



Baltic
InteGrid
Integrated Baltic Offshore
Wind Electricity Grid Development

Case Study 2

Thilo Krupp, Stiftung OFFSHORE-WINDENERGIE
Warsaw, 7 June 2018

Warsaw,
7 June 2018



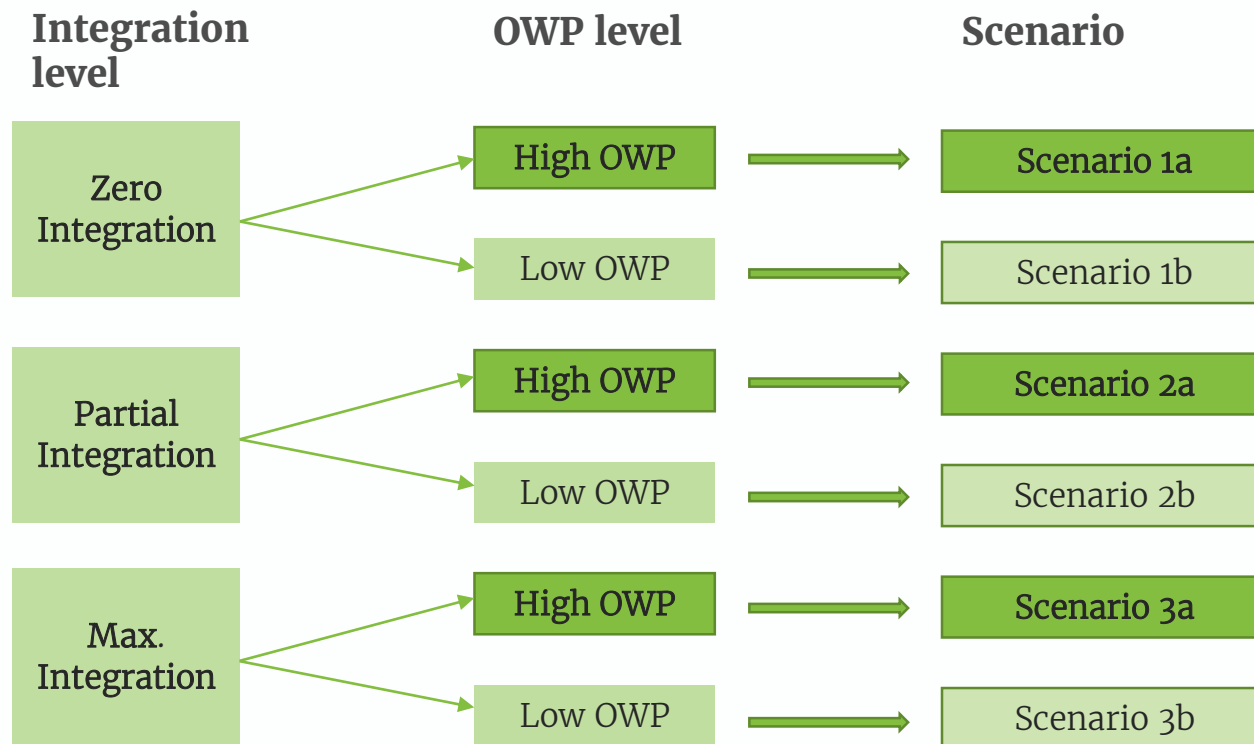
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DEVELOPMENT
FUND

Outline

- Scenario Description
 - High and Low Offshore Wind Development
 - Integration Levels
- Scenario Design & Roadmap
- Scenario comparison



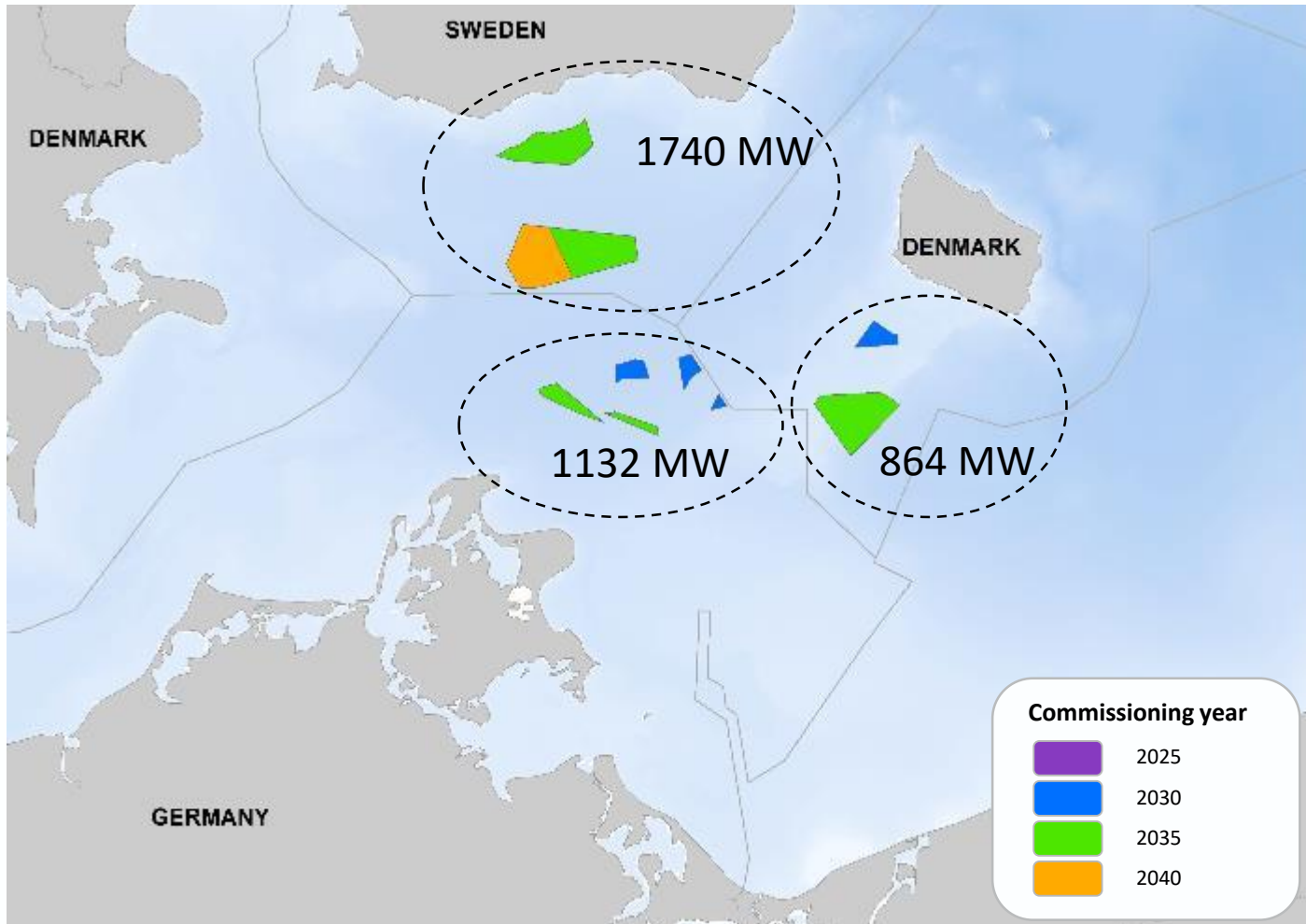
Scenarios

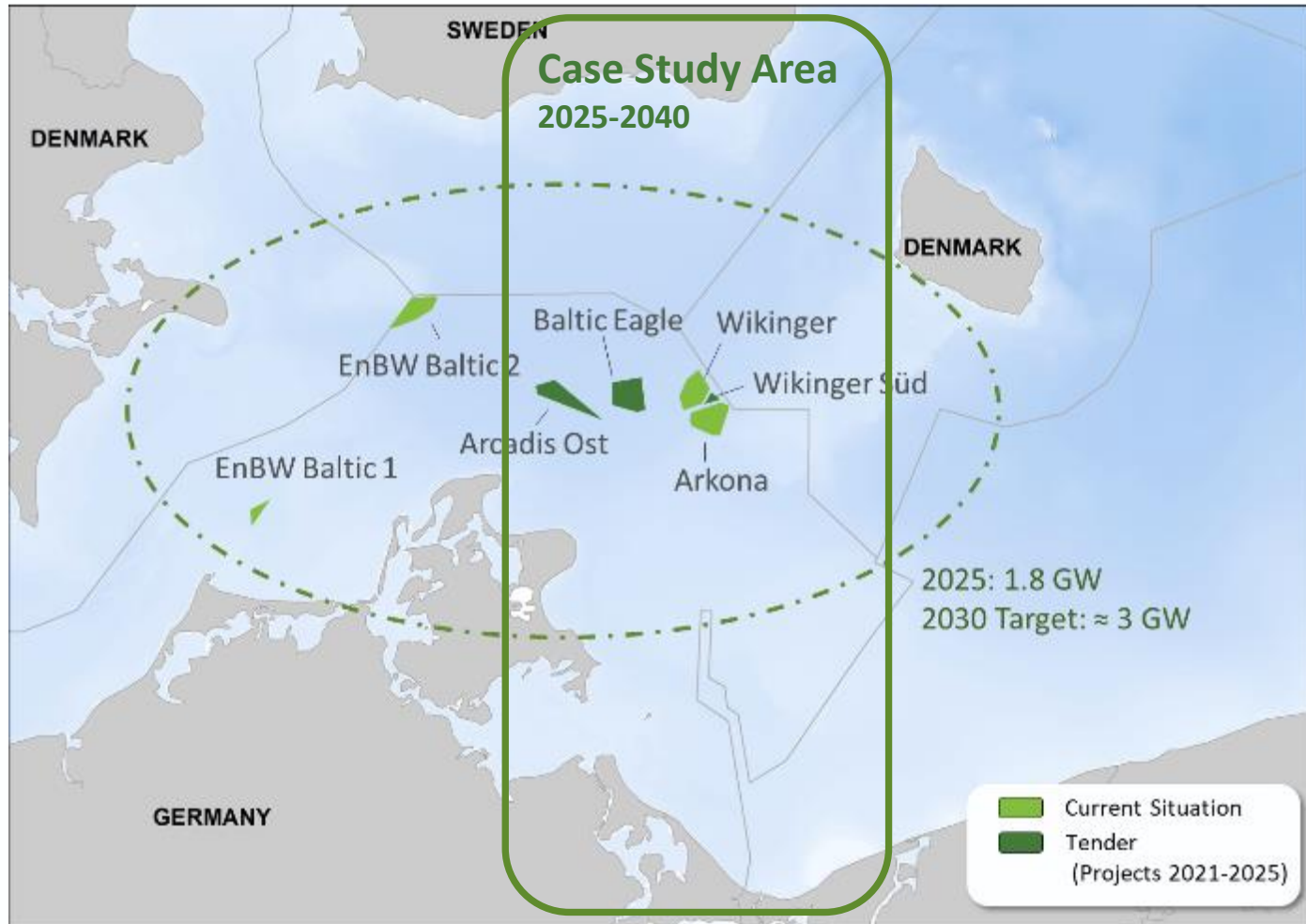


Focus on HIGH offshore wind for this presentation.

High OWP Vision: 2025 - 2040

OWP capacity: 3.7 GW

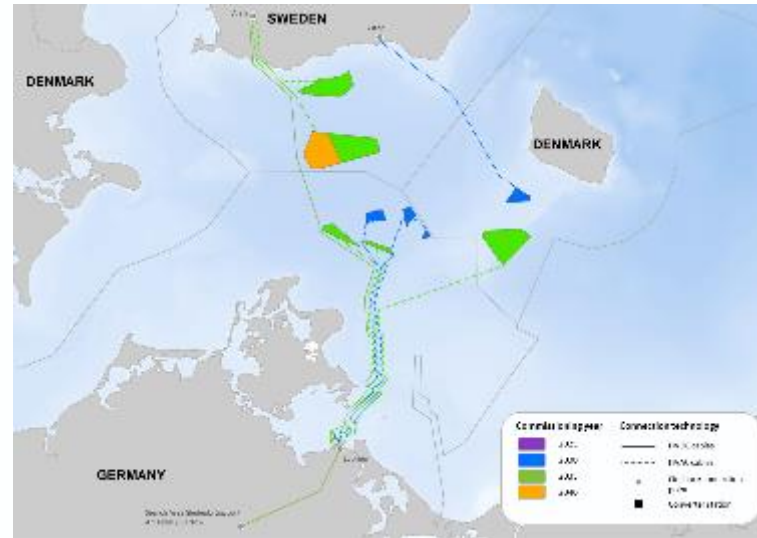




Level of Integration

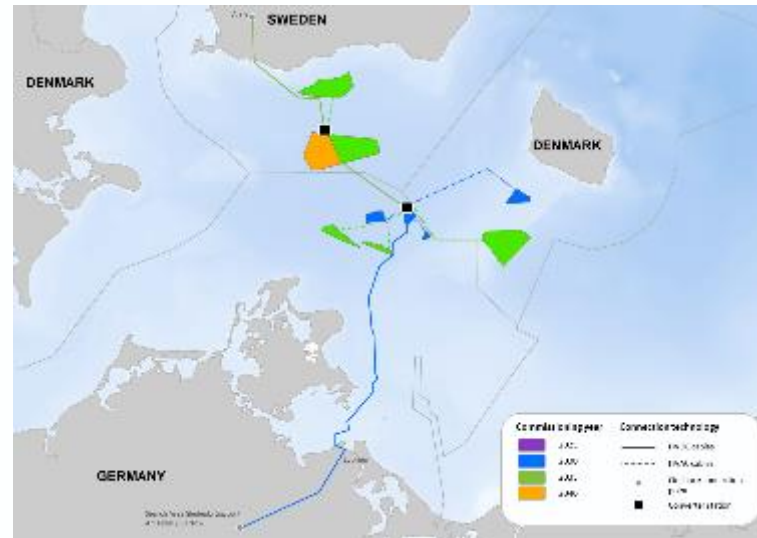
Scenario 1

Zero
Integration

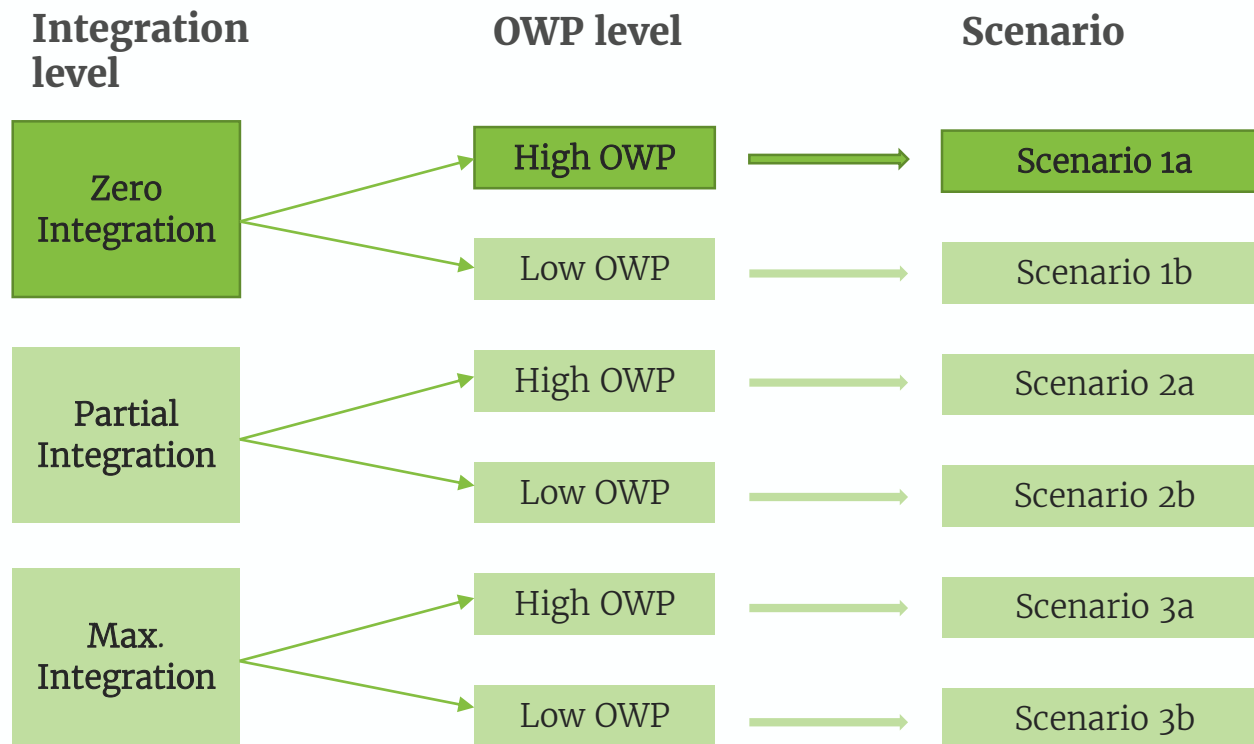


Scenario 3

Max.
Integration

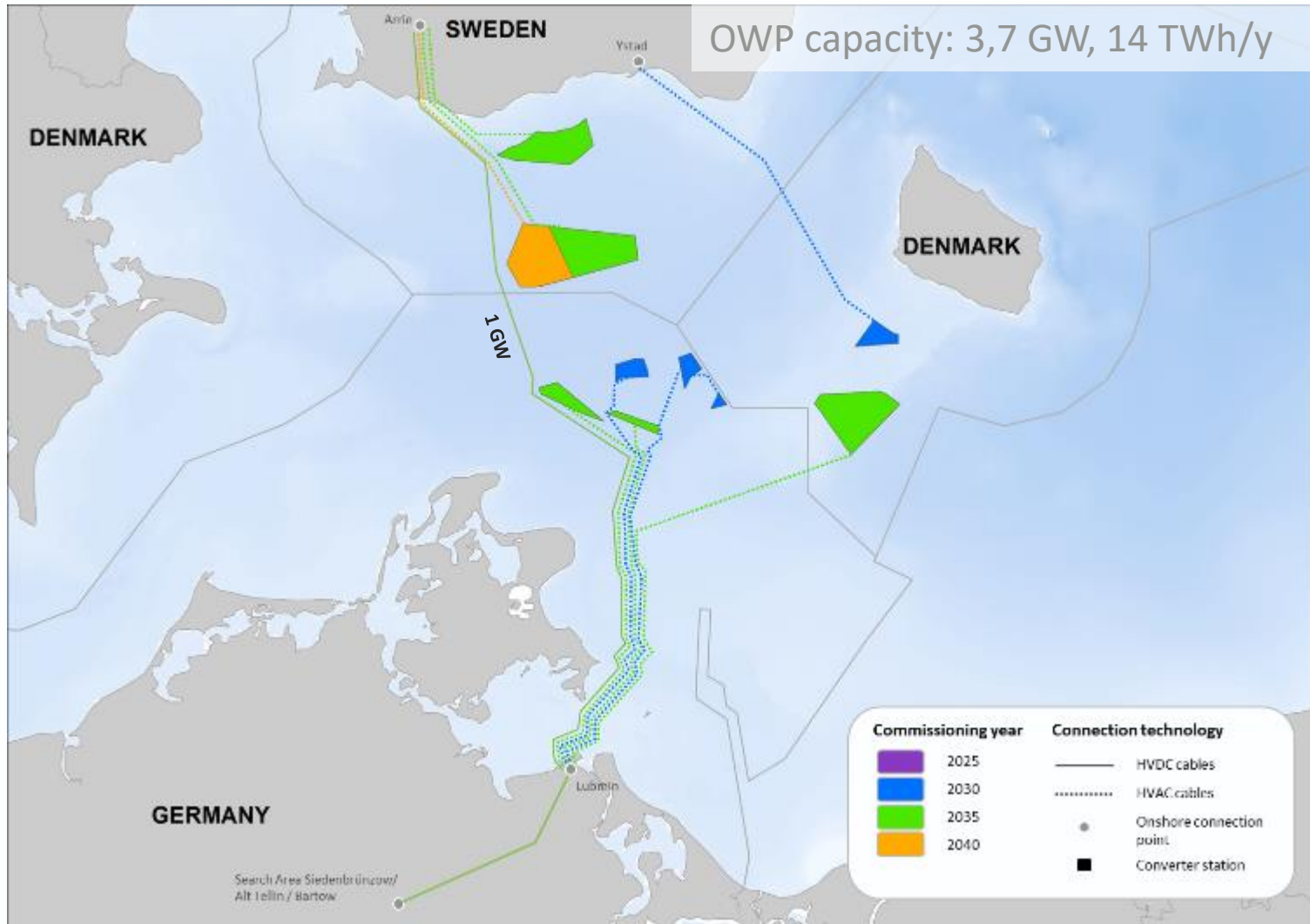


Scenarios

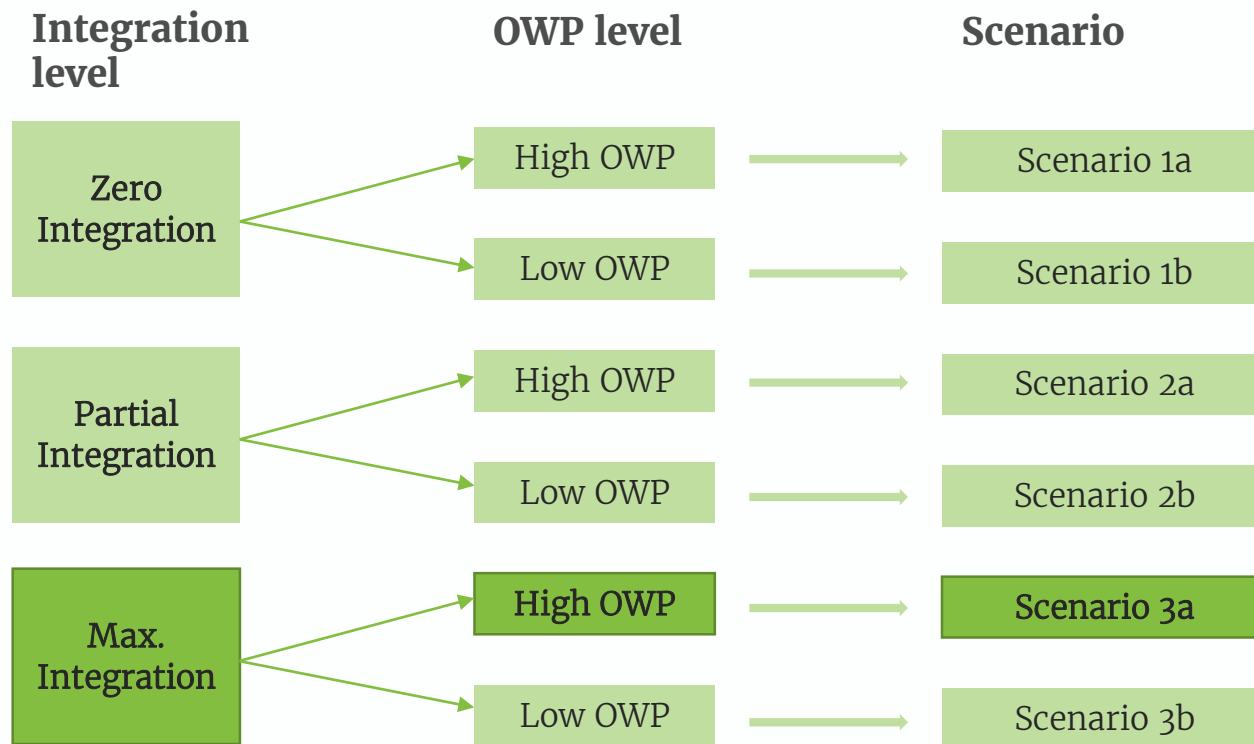


Focus on HIGH offshore wind for this presentation.

Zero
Integration

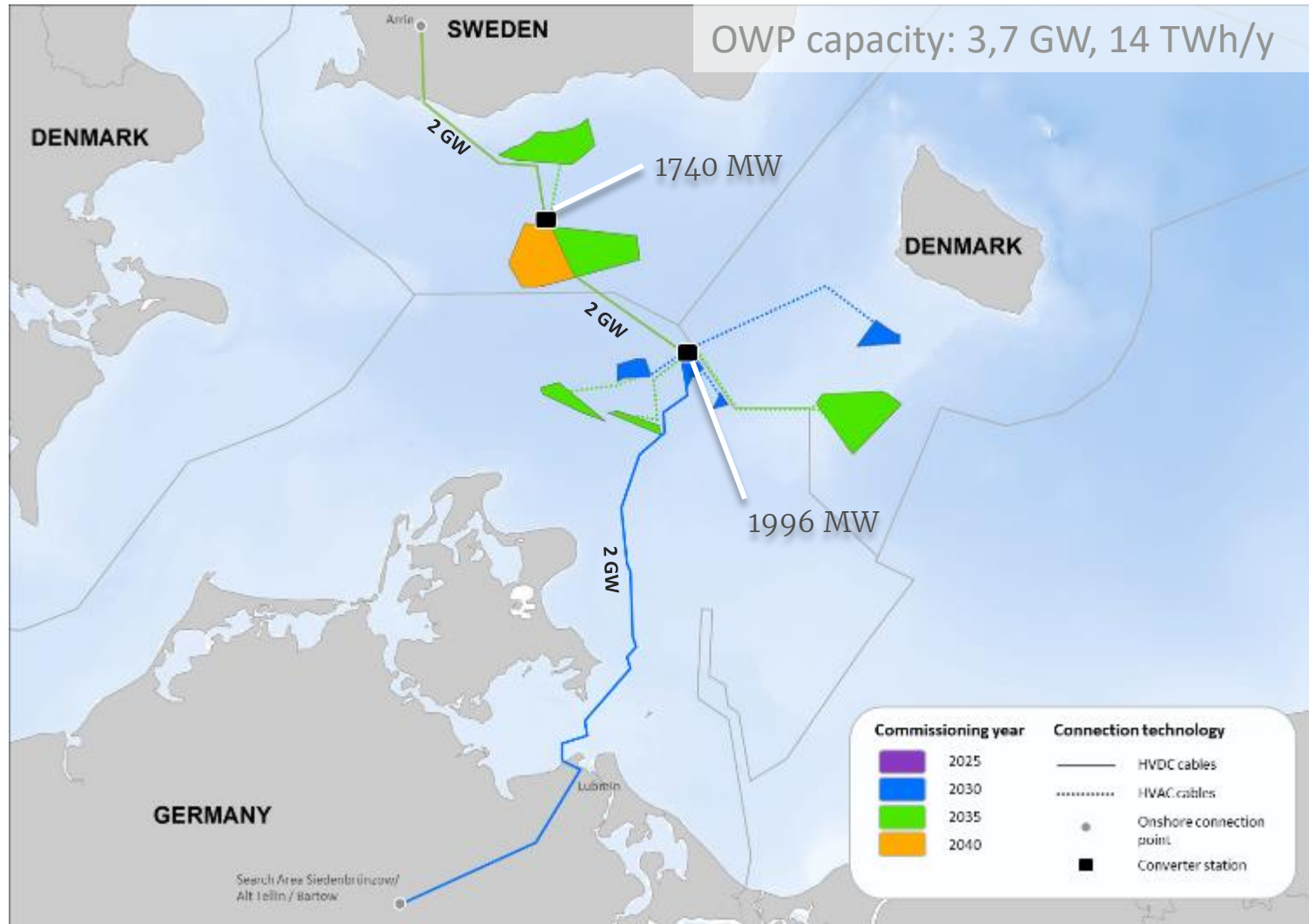


Scenarios

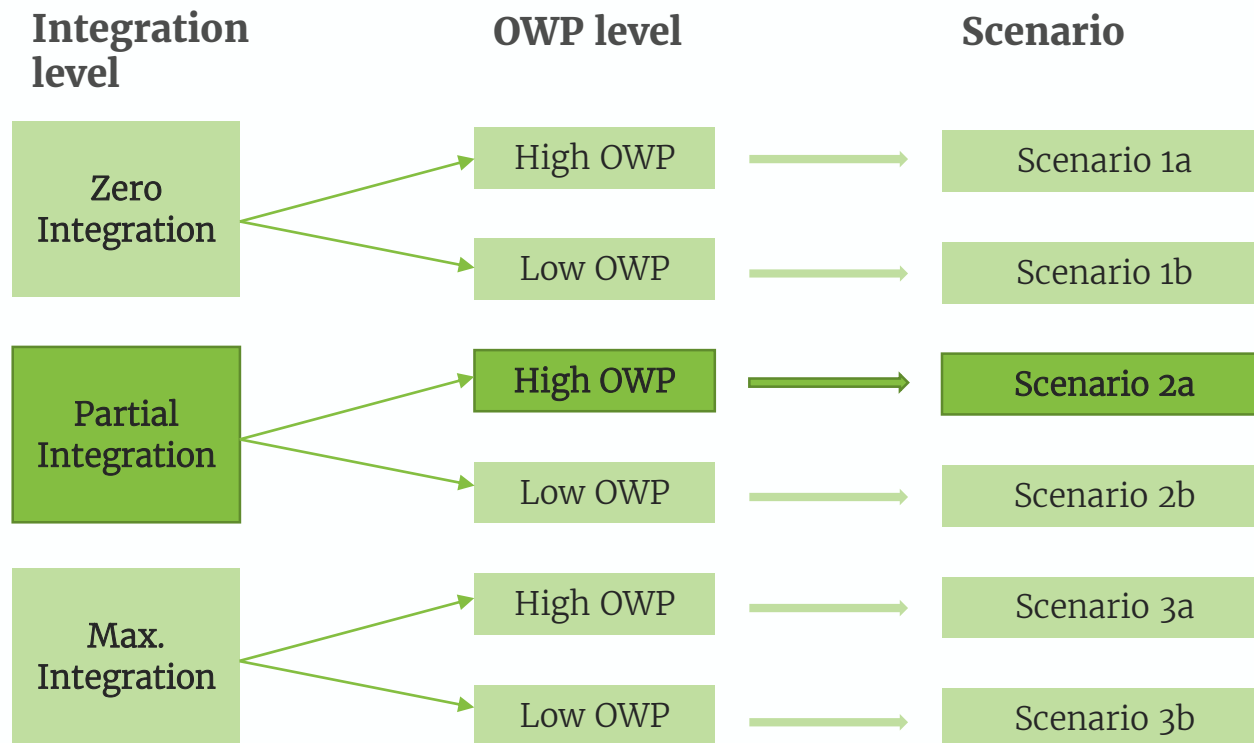


Focus on HIGH offshore wind for this presentation.

Max.
Integration

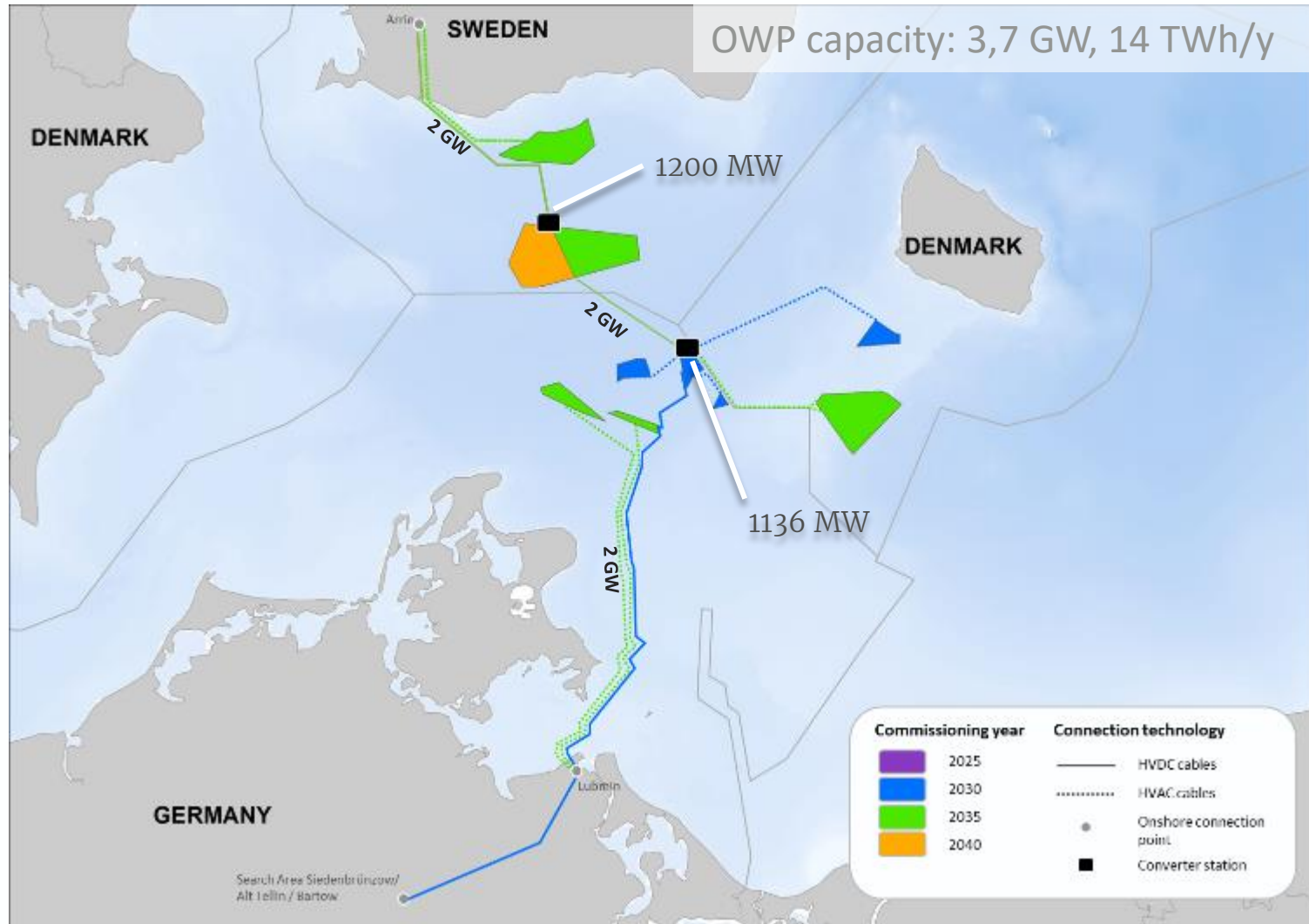


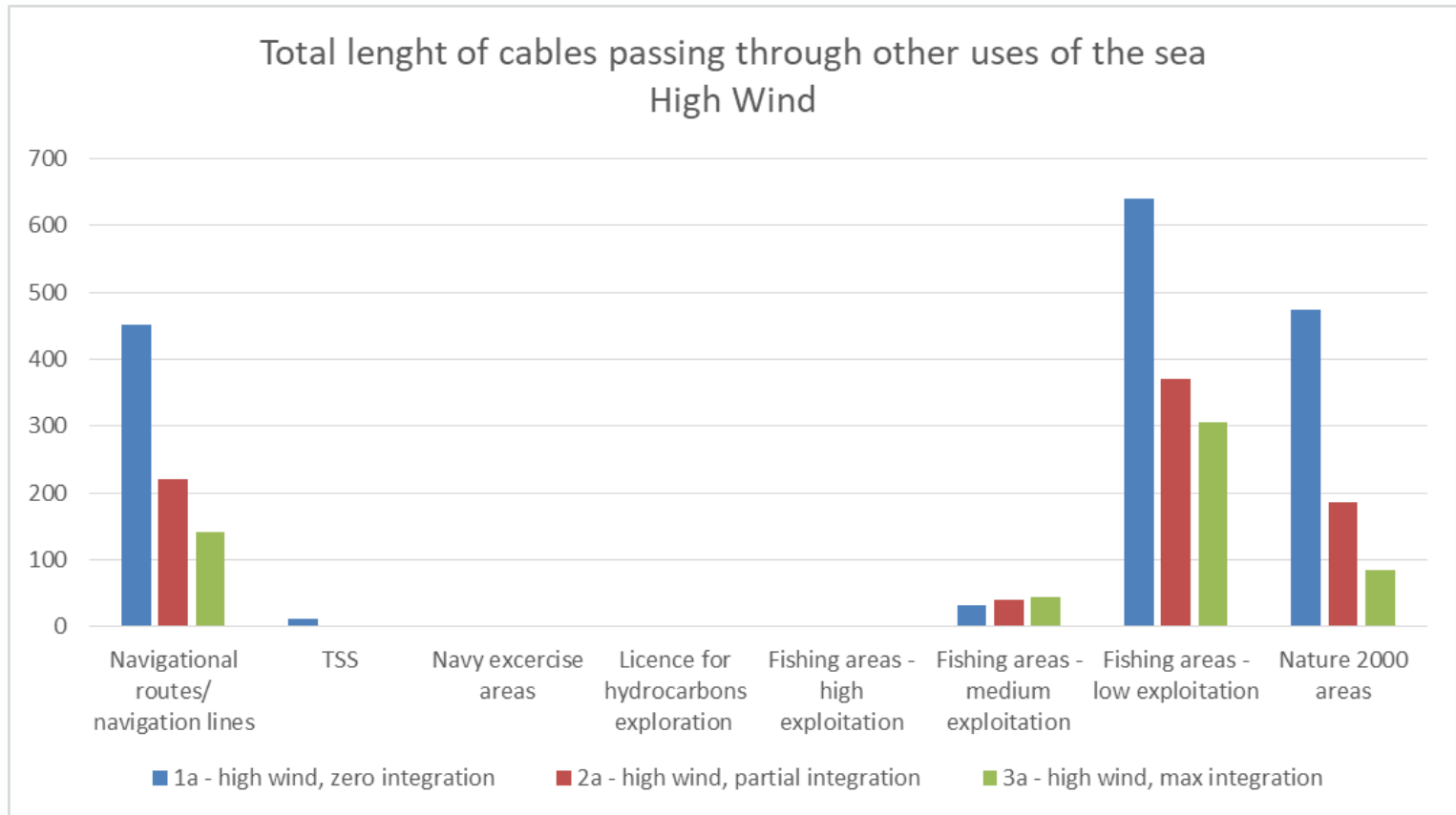
Scenarios



Focus on HIGH offshore wind for this presentation

Partial
Integration





Source: provided by FNEZ

Zero vs Partial vs Max grid integration

	Zero (1a)	Partial (2a)	Max (3a)
DC Converter substations	0	2	2
DC Cable length (km)	450	485	485
Total DC conductor weight	1 217 t Al (or 3 041 t Cu)	3 927 t Al (or 9 817 t Cu)	3 927 t Al (or 9 817 t Cu)
OWP on DC system (GW)	0,0	1,30	3,7
Onshore AC Transformers	10	3	0
AC export cable length (km)	832	733	0
Total AC export conductor weight	2 654 t Al (or 6 634 t Cu)	2 329 t Al (or 5 823 t Cu)	0 t Al (or 0 Cu)

Thank you for your attention!

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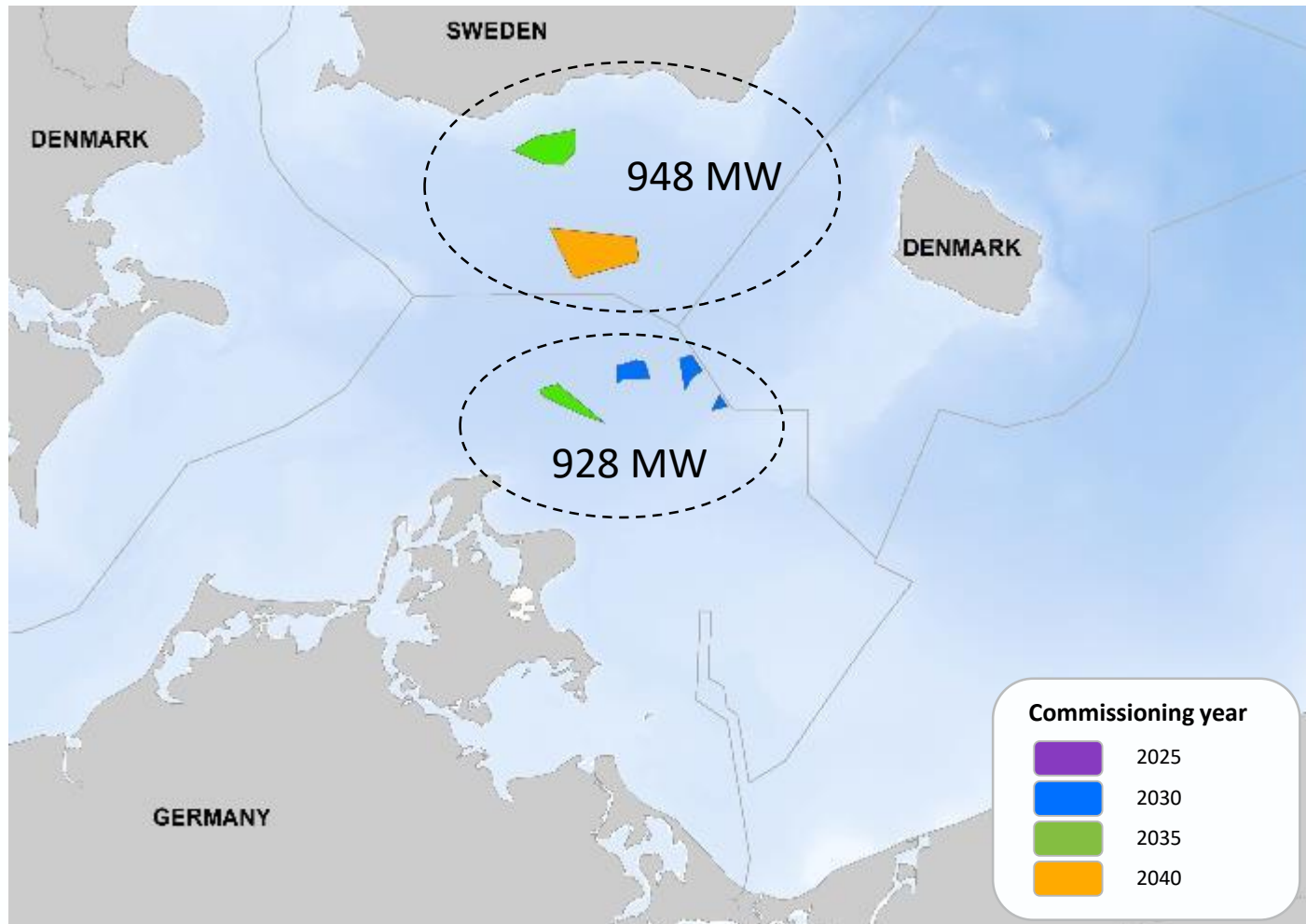
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High OWP Vision: 2025-2040

OWP capacity: 1.9 GW



Wind tubrines	
Pre-2030:	8 MW
Post-2030:	12 MW
Inter-array voltage	
Pre and post 2030:	66 kV AC
AC transformer substations	
Pre and post 2030:	600 MW
AC export cables	
Pre and post 2030:	300 kV AC
Converter technology	
VSC: Modular Multi level	
System: Symetrical Monopole or Bipole	
HVDC cable voltage (available)	
Pre-2030:	± 525 kV → 2500 MW
Post-2030:	± 640 kV → 3000 MW
AC onshore grid	
Pre and post 2030:	300-400 kV AC

Wind Turbines

OWF Platforms

AC Cables

Conv. Platform

DC Cables

Conv. Station

Onshore AC Grid

OWF1

OWF2

