

# Denmark's Energy Islands

Carl-Christian Munk-Nielsen

© Danish Energy Agency



### Carl-Christian Munk-Nielsen

- 2021- : Technical Director, Center for Energy Islands, Danish Energy Agency
- 2019-2021: Head of Division, Center for Subsoil Resources and Risk Preparedness, Danish Energy Agency
- 2016-2019: Head of Division, Center for Energy Administration, Danish Energy Agency
- 2013-2016: Head of Campus Support, Copenhagen University
- 2004-2013: Head of Division, Coastal Authority







With the energy islands, Denmark is leading the way in Europe by contributing to the green transition among our neighbouring countries, through the export of green and renewable energy, and by continuing to support green innovation and commercial potential.

Addendum to the climate agreement on energy and industry of 22 June 2020, regarding the ownership and construction of energy islands etc., 4 February 2021

## Strong political support



- Broad agreement behind the energy islands in the North Sea and at Bornholm
- The Esbjerg Declaration: "The North Sea to be Europe's green power house
- Belgium, Denmark, Germany and the Netherlands had agreed to jointly develop 150 GW in their North Sea territories
- Baltic Sea Countries Agree to increase offshore wind capacity sevenfold by 2030



### Long-term vision



- Very significant in achieving a carbon neutral society
- Several energy islands and a large scale power grid
- Sector coupling and regional integration
- Green electricity and e-fuels from renewable energy
- Energy independence and lower electricity prices



# The Danish Energy Agency's role

The Danish Energy Agency is leading the planning of the world's first energy islands We are securing political support and optimal framework for development and construction

We enable smooth collaboration with authorities and limiting governmental bureaucracy

We share our experience and knowledge with the world



The construction of two energy islands by 2033 is the equivalent of a Mars Mission for the Danish energy system.

Energistyrelsen
Danish Energy Agency

## One of Denmark's largest construction projects





# Where will the Energy Islands be located?

The North Sea - approx. 80 km off the coast at Thorsminde



The Baltic Sea - approx. 15 km south-southwest from Bornholm





# **Energy Island Bornholm**

- 3 GW of offshore wind, instead of the initially planned 2 GW by 2030
- Several offshore wind farms with onshore facilities on Bornholm
- Connection to Zealand and Germany
- Subsea cable connecting Denmark and Germany will have a length of approx. 470 km
- Provides enough green power to supply the electricity needed by 3.3 million Danish households



# **Energy Island Bornholm creates new possibilities**



### North Sea Energy Island

- the future of large-scale offshore wind power





Note that the scope, appearance and exact features of the island have not yet been determined.

© Danish Energy Agency

时时时时时时时时时

# A flexible and scalable technical concept

- Combines on-island transmission with platform based system situated around the island
- 3 GW of offshore wind by 2030, and later reach full capacity at 10 GW by 2040
- 3-10 GW = 3-10 millions households
- Technological flexibility helps futureproof the island
- Several innovation options are possible, but these will not be evaluated as part of the tender





# Visualisations of the North Sea Energy Island

Energistyrelsen
Danish Energy Agency

Note that the scope, appearance and exact features of the island have not yet been determined.

© Danish Energy Agency



Energistyrelsen
Danish Energy Agency

Note that the scope, appearance and exact features of the island have not yet been determined.

© Danish Energy Agency

# **Critical infrastructure**

- The energy island is considered 'critical infrastructure'
- Investment screening and criteria for buyer(s)
- Collaboration with Energinet, which is responsible for the electrical transmission equipment
- Dialogue with relevant authorities (e.g. Danish Ministry of Defense, The Defense Command, Danish Security and Intelligence Service, the National Police)





### **Investment highlights**



#### Active partnership

An active partnership with freedom to bid on projects in the North Sea and optimize business opportunities.

#### Early entry

Early entry into Europe's new "green power plant" with opportunity to shape design and business decisions.

#### First mover

Ability to leverage first-mover advantage for future islands gaining invaluable know-how into the first of many islands.



Long-term investment

Large, green investment with an investment horizon longer than most infrastructure investments.



World's first energy island

3 GW by 2033 10 GW by 2040



#### Strong project fundamentals

Strong national and international support and attractive location for offshore wind.



Availability-based secured cash flow from Danish TSO provides investors high predictability and low risk.

#### Flexible concept

Technological flexibility helps futureproof the island as later platform additions can be tailored to tomorrow's technological solutions.

#### Preliminary time table for the energy island project







# **Questions**?

© Danish Energy Agency