



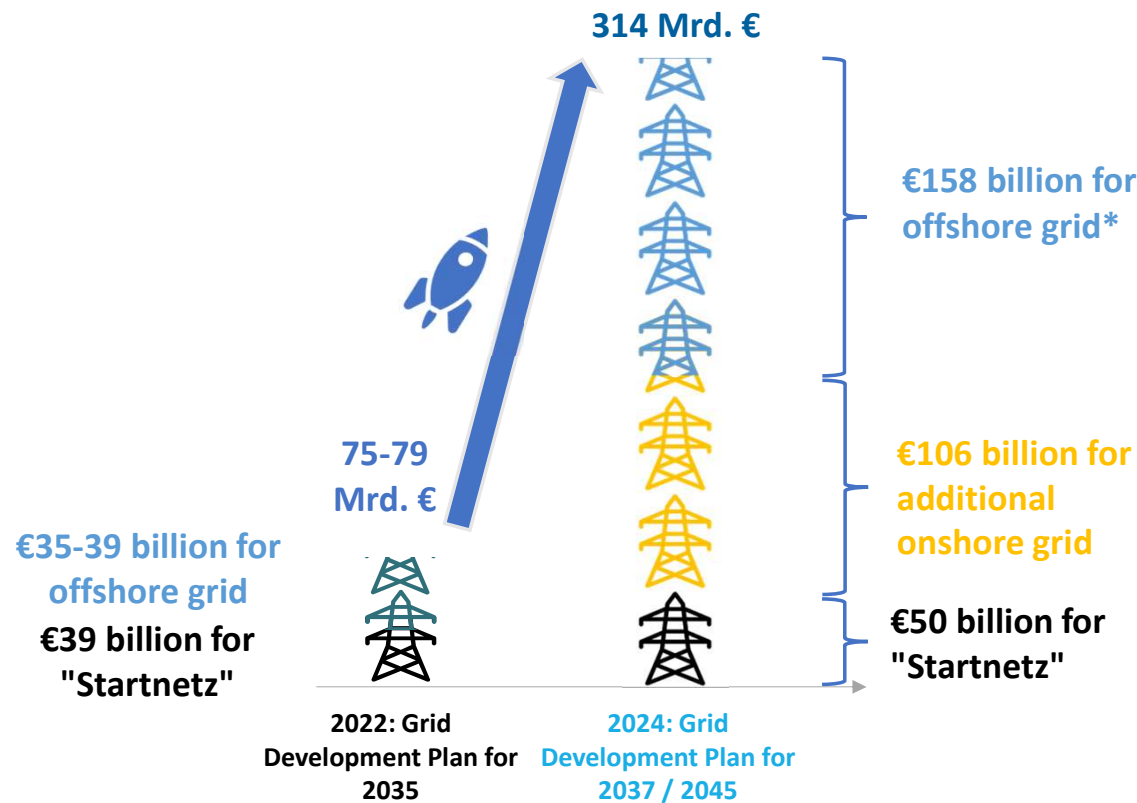
**AquaVentus**

26 February 2026  
WAB Networking Day



**Efficient integration of offshore wind energy  
through offshore hydrogen production**

# According to previous logic, all wind farms are (almost) exclusively connected with power lines, but costs are threatening to explode

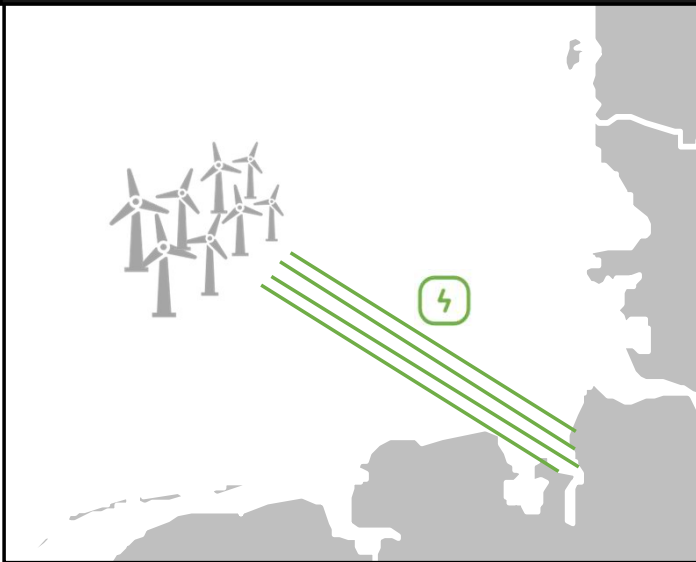


Source: [NEP 2035](#); [NEP 2037 / 2045 \(Version 2023\)](#)

\* Offshore expansion by 2045 with an investment volume of €145.1 billion and €12.4 billion for expansion measures already under implementation

# For this reason, the responsible Federal Shipping Agency BSH proposes "overplanting" or "peak load capping"

Current expansion  
Wind farm capacity = grid capacity



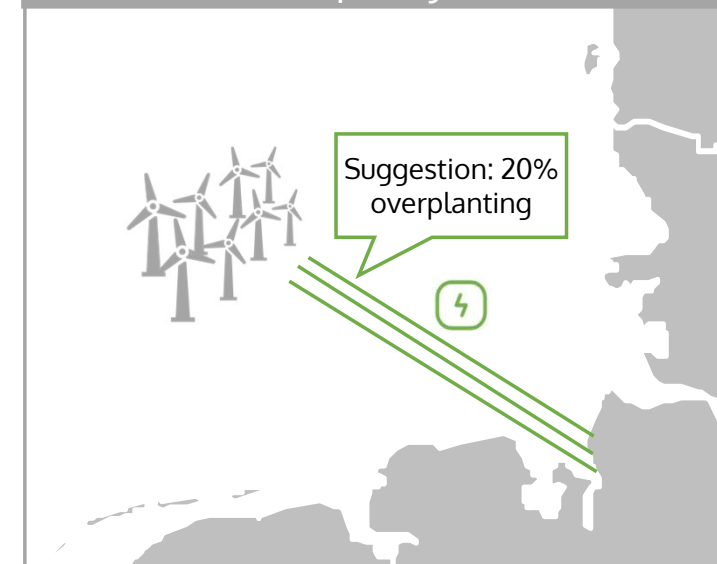
BSH proposals in the FEP 2025  
to increase grid utilisation

Focus on zones 4 and 5:

1. Reduction of grid connection capacity in relation to wind farm capacity ("overplanting" of 20%) and peak capping
2. New cutting of the surfaces with lower power density for lower wake effects
3. Increase of ONAS' transmission capacity from the current 2 GW to 2.2 GW

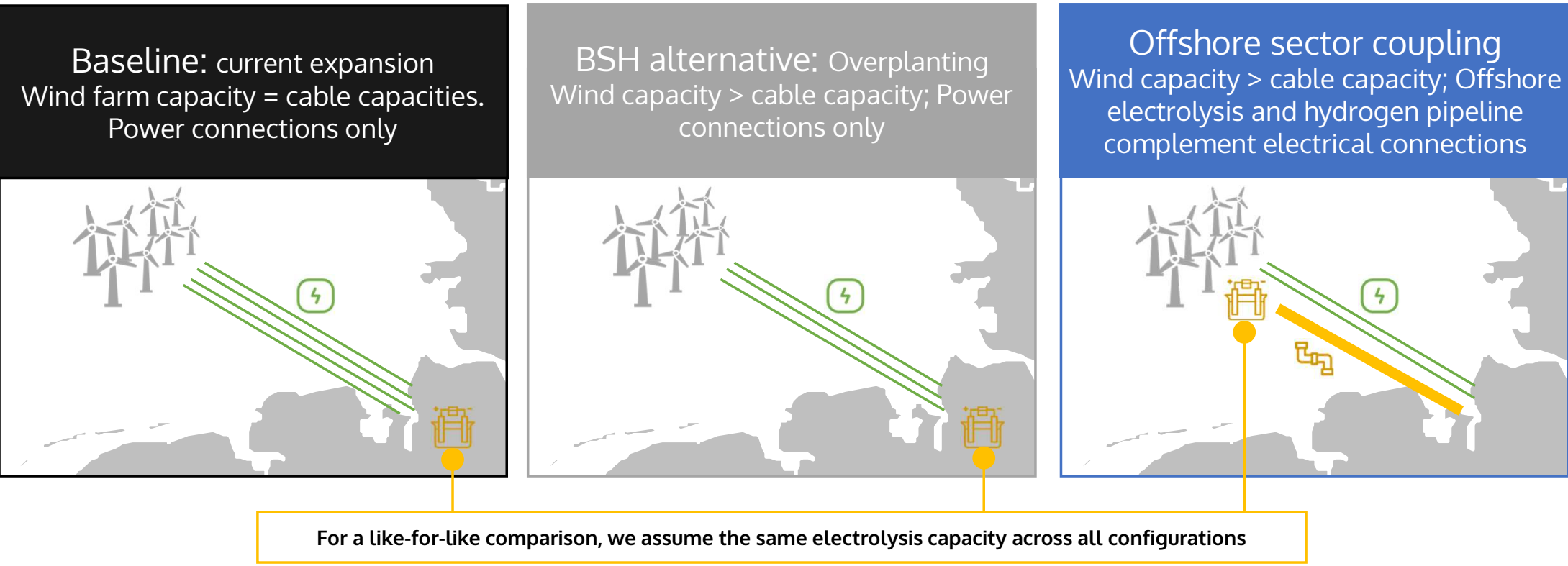
As a result, a reduction of five ONAS is to be achieved compared to the NDP 2037/2045

BSH proposal: Overplanting  
Wind capacity > connection capacity

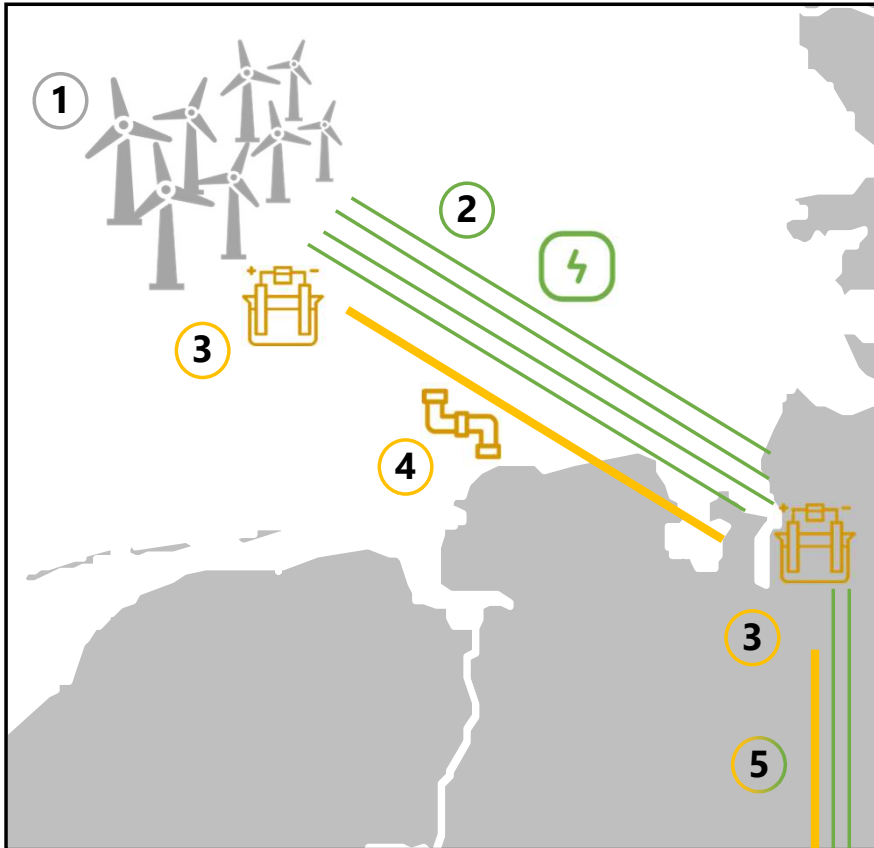


# Study examines the extent to which costs can be reduced by transporting part of the energy as hydrogen in pipelines

Comparison of 3 configurations for the development of offshore wind potential in North Sea zones 4 & 5



# Model approach: We minimize infrastructure costs while taking into account the value of electricity produced and H2



- ① OWF Capacity
- ② Cable Capacity
- ③ Electrolysis Capacity
- ④ Pipeline capacity
- ⑤ Onshore grid

More degrees of freedom in the model

Current expansion	Overplanting (electricity only)	Offshore sector coupling
Uniformly specified across all configurations (consideration of zones 4 and 5)		
Identical to OWF	Optimized	
Onshore	Offshore	
No offshore pipeline	Optimized	
Optimized for H2 and power		



The model optimizes endogenous investments in electricity and H2 infrastructure to minimize "integration costs": Value of energy supplied to end users (electricity & H2)

# Results at a glance



Cost savings through offshore sector coupling up to 1,700 mn. €/year (70 GW) or 500 mn. €/year (55 GW) compared to current expansion.



Electricity overplanting already reduces costs, but sector coupling also uses hydrogen pipelines as a cheap transport route, which further reduces costs.



Grid utilization increases from 55% → 65% (70 GW) and 55% → 64% (55 GW).

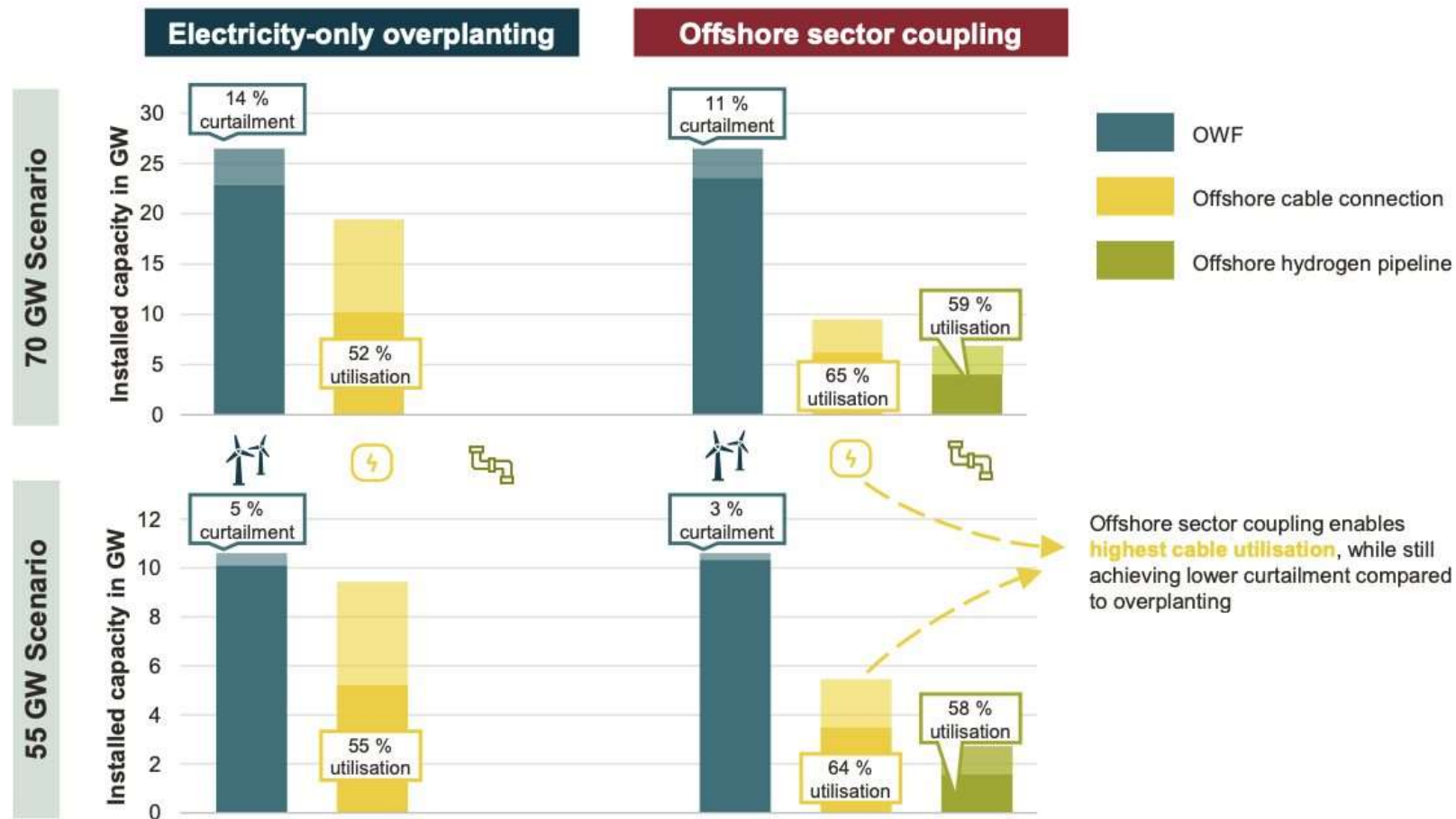


Curtailment decreases from 14% → 11% (70 GW) and 5% → 3% (55 GW) compared to overplanting; thus more usable energy (~ 2.5 TWh in the 70 GW scenario and 1 TWh in the 55 GW scenario) in 2045.



Results robust in the face of changes in electrolyser capacity, electrolysis costs and electricity prices.

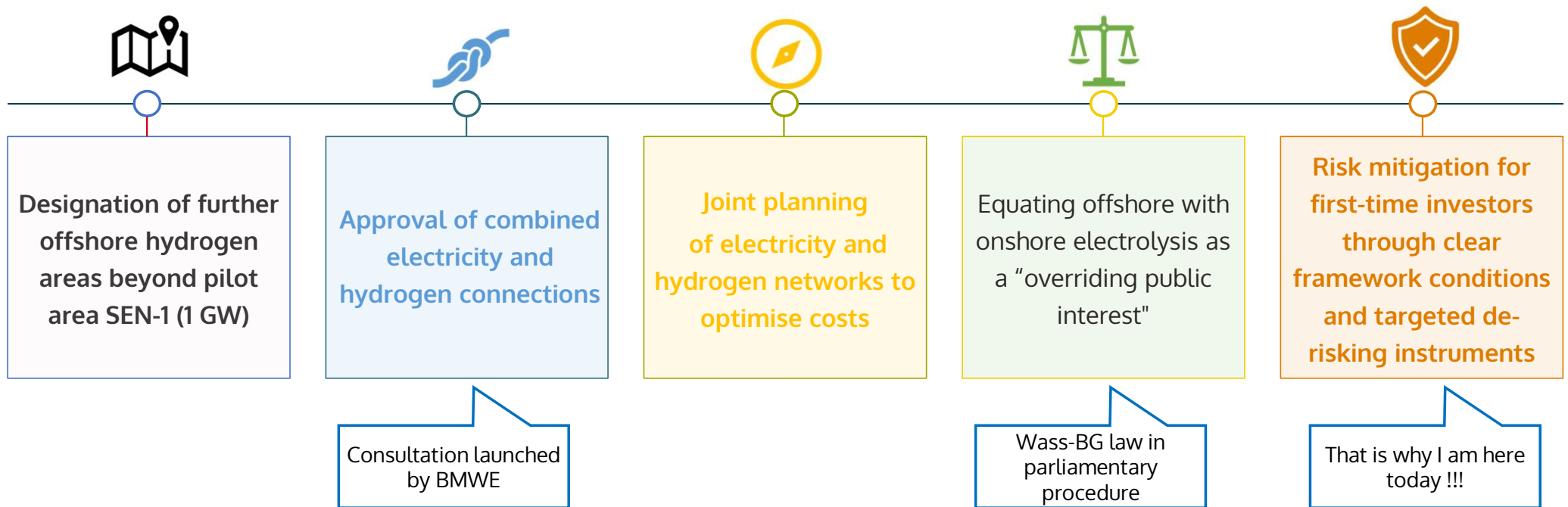
# Offshore sector coupling enables higher utilization of expensive offshore grid connections – with lower curtailment compared to overplanting



Source: Frontier Economics

Note: Lighter coloured areas indicate share of capacity that is curtailed (for OWF) or not utilised (for cable and pipeline)

# To exploit this potential for cost reduction and flexibility, targeted political decisions are needed



# Regulatory next steps towards integrated offshore-hydrogen production

## E-TSO Electricity Market Survey (NDP 2027)

- Update of the AquaVentus project data as part of the electricity market survey (NDP 2027) as a planning basis for the grid development plan
- Reported projects flow into scenarios > grid expansion > infrastructure decisions
  - SEN-1 from 1 GW offshore wind
  - SEN-X from 10 GW offshore wind

## Offshore spatial development plan (FEP 2026)

- Draft of FEP update is expected in the course of 2026, official publication date is still pending

## Offshore Wind Energy Act amendment

- The market consultation showed that:
  - a legally regulated overplanting - as proposed by the TSOs - is not wanted,
  - the majority welcomes offshore H<sub>2</sub> generation and only a minority - apart from the TSOs - rejects sector coupling at sea,
  - the introduction of CfD has a majority.
- Timeline for go-live is 1<sup>st</sup> Jan 2027





AquaVentus

**The green energy revolution starts in the North Sea**

