

# Offshore Wind Summit

**September 25, 30, and October 7, 2020**

**National Governors Association Center for Best Practices & The  
Embassy of Denmark**



**EMBASSY  
OF DENMARK**  
*Washington D.C.*

# **Electricity Market Structure & Transmission Grids- Introductory Remarks**

**Jessica Rackley, Energy & Environment  
Program Director, NGA Center for Best  
Practices**



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**SIEMENS Gamesa**

RENEWABLE ENERGY

# Opening Remarks

**Ralph Northam, Governor, Commonwealth of  
Virginia**



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# Lessons from the EU Offshore Wind Sector

Ivan Pineda

WindEurope Public Affairs

# Our members make wind energy work

400+ MEMBERS

Wind turbine manufacturers

e.g.



GE Renewable Energy

SIEMENS Gamesa  
RENEWABLE ENERGY

Vestas

Wind farm developers

e.g.



VATTENFALL

Power utilities

e.g.

e-on



Component manufacturers

e.g.



Installation / logistics

e.g.



Financial & legal services

e.g.



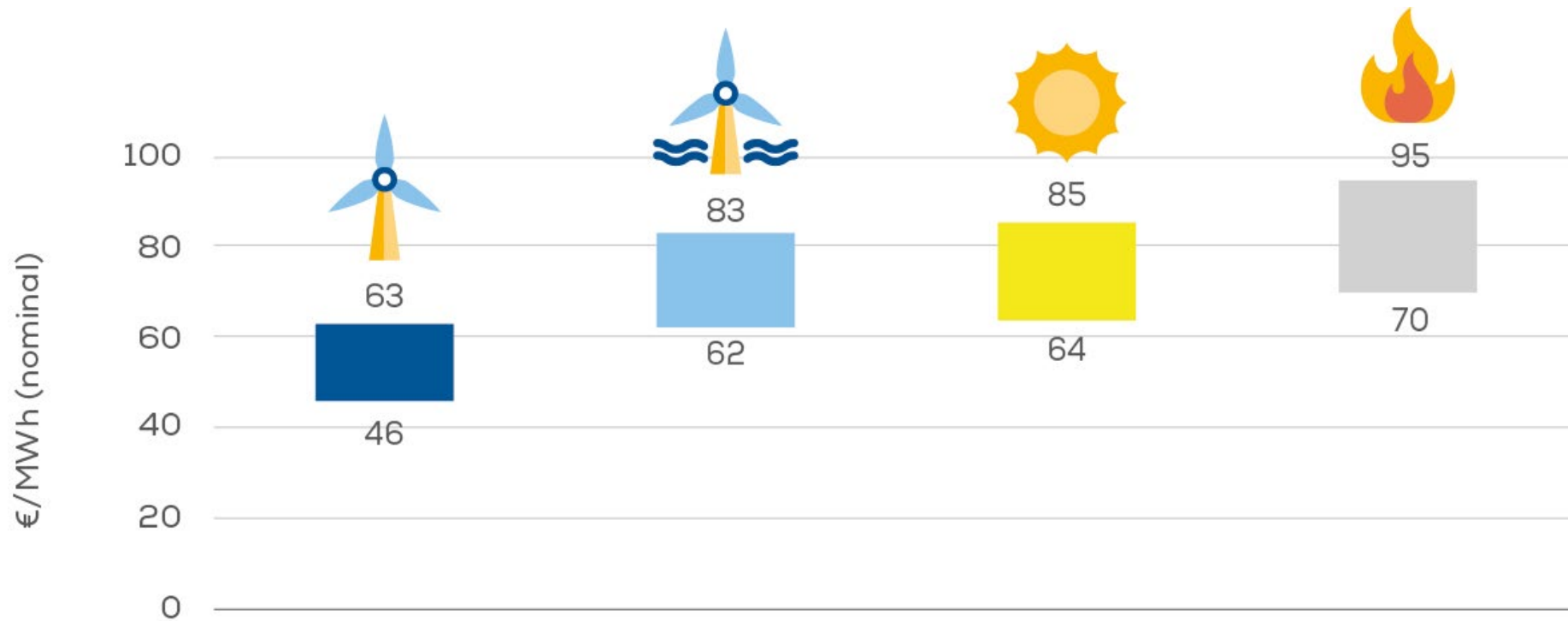
Research institutes

e.g.



+ NATIONAL WIND ASSOCIATIONS

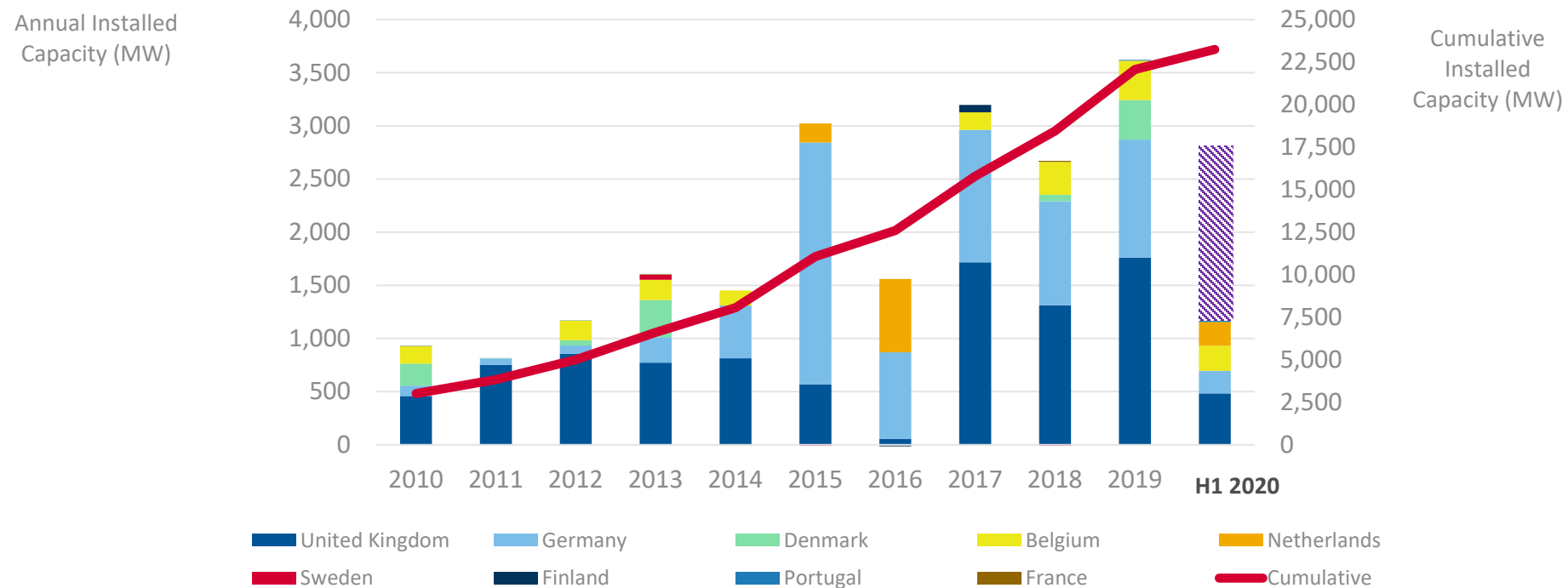
# Wind the cheapest form of new power generation



EUR 1 = USD 1.12  
ECB, 2019 exchange rate

Based on BNEF 2019 data for North West Europe.

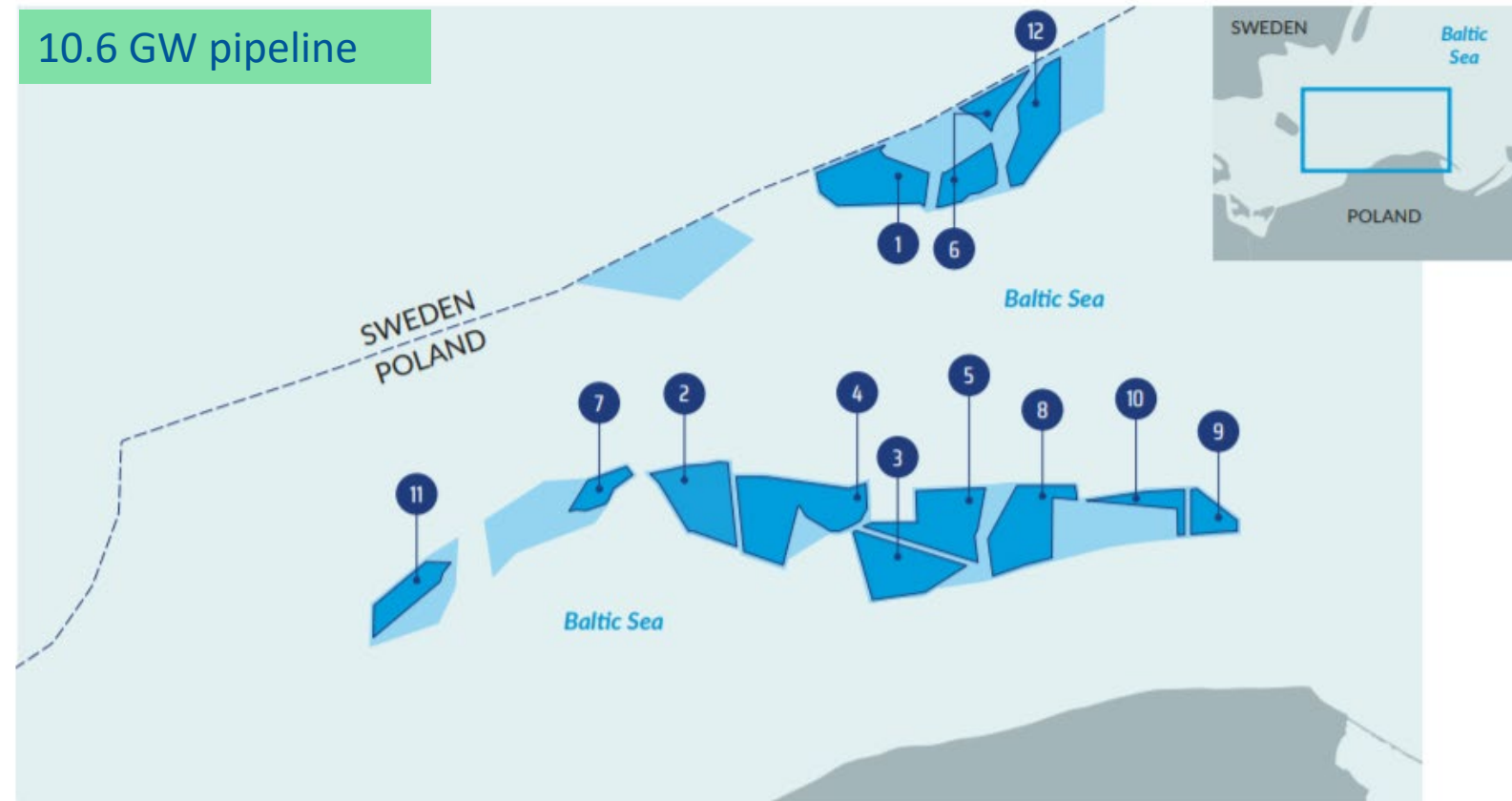
# Offshore wind has developed individually in each country





# Poland is now the hottest market

Figure 7 Location of planned wind farms in the Polish part of the Baltic Sea



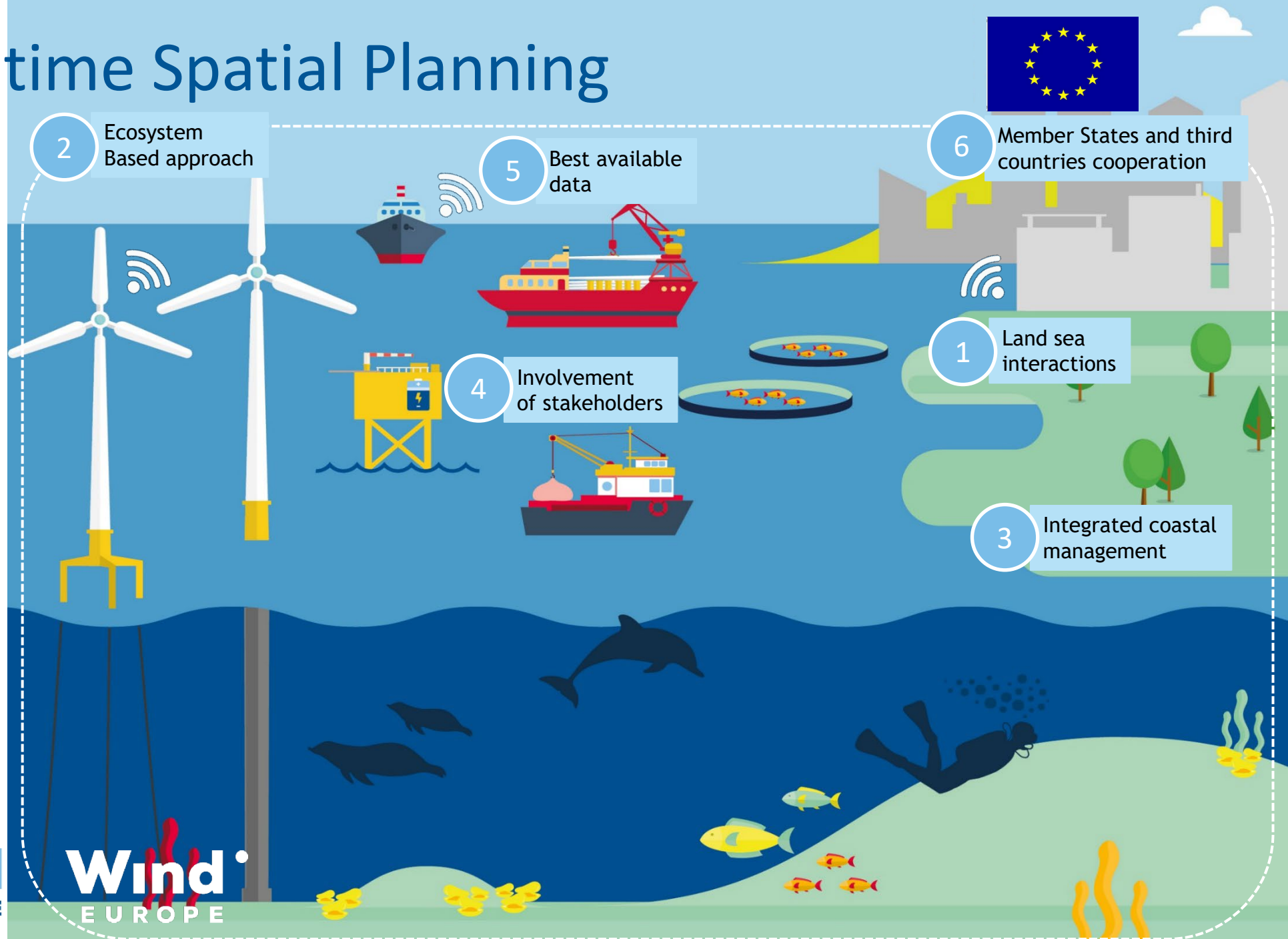
Source: (PWEA, 2020) Vision for Poland.  
Development of offshore wind in the Baltic Sea region

# A journey to gain experience

🚧  
Vindeby Wind Farm  
Lolland, Denmark  
1991



# Maritime Spatial Planning



# Maritime Spatial Planning

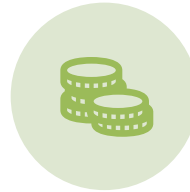
## Why is it important?



Reduce conflicts on access to maritime space



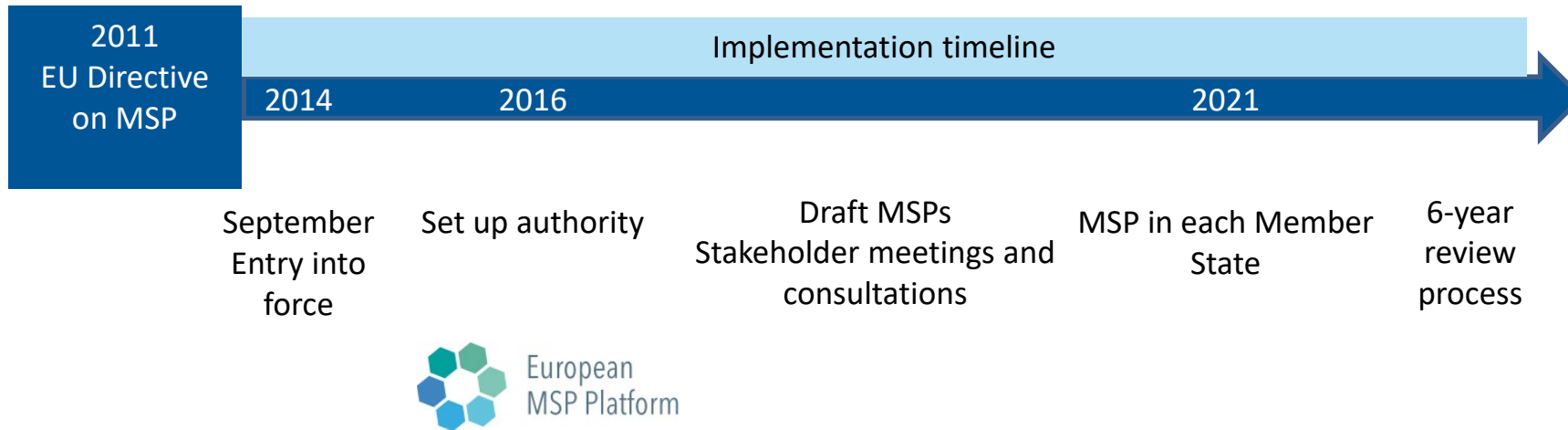
Reduce cumulative environmental impacts



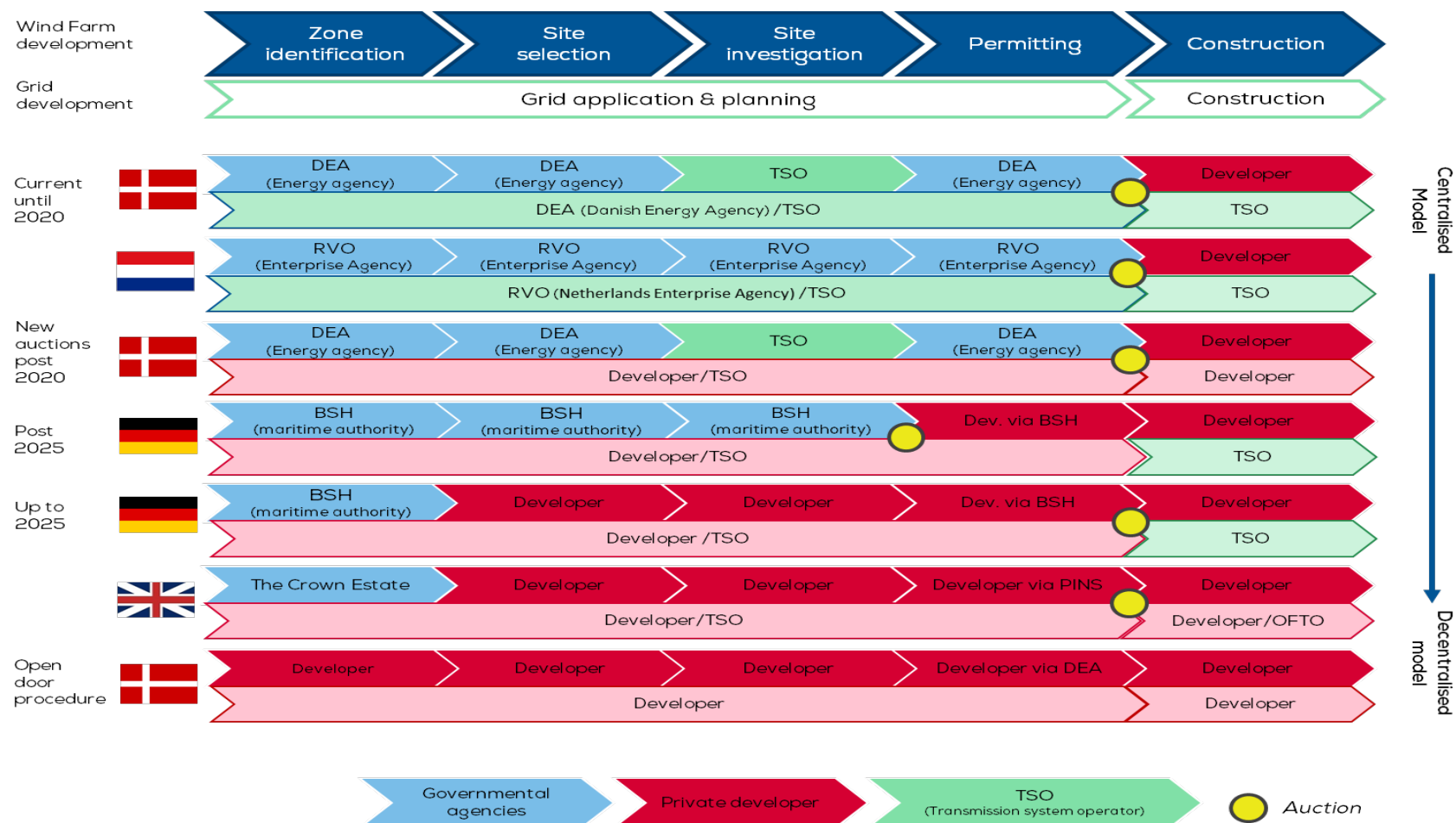
Reduce coordination costs



Improve visibility for private investments

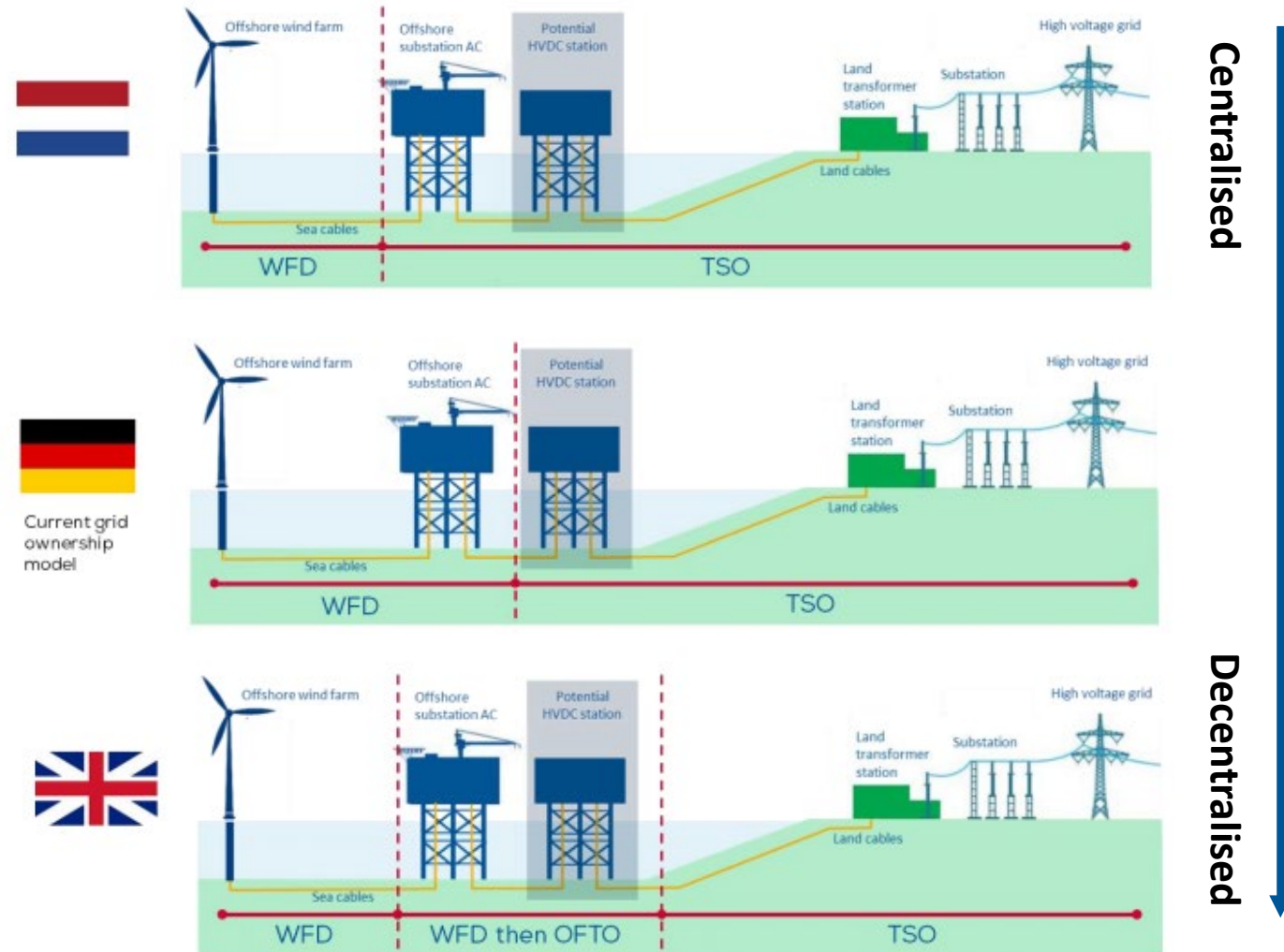


# Who's responsible where?



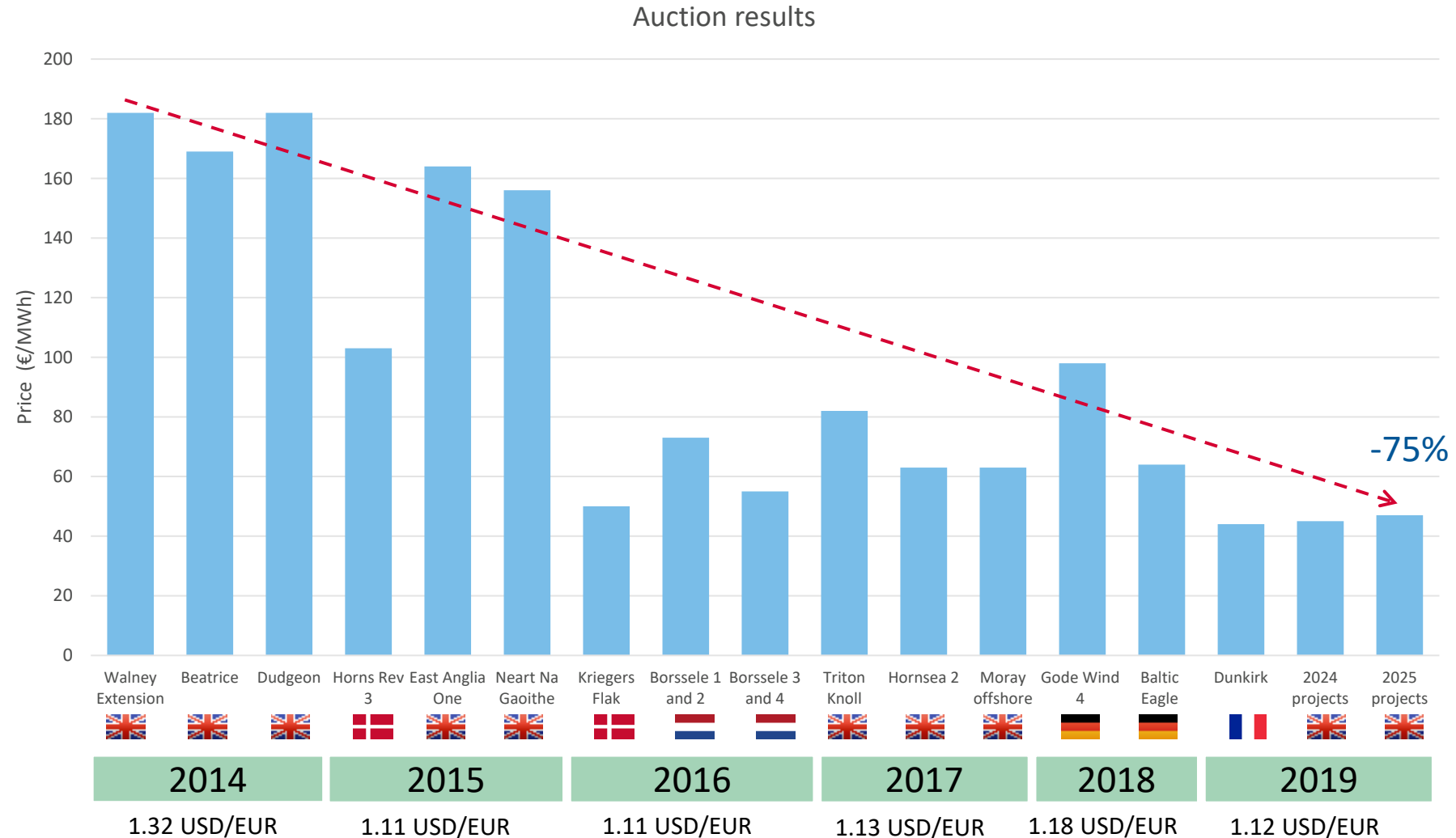
# Offshore grid connections

## Different configurations, different costs

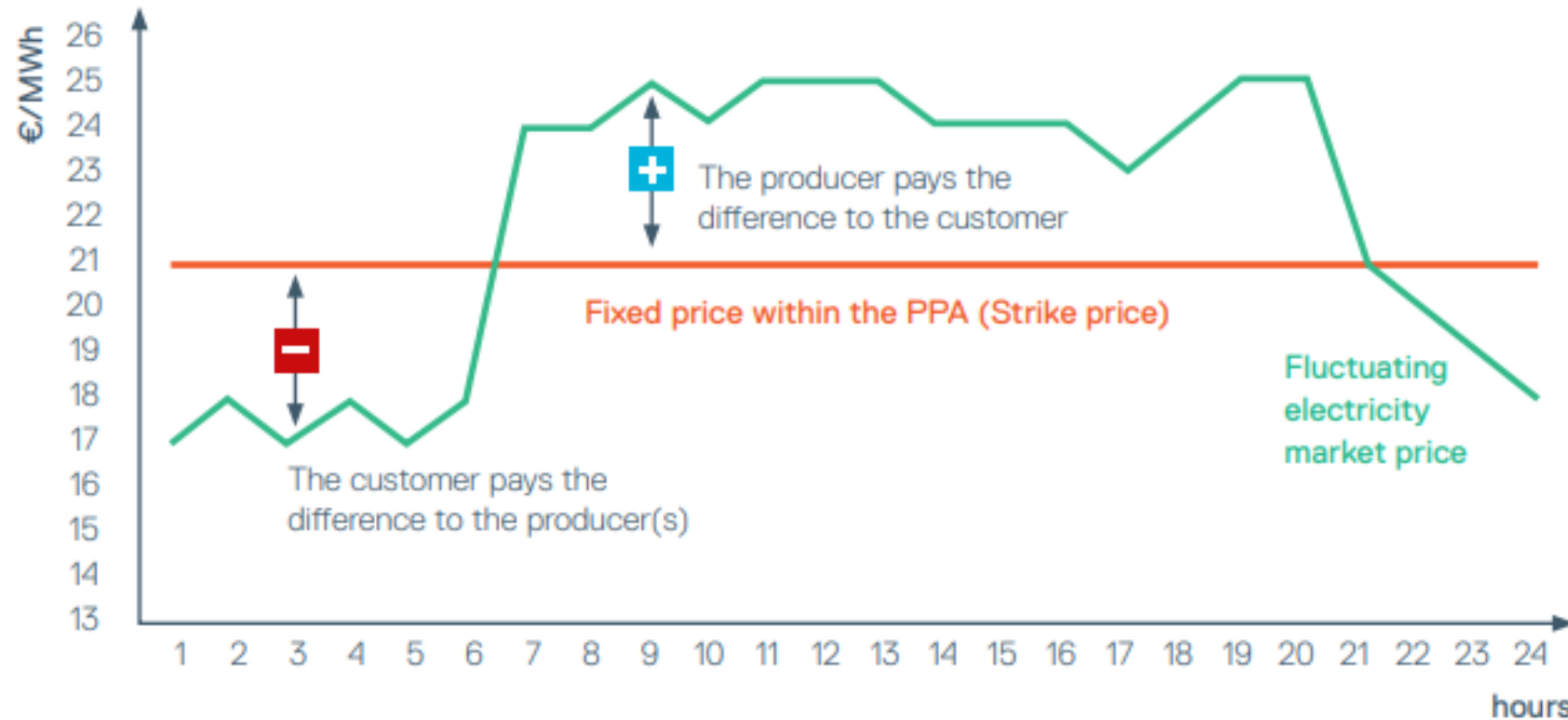


Source: WindEurope

# Cost of offshore wind is decreasing

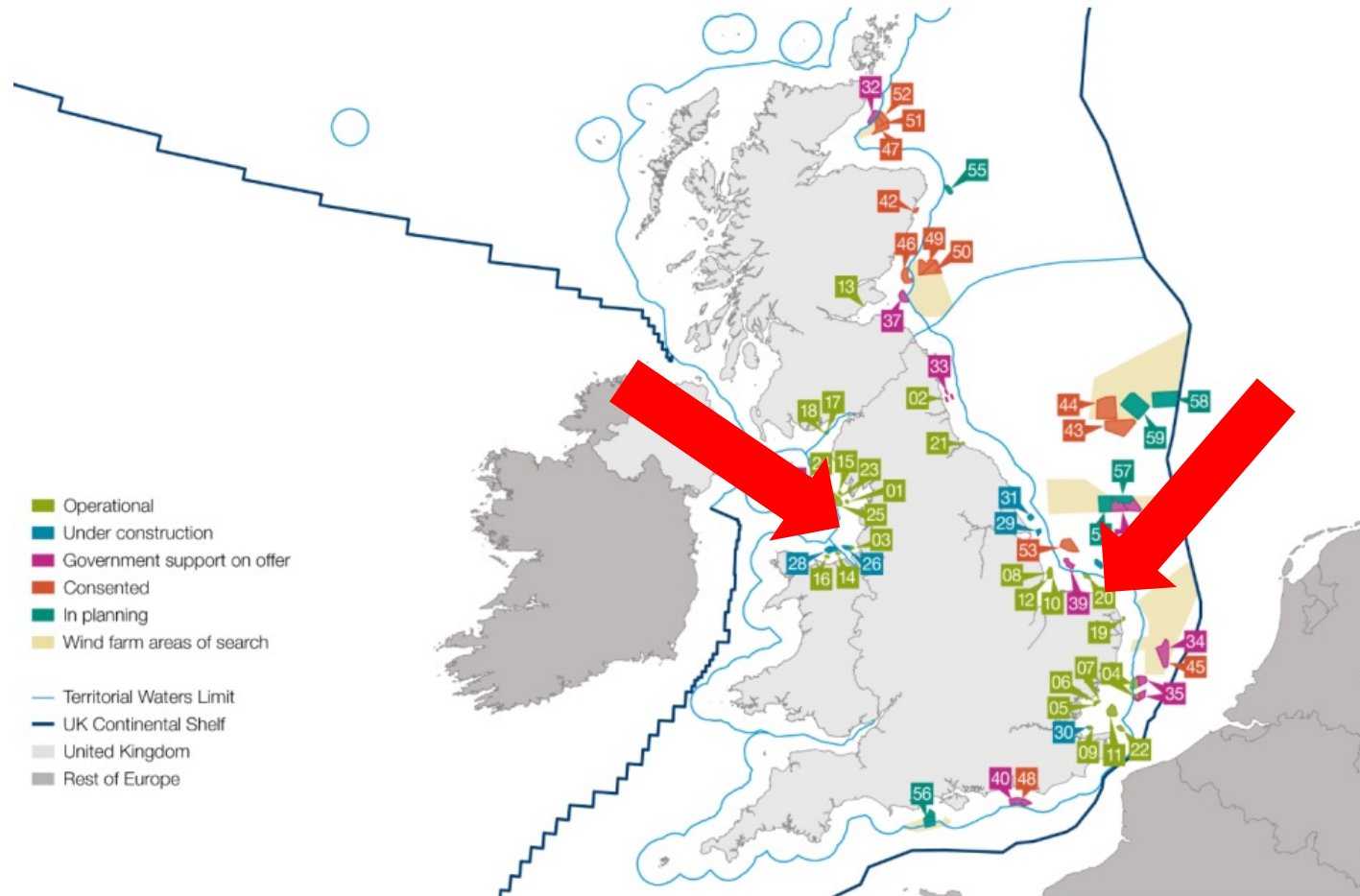


# Delivering high volumes requires auctions and Contracts for Difference (CfD)





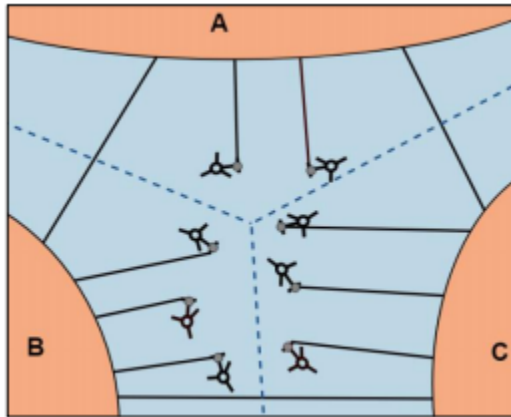
# The UK is now revising the transmission long term strategy



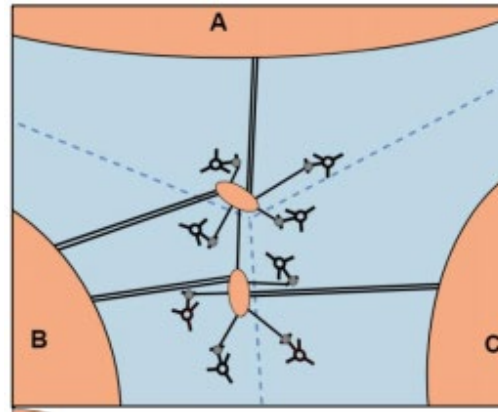
Potential bottleneck  
with point-to-point

Source: UK BEIS  
Bottlenecks sketch, WindEurope

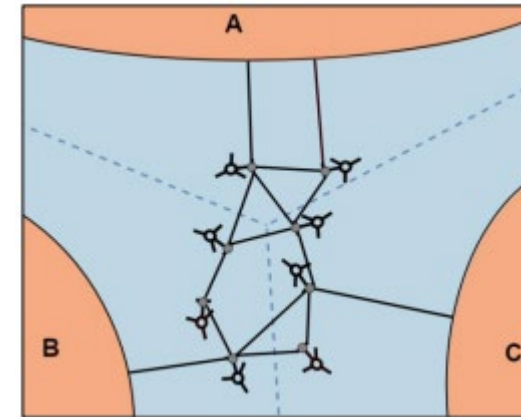
# But the grid requires a new approach



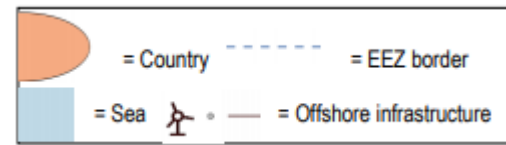
**Business as Usual**



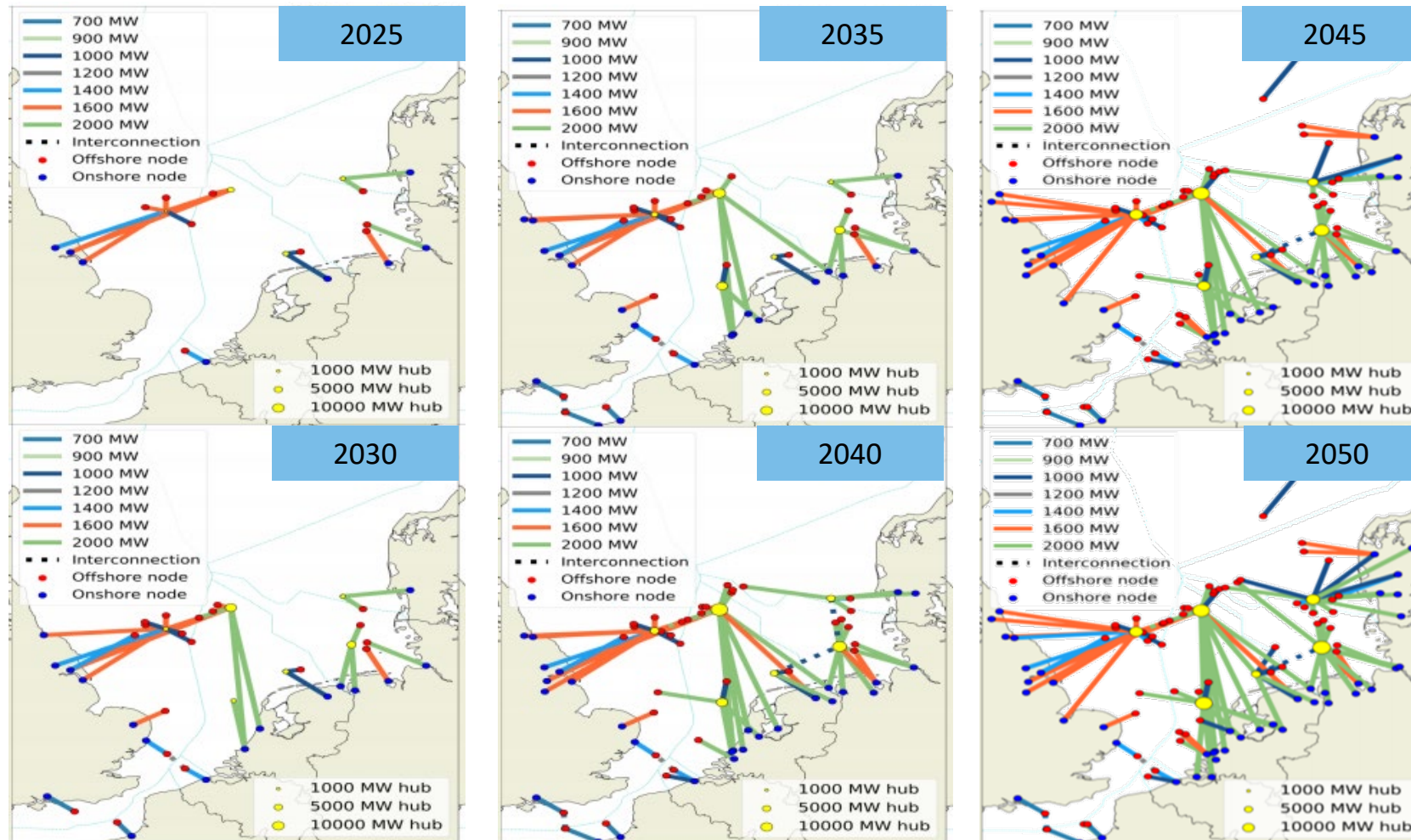
**European Centralised  
Hubs (HUB)**



**European Distributed  
Hubs (EUR)**



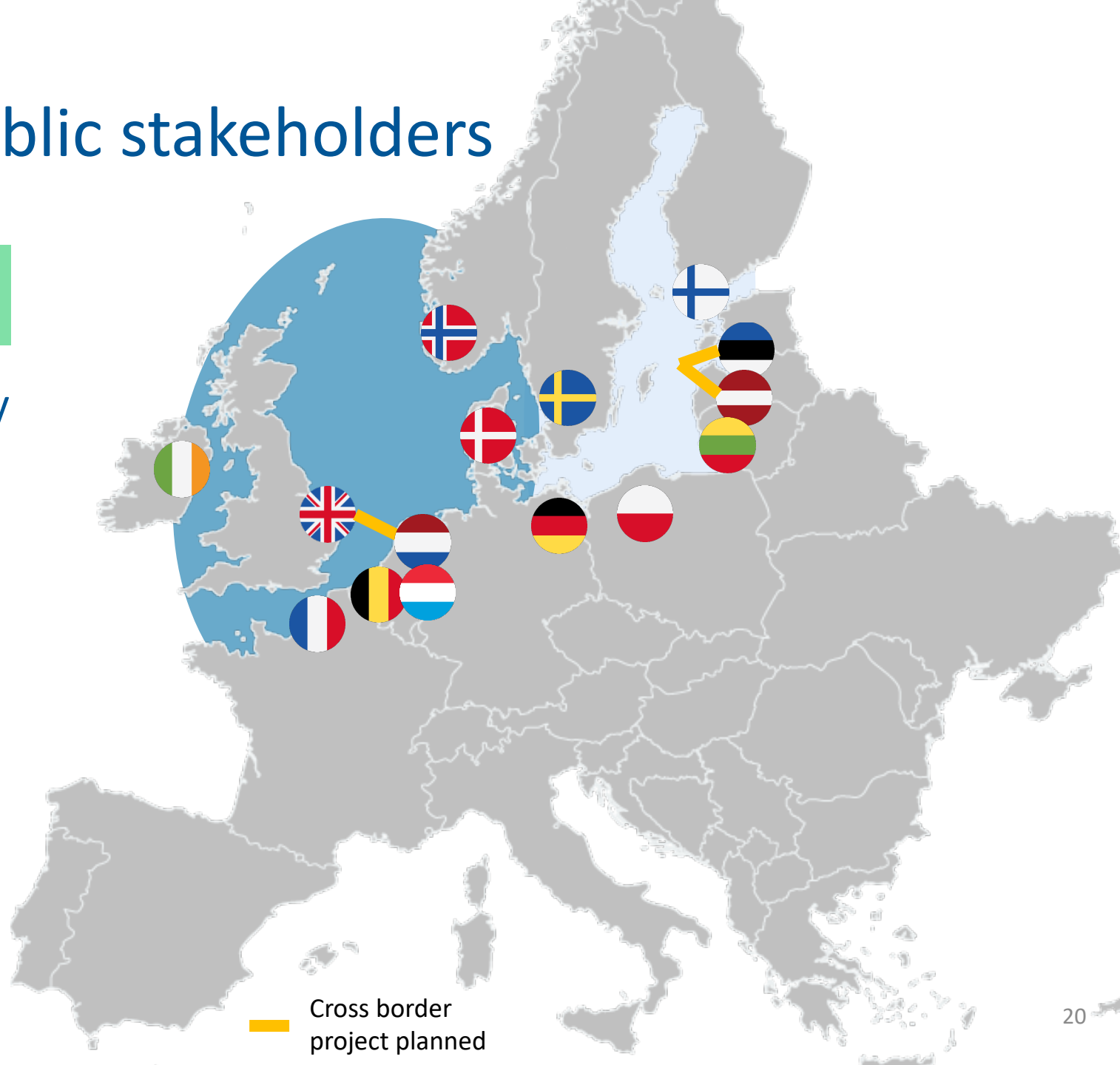
# Much more coordinated



# With private and public stakeholders

## Hybrid projects and regional cooperation

- North Sea Energy Cooperation
- EE-LV 1GW joint project
- UK-NL Multi-purpose interconnector
- Baltic Sea Offshore Wind Pact





# For Europe to be climate neutral



2050 vision:

**450 GW**

OF OFFSHORE WIND

212  
GW

83  
GW

85  
GW

70  
GW

Atlantic Ocean

North Sea

Baltic Sea

Southern European waters

Source: BVG Associates for WindEurope

**Wind**  
EUROPE

**Wind**  
EUROPE

# Some lessons learned in offshore wind in Europe

1. 

Get your maritime spatial planning right

2. 

Beef up your permitting authorities

3. 

Accelerate grid development -on and offshore

4. 

EU regulatory framework for “cross border” projects

5. 

Electrify transport, heating and industry

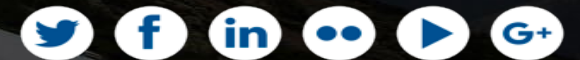
6. 

Visibility on volumes and revenues

# THANK YOU

**Wind**<sup>•</sup>  
**EUROPE**

[windeurope.org](http://windeurope.org)



WindEurope, Rue Belliard 40  
1040 Brussels, Belgium



# NGA & Embassy of Denmark Offshore Wind Summit



**Kirsty Townsend**

*Head of Special Projects*

October 7, 2020



## Ørsted Offshore: Global overview

25+ years of experience and unparalleled track record

### The global leader in offshore wind

- › **6.8 GW** installed capacity
- › **3.1 GW** under construction
- › **1,500+** turbines spinning
- › **26** offshore wind farms in operation

#### The world's first

Vindeby, 1991

5 MW



#### America's first

Block Island Wind Farm, 2016

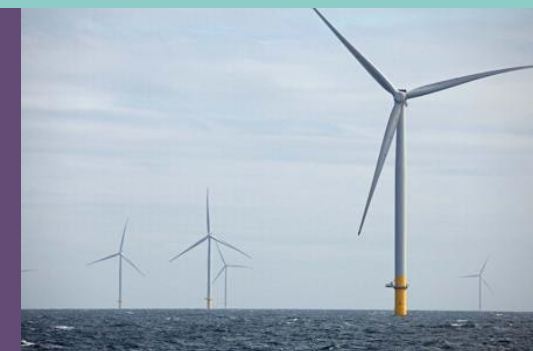
30 MW



#### The world's largest

Hornsea 1, 2020

1.2 GW



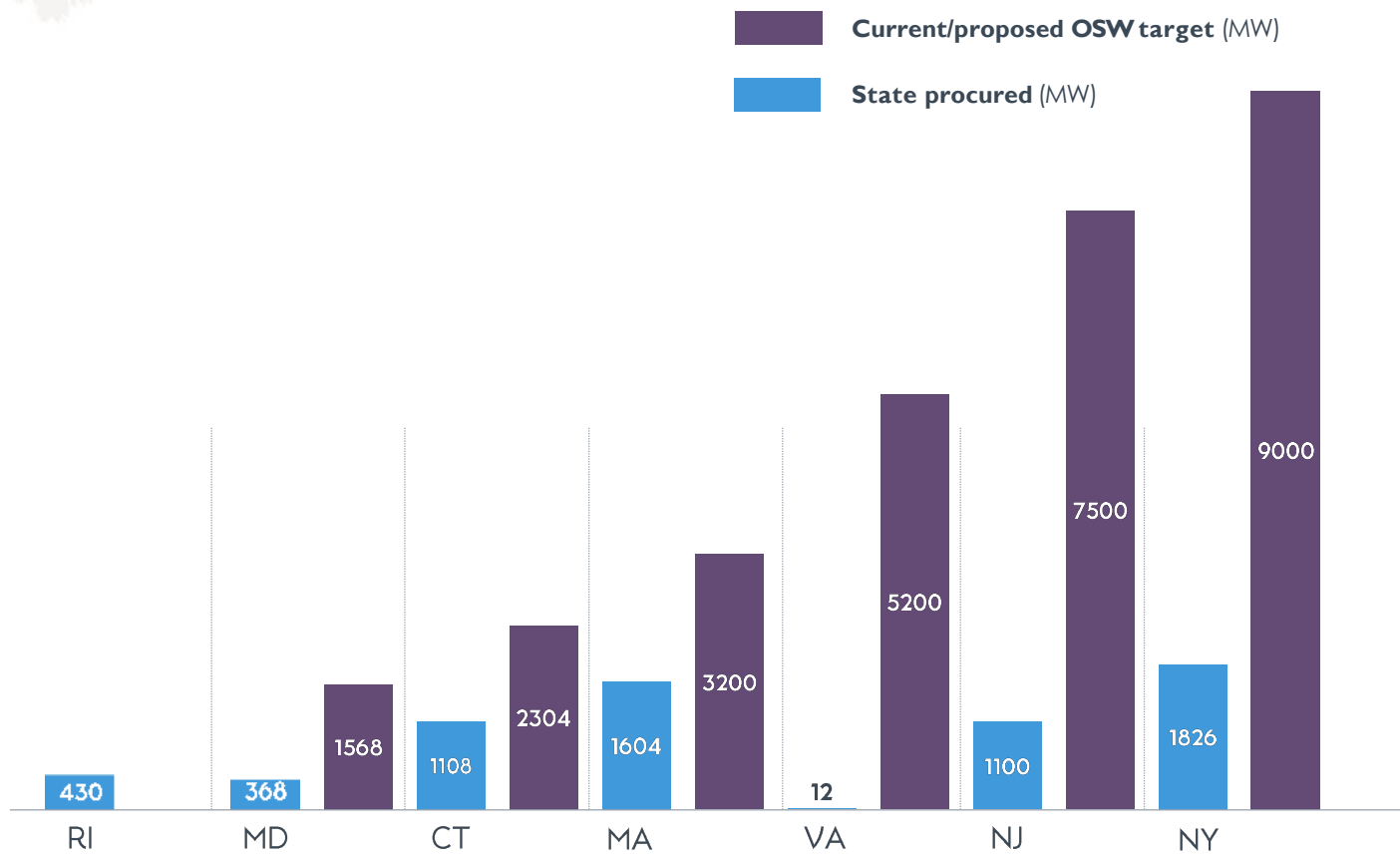
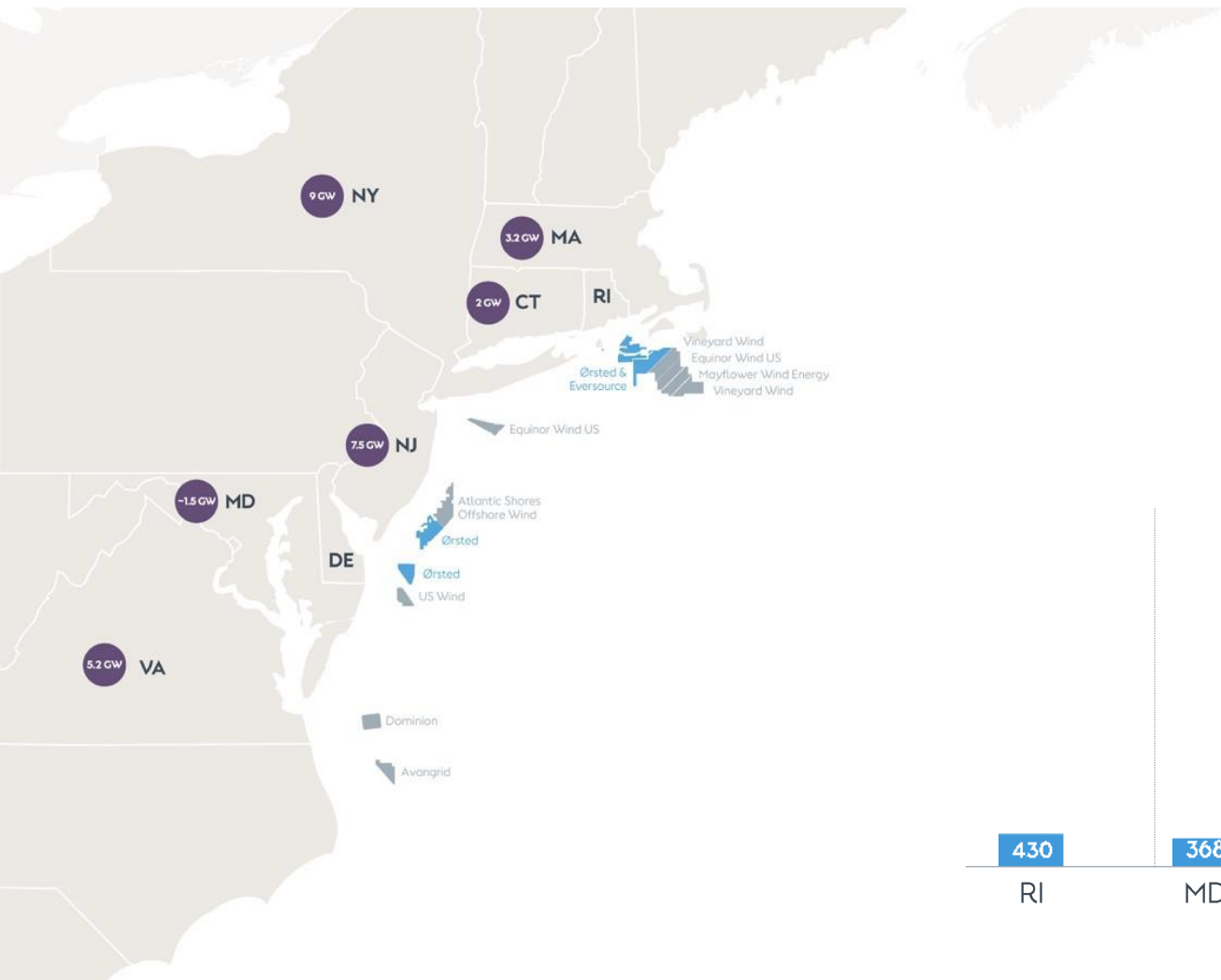
## Overview



- Offshore wind represents the dawning of a new industry in the U.S.
- It has huge potential to achieve both economic and environmental goals
- There is no clear rulebook for how this new industry can and should develop
- Without a rulebook, offshore wind faces several major challenges
- States and the federal government can set the stage for success

# Offshore wind market on the East Coast

## Potential for 25+ GW



# Ørsted U.S. Offshore Wind portfolio

Awarded over 2,900 MW of offshore capacity on the East coast



## In Operation

**Block Island Wind Farm:** 30MW

## Awarded

**Revolution Wind:** 50/50 JV w/ Eversource, 704MW (400MW to RI, 304MW to CT)

**South Fork Wind:** 50/50 JV w/ Eversource, 132MW

**Sunrise Wind:** 50/50 JV w/ Eversource, 880MW

**Ocean Wind:** with the support of PSEG, 1,100MW

**Skipjack Wind Farm:** 120MW

## Under Construction

**Coastal Virginia Offshore Wind:** EPC contract, 12MW demo project



# Key Challenges

## Key challenge: complex design & permitting uncertainties

- Offshore wind farms are complex
- Multi-year design & planning phases
  - Globally ~ 7-year average
- U.S. had to create a permitting regime from scratch
  - Multiple state and federal agencies
  - Enormous amount of uncertainty regarding costs and timelines



## Key challenge: finding physical space to come ashore

- Power cables need to physically and electrically interconnect to land to serve customers
- On the U.S. East Coast:
  - High population density
  - High real estate costs
  - Difficult to find suitable space for substations and cable routing





## Key challenge: finding electrical space to come ashore

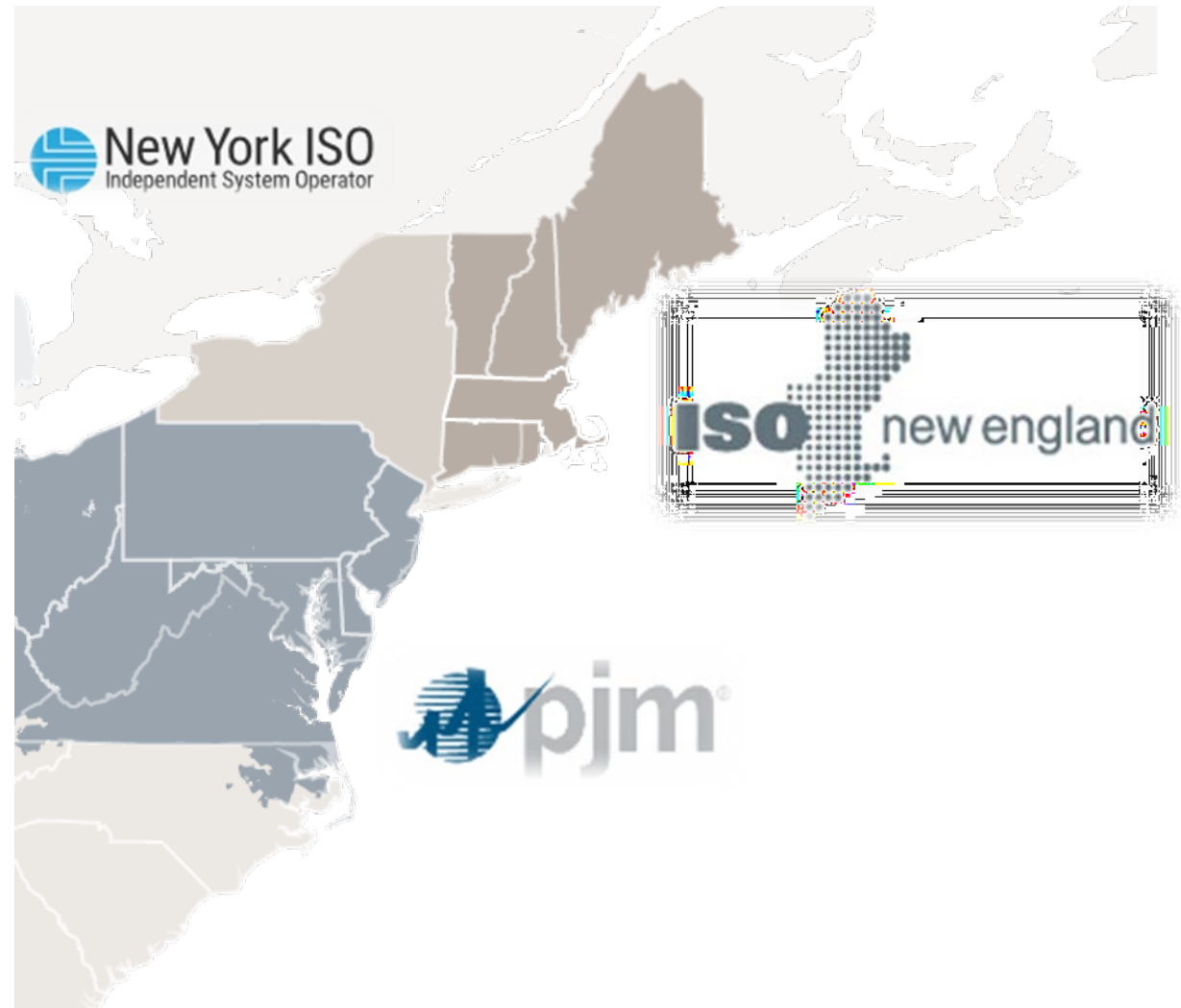
- Power grid along the U.S. East Coast not designed to take large amounts of power from offshore
- Injecting offshore wind power can result in:
  - Congestion on transmission lines
  - Curtailment of clean power production
    - Hinders climate goals





## Key challenge: finding electrical space to come ashore & wholesale markets

- Independent System Operators manage new generator interconnection process to maintain reliability
  - Slow and uncertain process
  - In ISO NE feasibility studies have a 90 timeline, but in Q2 2020 average completion time of 241 days reported
  - Projects moving in and out of queue result in delays and changing interconnection cost estimates
- Growing conflicts between wholesale market design and state energy policies
  - Currently, only offshore wind ineligible for capacity market revenue in New York and PJM; and limited in New England



## Key challenge: reducing impacts to coastal communities & the environment



- Agreements to help reduce impacts of cable landfall needed for coastal communities
- Scientific research necessary to protect marine wildlife

## Fisheries Outreach Resources



Fisheries Liaisons



Fisheries Representatives



Outreach – early and often



Input on project layout  
and design



Collaborative design





# Solutions & Opportunities

An abstract graphic on the right side of the slide, consisting of numerous small white dots connected by thin, flowing white lines, creating a sense of movement and connectivity against the solid blue background.

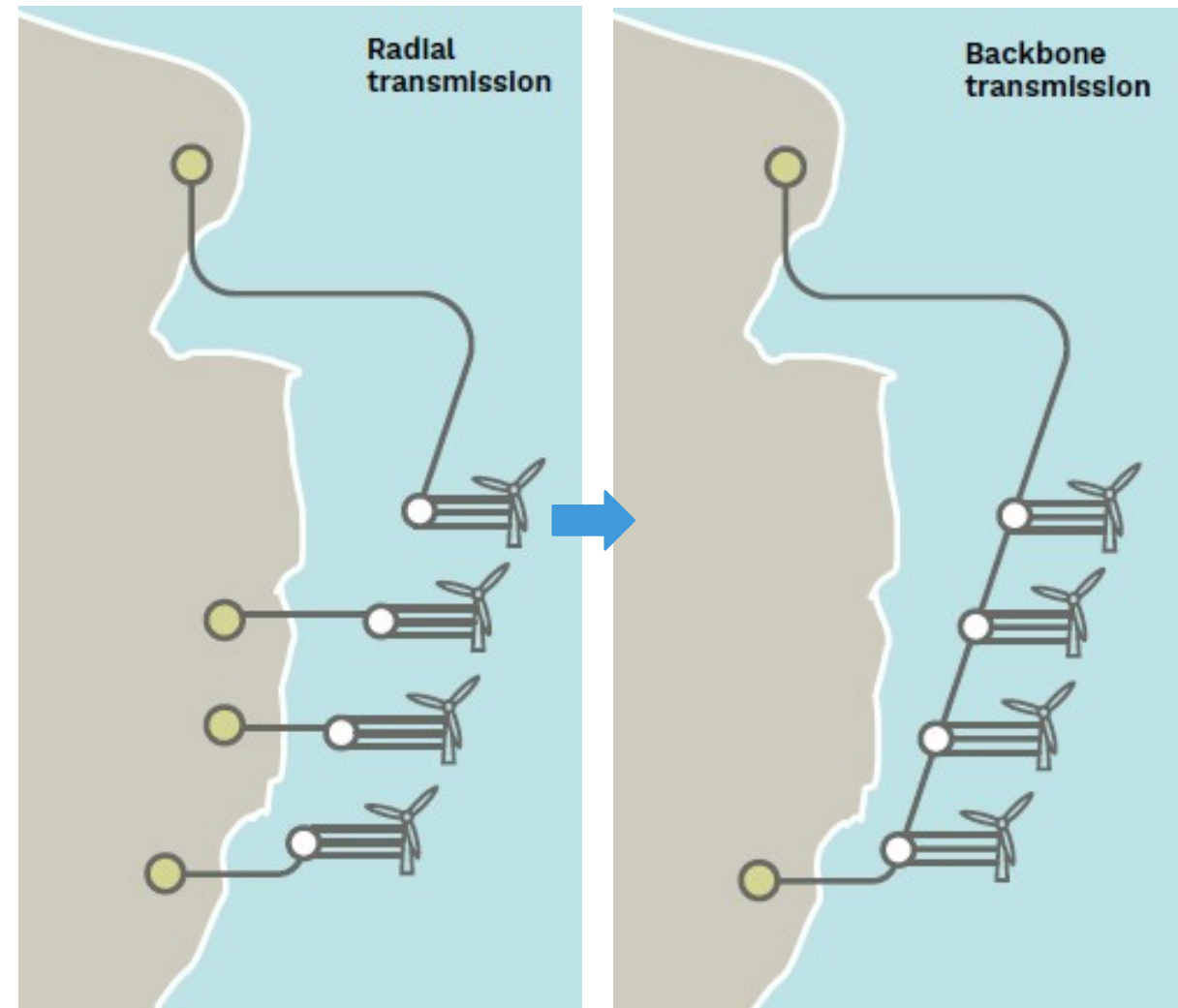
## Solutions & opportunities: large-scale onshore power grid upgrades



- States should lead efforts to ensure the transmission grid is strong enough to support their offshore wind generation goals
  - Innovative cost sharing tools already exist (FERC Order 1000 Public Policy Transmission)
  - Some states, like NY, have been using this process to upgrade transmission to meet public policy goals

## Solutions & opportunities: large-scale offshore power grid upgrades

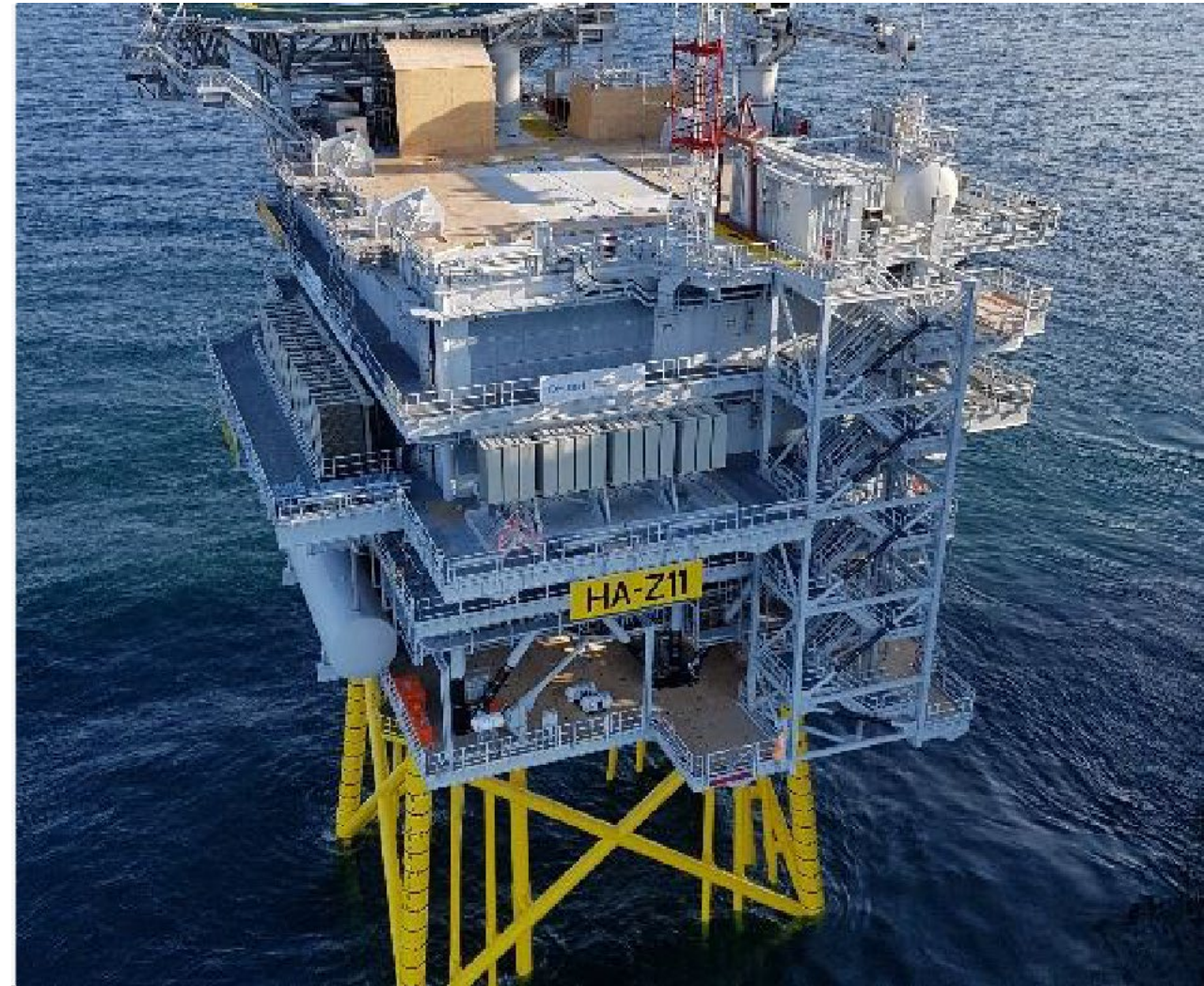
- As space at points of interconnection become more limited, states should consider options for backbone transmission
- In order to avoid costly miscues that plagued the first European attempts the following will need to be addressed:
  - Develop revenue and risk allocation mechanisms to protect offshore wind developers from lost revenue in the event of backbone failures
  - Site backbone in locations that accommodate geographically diverse lease areas
  - Develop interconnection standards that can be factored into project design and cost in advance of project bids





## Solutions & opportunities: explore new ways to procure offshore power

- As states move forward with their offshore wind goals, consider new procurement approaches
  - States, working with ISO/RTOs can identify areas suitable to build offshore points of interconnection (POI)
  - These facilities could be procured and offshore wind developers could bid future projects to interconnect at sea, instead of on land
  - It is possible that a single offshore POI (or series of them) could serve multiple states, potentially saving onshore upgrade costs and reducing the cost for offshore wind



## Solutions & opportunities: update wholesale market rules

- States should work together to ensure wholesale markets work for them
- Potential market reforms to help state's meet their clean energy goals include:
  - Removal of restrictions to revenues for offshore wind resources such as the PJM Minimum Offer Price Rule
  - Streamlining and fast-tracking interconnection review process for public policy generation and transmission projects
  - New cost allocation schemes for offshore wind interconnection upgrade costs
  - Revised interconnection queue and study processes to ensure timely studies and project deadlines



## Conclusion

- The solutions to the offshore wind challenges are not simple
- It will take time and there will be growing pains along the way
- The time is now to start this journey so we can help the states reach their critically important clean energy goals
- States need a real partner in the federal government to help streamline permitting and manage new lease area auctions
- Ørsted can be a valuable partner for the government as we chart a new energy course together

# Thank you

**Kirsty Townsend**

*Head of Special Projects*

[KIRTO@orsted.com](mailto:KIRTO@orsted.com)

# **Panel Discussion on Electricity Market Structure & Transmission Grids**

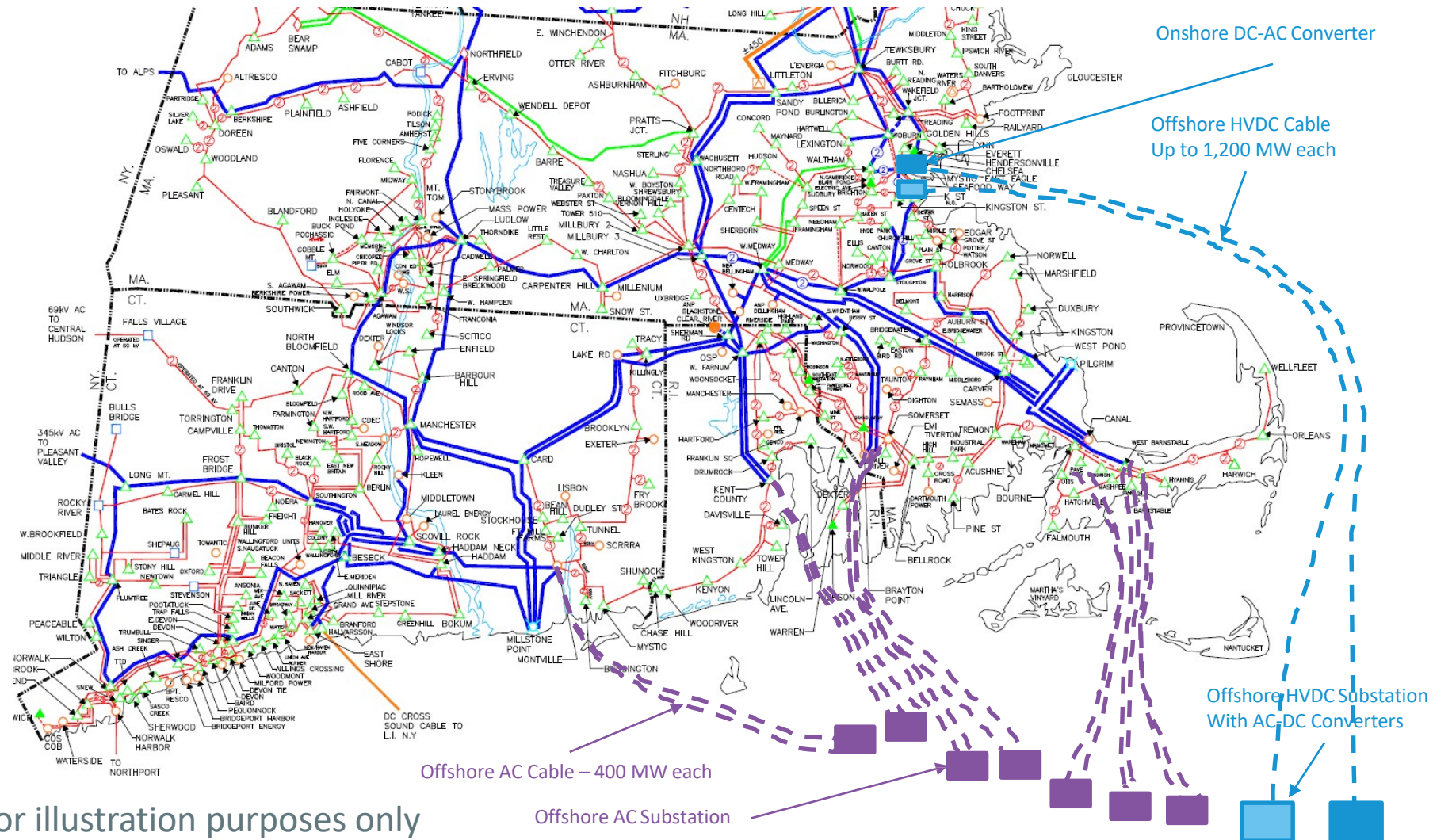
**Moderator: Rob Gramlich, President - Grid Strategies**

## **Panelists:**

- **Judy Chang, Undersecretary of Energy and Environmental Affairs - Massachusetts**
- **Mary Beth Tung, Director - Maryland Energy Administration**
- **Al McBride, Director of Transmission Strategy and Services - ISO New England**



# Conceptual Depiction of Offshore Interconnections: 8,000 MW



# State Breakout Discussions on Electricity Market Structures & Transmission Grids



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# State Report Out



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# Summary & Closing



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# Summit Wrap-Up

## General

**COLLABORATION & COOPERATION.** Vital across states and regions

**LONG-TERM VISION.** Investors respond best to long-term signals

**COST DECLINES.** LCOE reductions significantly greater than anyone expected

**SUPPLY CHAIN & EMPLOYMENT.** Renewable generation is a jobs machine

## Stakeholders

**ROLES & RESPONSIBILITIES.** Clearly designated methodology and pathways

**CLEAR PROCESS.** Clarity at the outset significantly helps stakeholder engagement

**COMPREHENSIVE ENGAGEMENT.** All key stakeholder perspectives at the table

## Ports & Infrastructure

**MULTIPLE PORT OPTIONS.** Different approaches fit different states

**FINANCING.** Leveraging public/private investment can be done in multiple ways

**WATERFRONT VS. INLAND.** Inland regions are a key part of the offshore supply chain

## Electricity Markets & Transmission

**BACKBONE VS. RADIAL.** The decision between the two is not binary

**OFFSHORE PLANNING.** It takes a LOT of time to plan, permit and build

**POWER FLOWS FROM OFFSHORE.** Onshore grid was not built for offshore wind