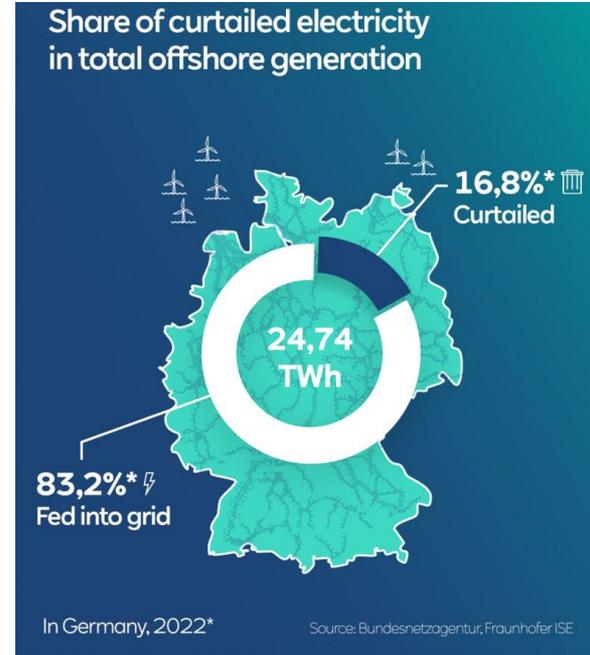
Offshore wind, case for storage

Economical curtailment (April 2024)
due to cannibalization in Netherlands



[LinkedIN post, KYOS energy consulting B.V.](#)

Technical Curtailment (2022) due
to grid congestion in Germany



[LinkedIN post, Sven Utermöhlen, CEO RWE offshore wind](#)

Our storage activities



OASIS

Interreg North Sea

Offshore Accelerator for Storage and System Integration

SME training

Network

Research



OESTER

TKI MOOI project

Offshore Electricity Storage Technology for Energy Research

Optimal
sizing

Life Cycle
Analysis

Techno-financial
analysis

Bankability



OASIS - Our accelerator for offshore storage & system integration



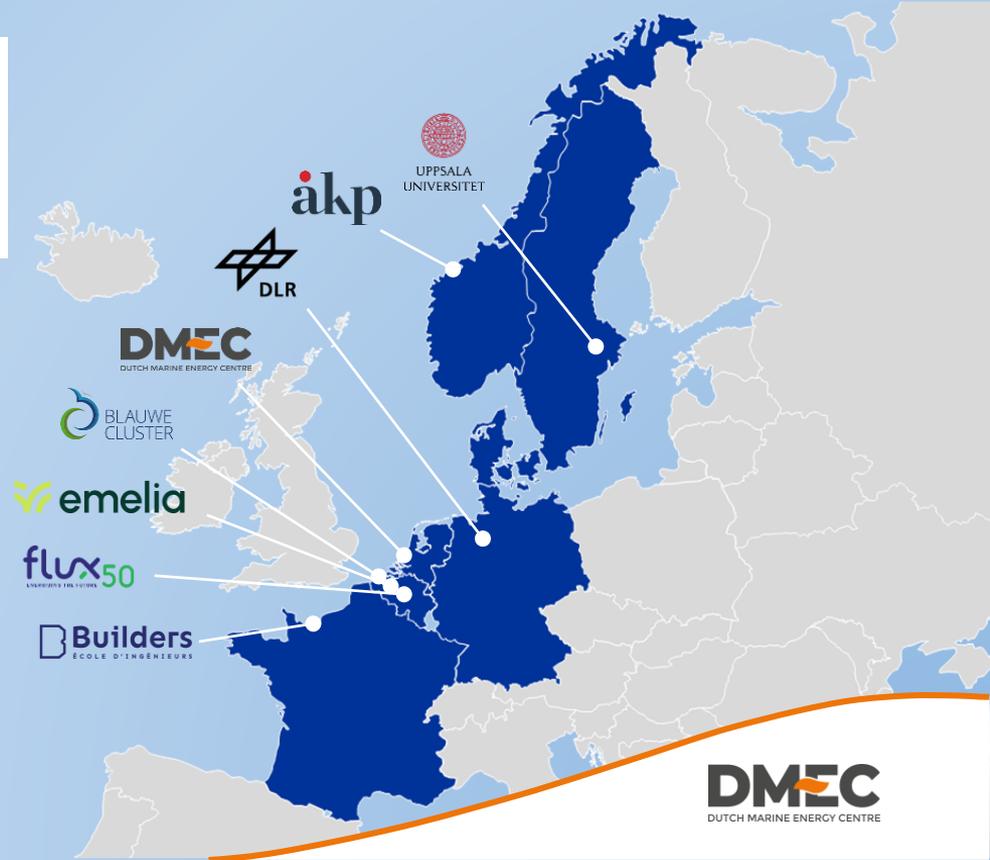
**Interreg
North Sea**



Co-funded by
the European Union

OASIS

Improve the capacity of SMEs developing innovative offshore system integration and energy storage solutions in the North Sea Region.

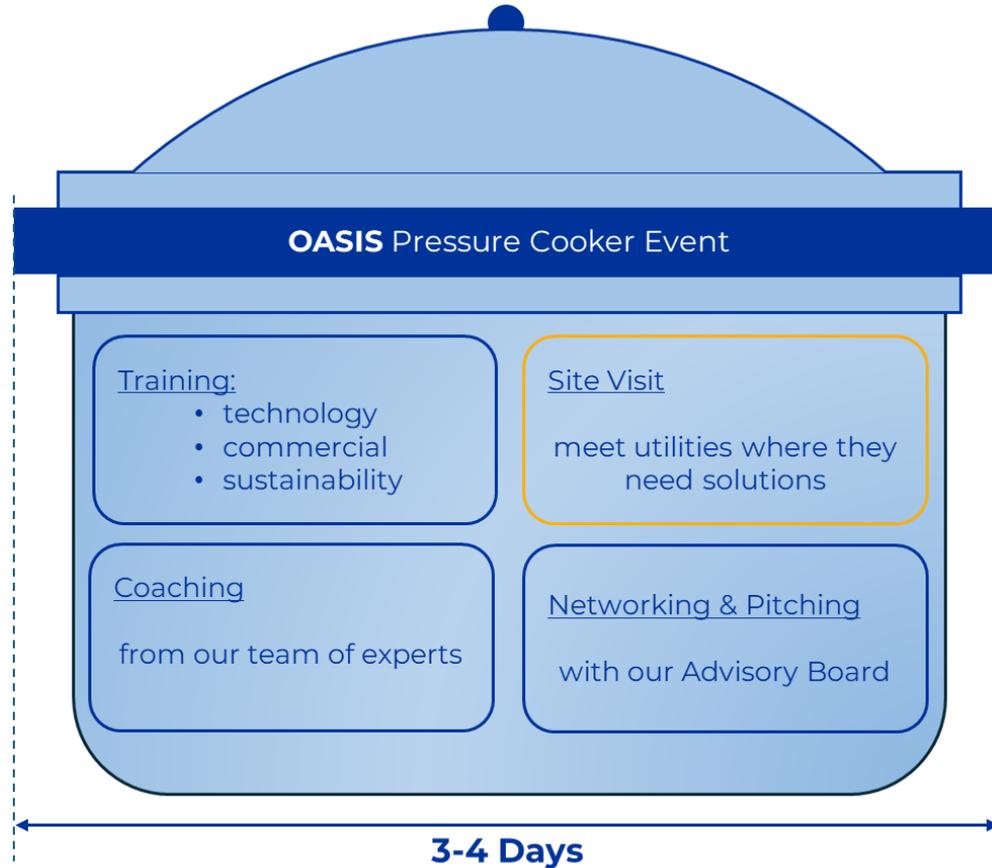


OASIS Support Calls (aka Accelerator Pilots)



repeated 7x

Overall target: 45 SMEs assessed, 30 selected





FAIRPHONE





Our SMEs:



Our Advisory Board members:



Energy Storage: Why Offshore ?

1 - Behind-the-Meter Optimisation

- Increase value of the wind farm output by delivering power when it is needed
- Support grid flexibility and stability
- Avoid additional grid and connection fees

2 - Offshore Multi-Use

- Increase the utilisation of the offshore space
- Share offshore logistics and grid infrastructure
- Interface with other technologies: green H₂, offshore PV, wave, existing subsea pipelines

3 - Minimum Impact at Landing Point

Wind farms connect to busy port areas or pristine coastlines making it challenging to install onshore energy storage

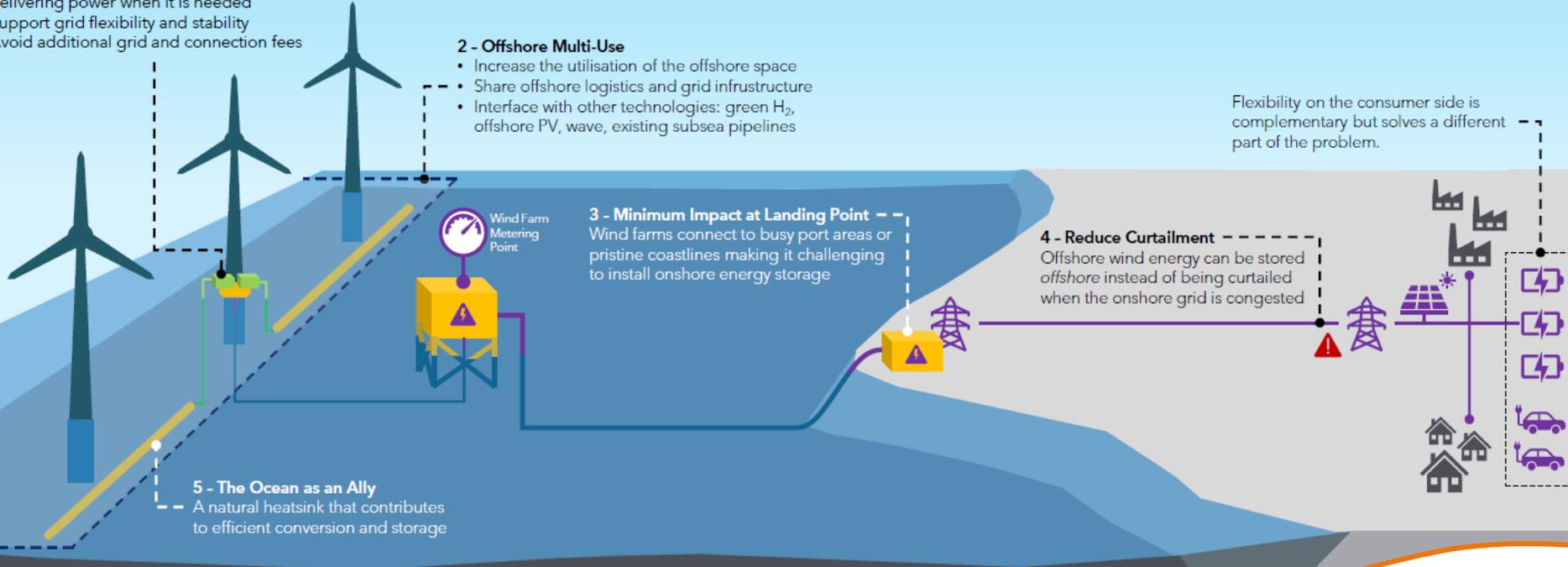
4 - Reduce Curtailment

Offshore wind energy can be stored offshore instead of being curtailed when the onshore grid is congested

5 - The Ocean as an Ally

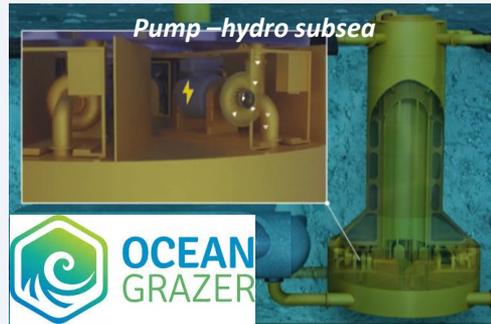
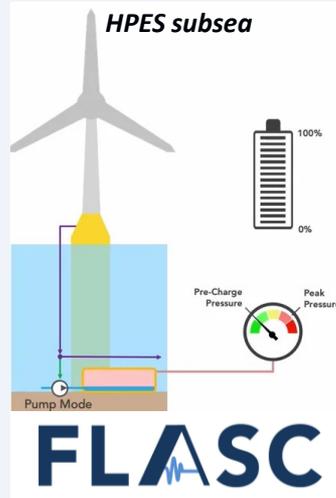
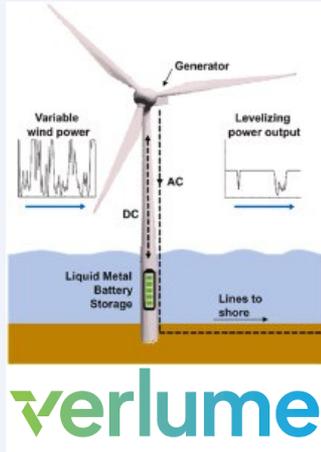
A natural heatsink that contributes to efficient conversion and storage

Flexibility on the consumer side is complementary but solves a different part of the problem.

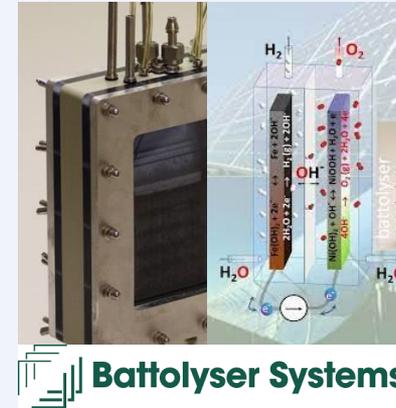


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Li-ion battery inside monopile subsea



Battery + Electrolyser In a platform



Short-term flexibility

Minutes

Medium-term flexibility

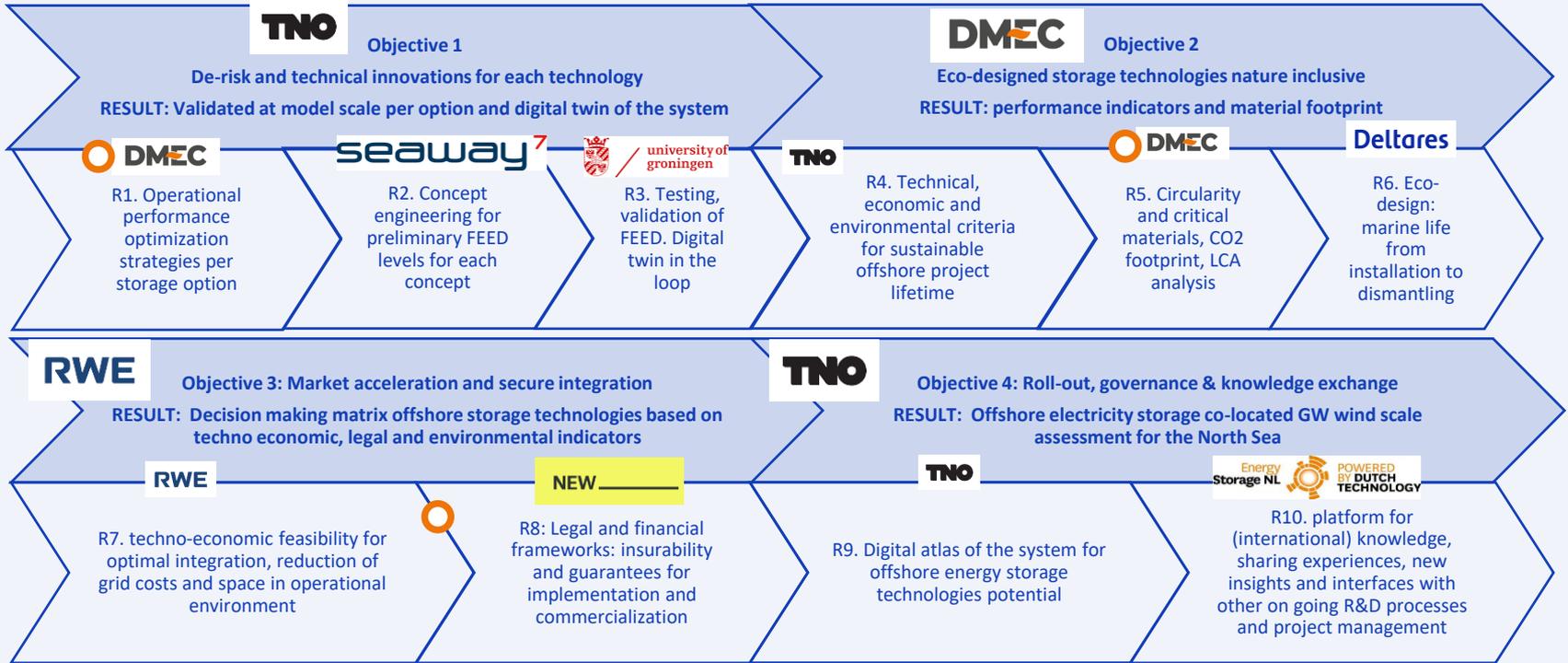
Hours

Days

Long-term flexibility

Weeks

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$$\text{FLASC} = \text{ECU} + \text{LPM} + \text{PCS}$$

Power [kW] Capacity [kWh]

Can be sized independently to achieve durations of 4 to 100 hours

Wind Farm
Offshore Substation

ECU: Energy Conversion Unit

- Electrical interface with variable-speed motor/generator
- Rotating equipment located topside to minimise OPEX
- Modular topside unit [5MW skid-assembly]

Air Riser

Hydraulic Risers

LPM: Liquid-Piston Module

- Multi-stage liquid-piston compressor/expander
- Efficient isothermal behaviour due to seawater heat exchange

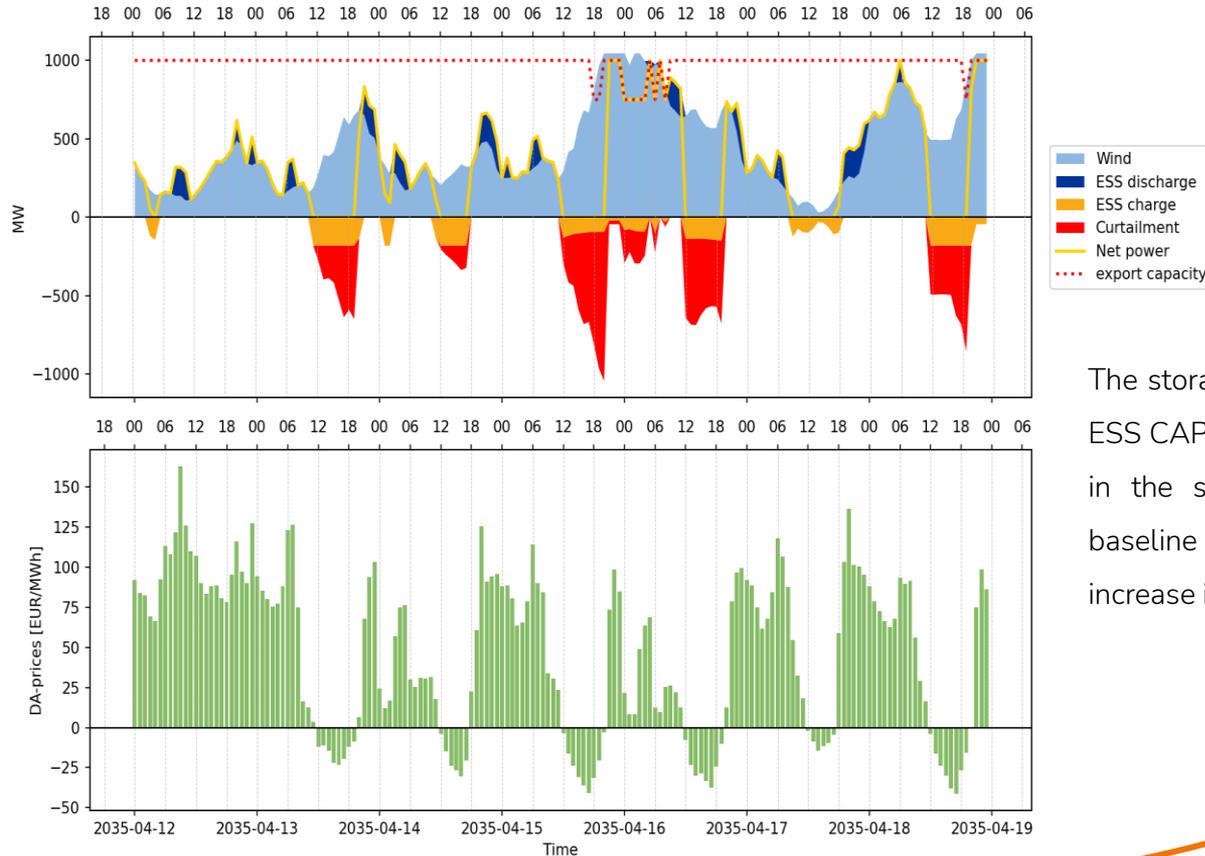
PCS: Pressure Containment System

- Determines the storage capacity [kWh/m³]
- Only contains compressed air
- Option to re-purposing existing offshore assets

Cable to Shore

Electrical Connection to
Offshore Substation

OESTER



The storage dispatch is optimized to minimize the ESS CAPEX required to deliver a net improvement in the system value of time-shifting over the baseline no-storage case, expressed as the increase in export volume weighted by DA prices.

What is next?



Explore how energy storage – either onshore or offshore – can best support the deployment of offshore renewables.

Thank You!
