PROMOTioN
PROGRESS ON MESHED HVDC OFFSHORE TRANSMISSION NETWORKS

PROMOTioN – Future Scenarios for the Offshore Grid

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Hamburg, 13-2-2019

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691714.

Introduction

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- Maritime Spatial Planning – Future outlook for grid development
  - GIS Scenarios for different timeframes
- The regulatory side of offshore wind and grid development
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  - Locational/temporal planning of the grid
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- Conclusion

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About PROMOTioN

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Political Context

Political Declaration on energy cooperation between the North Seas Countries

- Aim: Create good conditions for offshore wind energy to ensure sustainable, secure and affordable energy supply in the North Seas Countries
- Facilitate the building of energy links and allow more trading of energy and further integration of energy markets
- Reinforcing regional cooperation will help reduce greenhouse gas emissions and enhance security of supply in the region
- Declaration's action plan focuses on four main areas:
  - Maritime spatial planning
  - Development and regulation of offshore grids and other offshore infrastructure
  - Support framework and finance for offshore wind projects
  - Standards, technical rules and regulations in the offshore wind sector
- Signed by energy ministers from BE, DK, FR, DE, IE, LU, NL, NO, SE,

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Political Context

Regional cooperation in the energy Union – MEP manifesto

- Increase of regional cooperation as a way to realize the full potential of the Northern Seas energy system
- Use and build upon existing cooperation structures (e.g. NSCOGI)
- Large scale deployment of offshore wind farms and completion of a meshed electricity grid
- Proposal of a 7-step action plan, to call for strong political support and endorsement of the North Seas Offshore Grid as a key step to build an effective energy union
- Signed by MEP from BE, DK, FR, DE, IE, LU, NL, SE, GB

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Political Context

National Wind Associations Statement

- EU's Energy ministers strive for a **renewed regional cooperation** in the North Sea, supported by major wind industry associations in Europe
- **Close collaboration** between government authorities, industry stakeholders and national associations **as a success factor**
- **Coordinated political processes** in combination with **aligned technical requirements** lead to reduced costs and increased framework stability
- Estimate by European Commission: **offshore** wind from the North Seas can **cover up to 12 percent** of the EU's power demand
- Singed by national wind associations from DK, ES, IE, NL, NO, UK, DE

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Objectives

- Identify **technical requirements** and investigate possible **topologies** for **meshed** HVAC/DC **offshore grids**
- Develop **protection components** and **schemes for offshore grids**
- Establish components **interoperability and initiate standardisation**
- Develop recommendations for a coherent EU and **national regulatory framework** for DC offshore grids
- Develop **recommendations for financing mechanism** of offshore grid infrastructure deployment
- **Demonstrate cost-effective** Offshore HVDC equipment
- Develop a **deployment plan** for HVDC grid implementation

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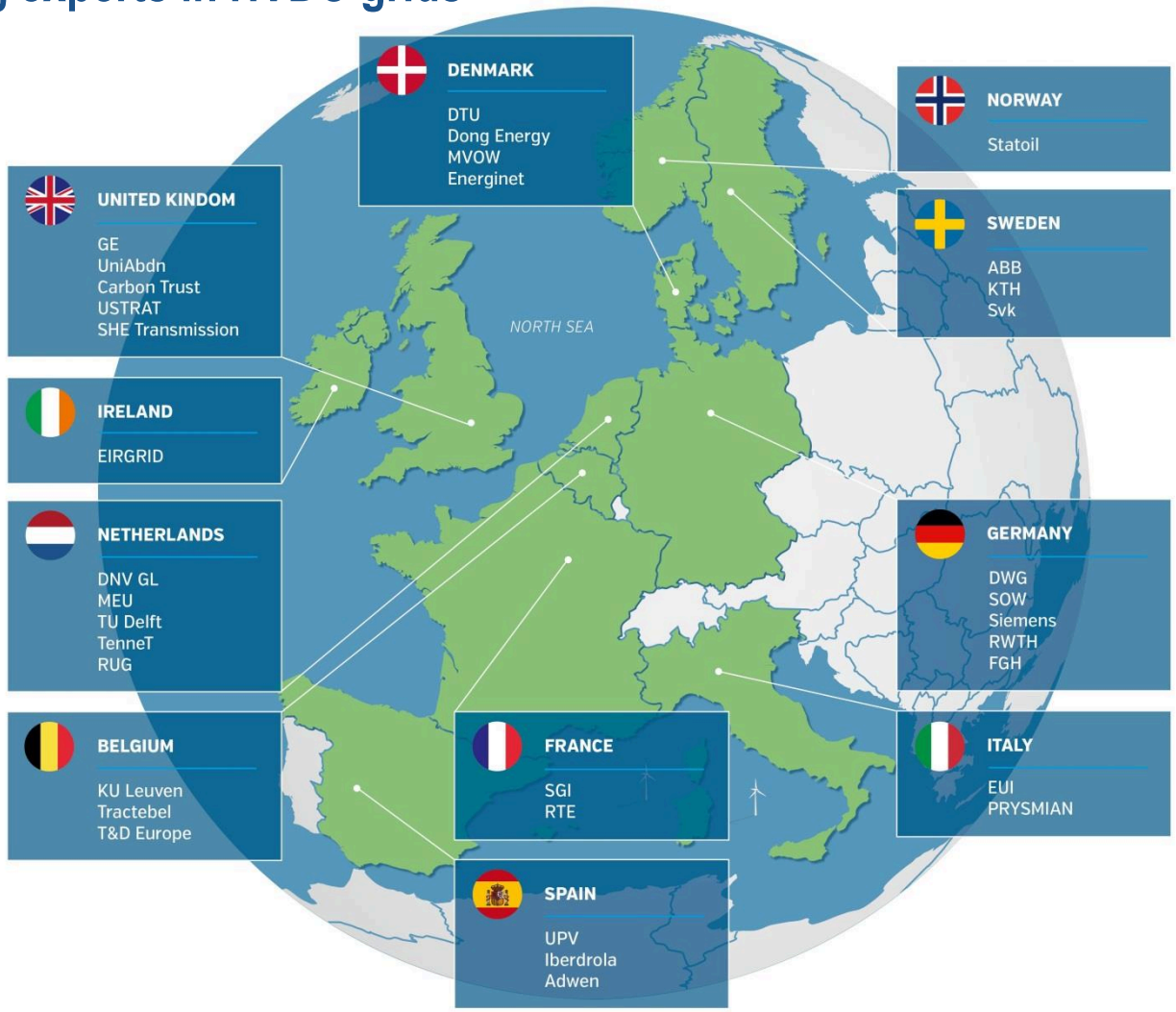
PROMOTioN - The Project

European Partners

34 leading experts in HVDC grids



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Future Outlook for Grid Development

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Future Outlook for Grid Development

4 scenarios:

- Business as Usual

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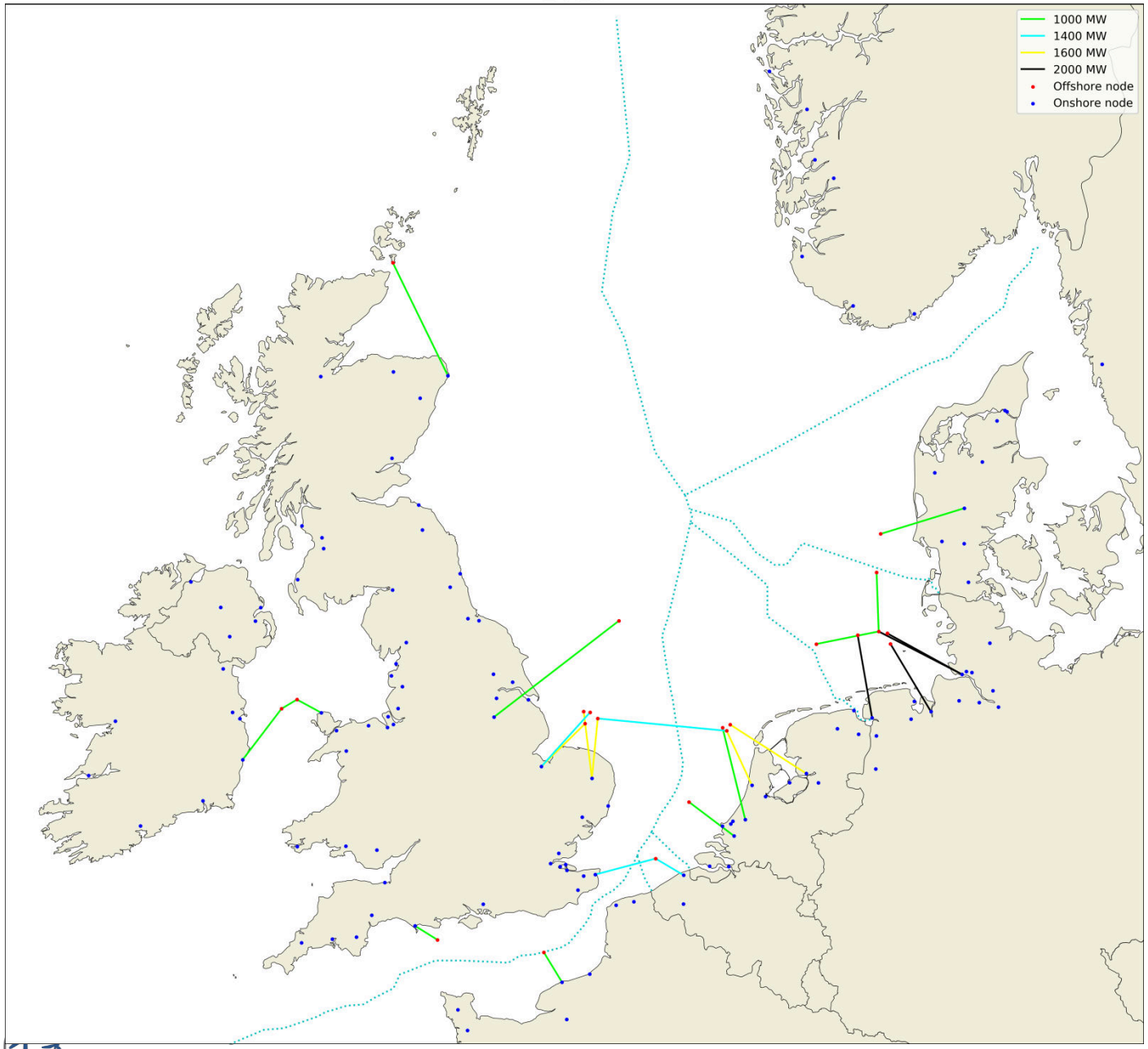
2025



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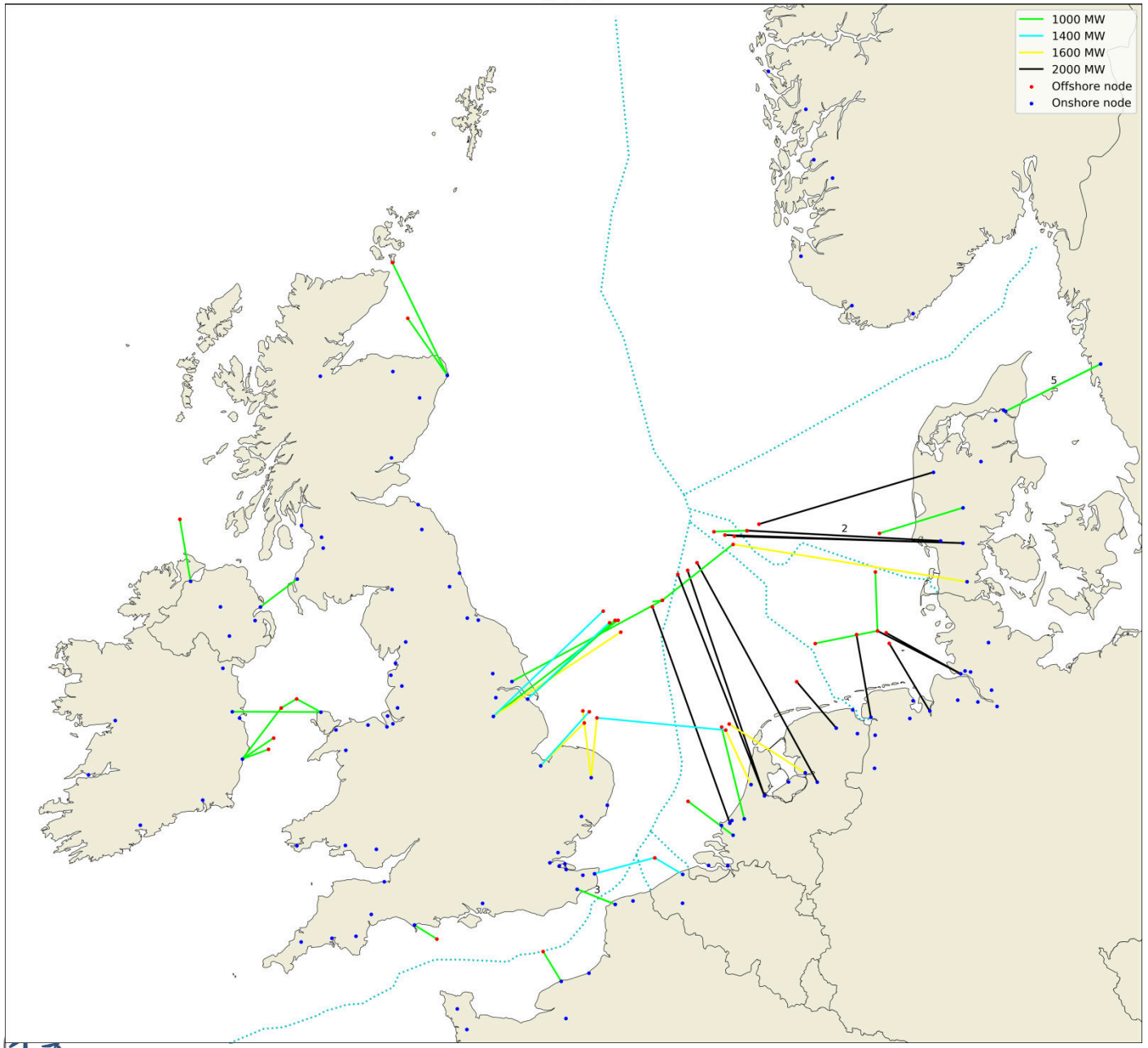
2030



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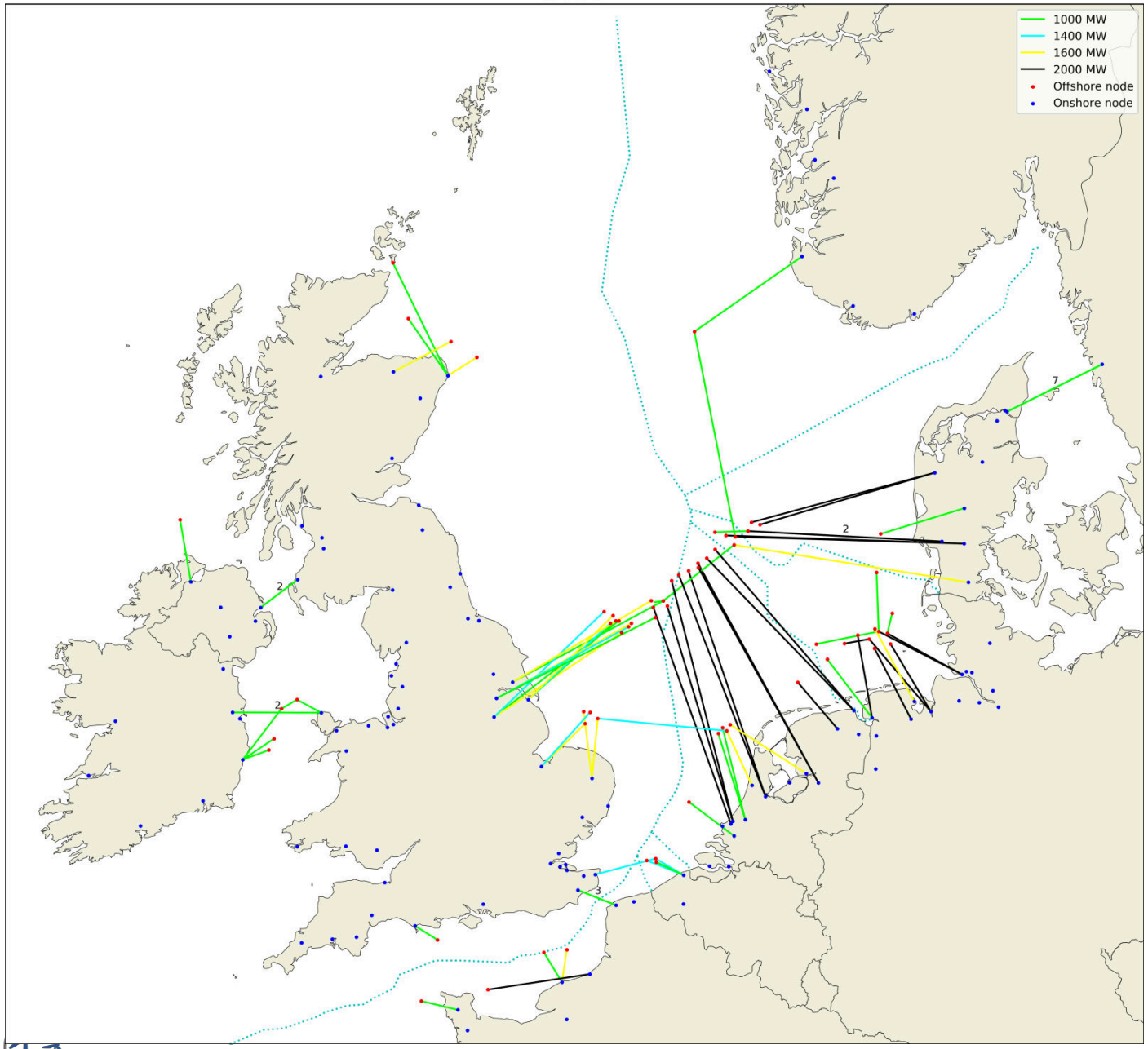
2035



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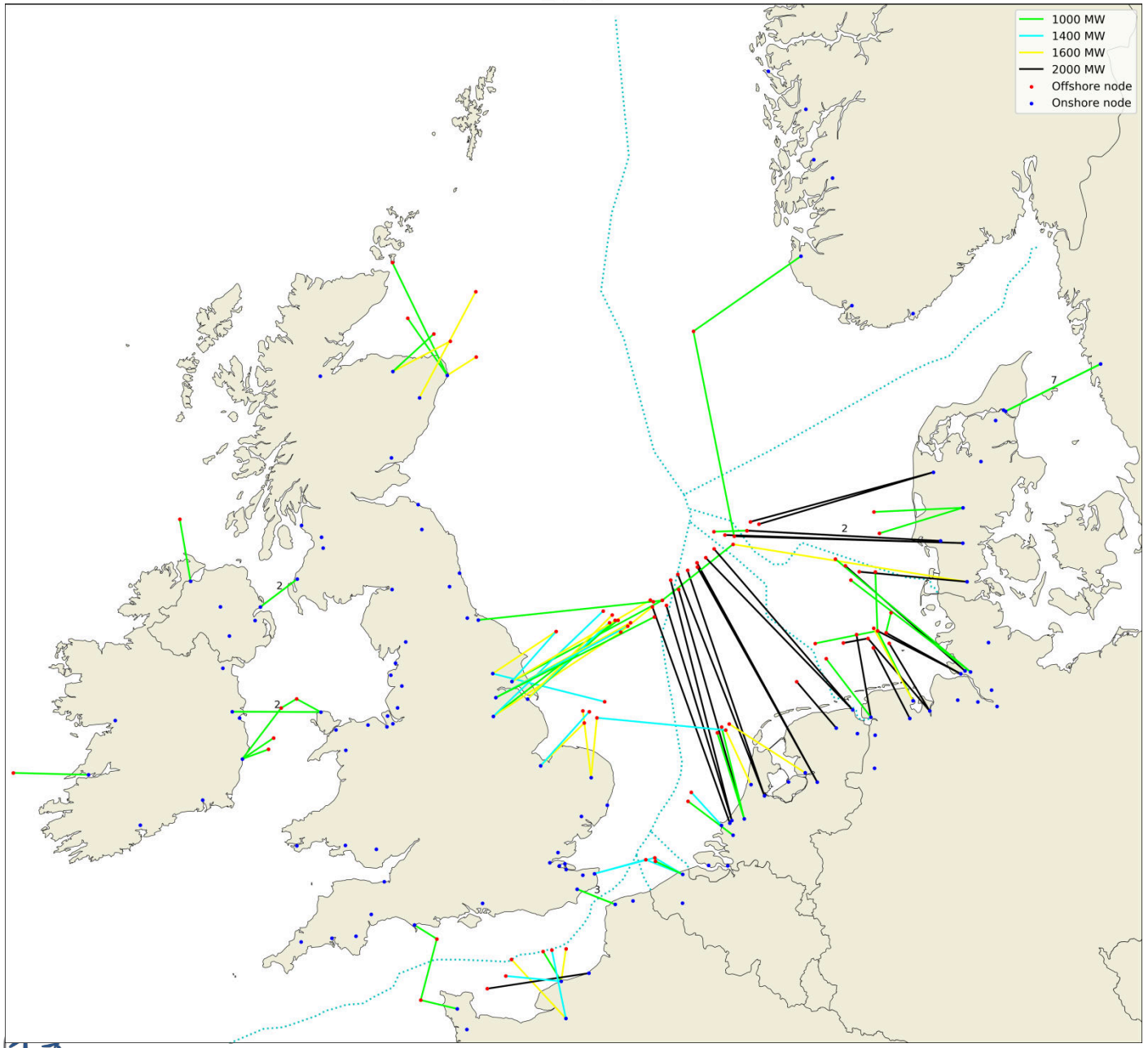
2040



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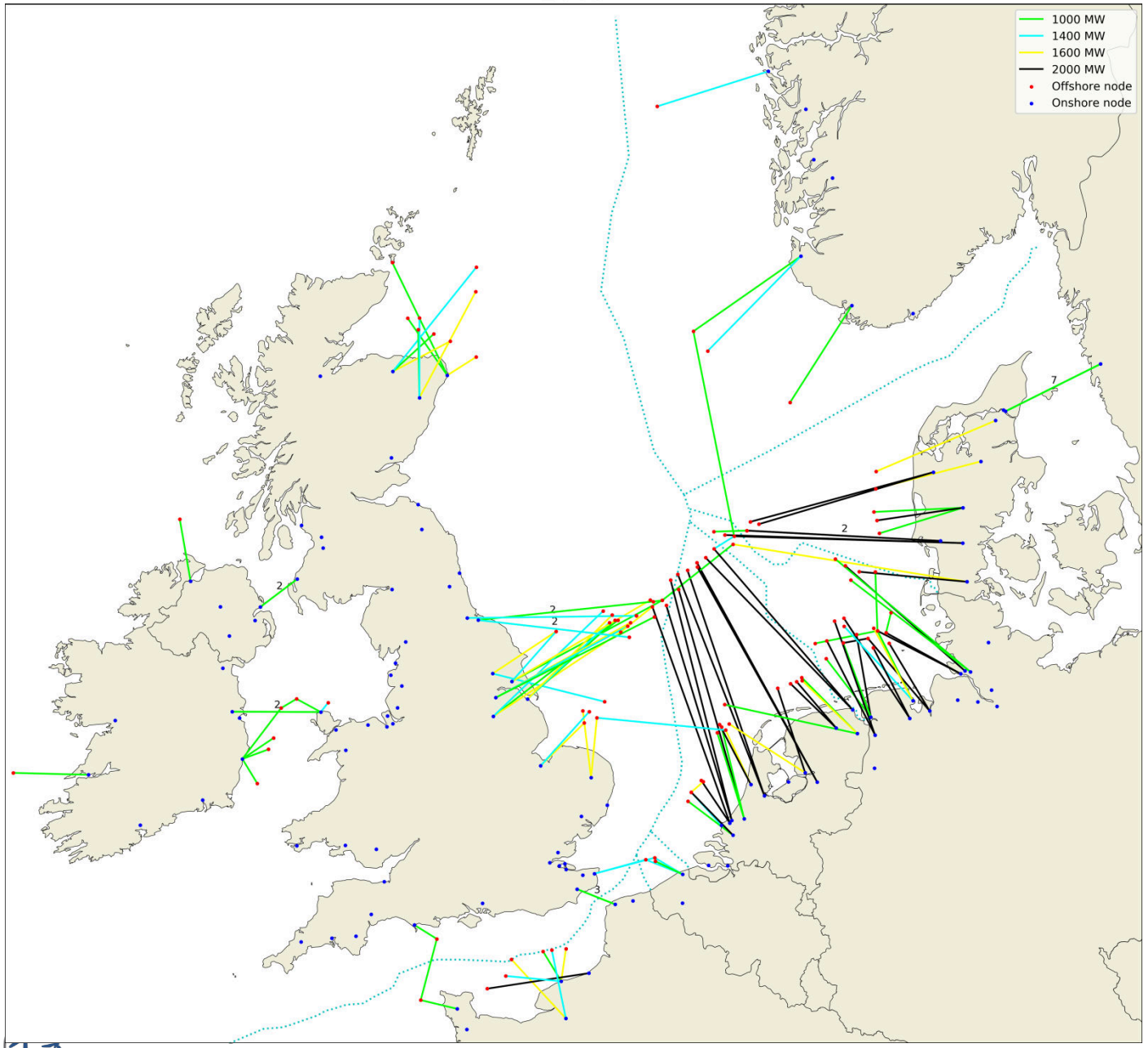
2045



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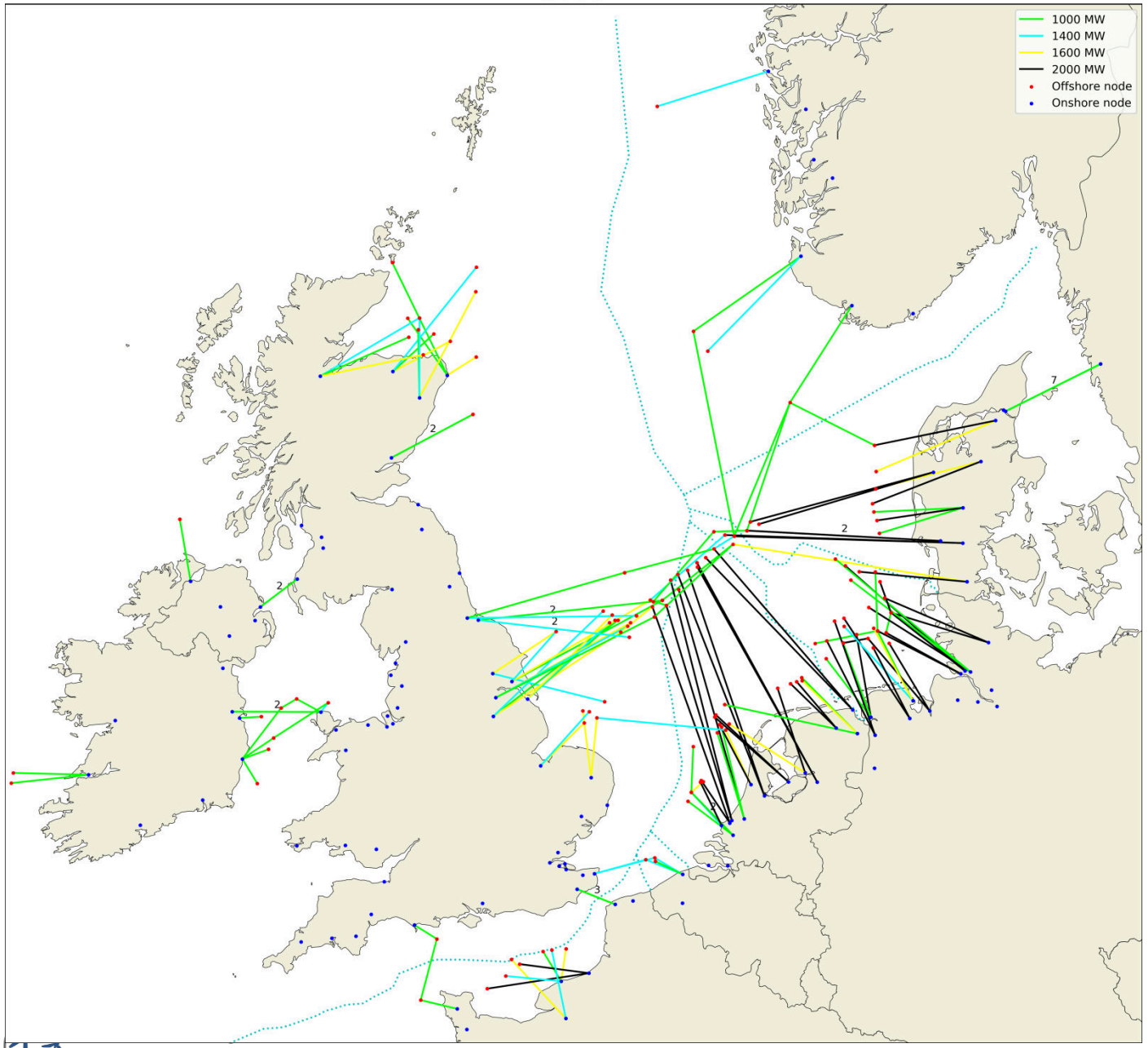
2050



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The regulatory side of offshore wind and grid development

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Locational/temporal planning OWFs

Three possible systems:

- Open Door
- Zonal Approach
- Specific location

- Long term ‘pipeline’ or different rounds, or open door

- Efficient use of space
- Strategic grid development

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Locational/temporal planning offshore grid

- Offshore grid develops where OWFs are located

  vs.

- OWFs are planned where offshore grid hubs are located

- Offshore grid development plans
- Anticipatory investments: “stepping stones”

  More efficiency but risk of stranded assets

- Offshore grid development may involve construction of offshore islands as “hubs”

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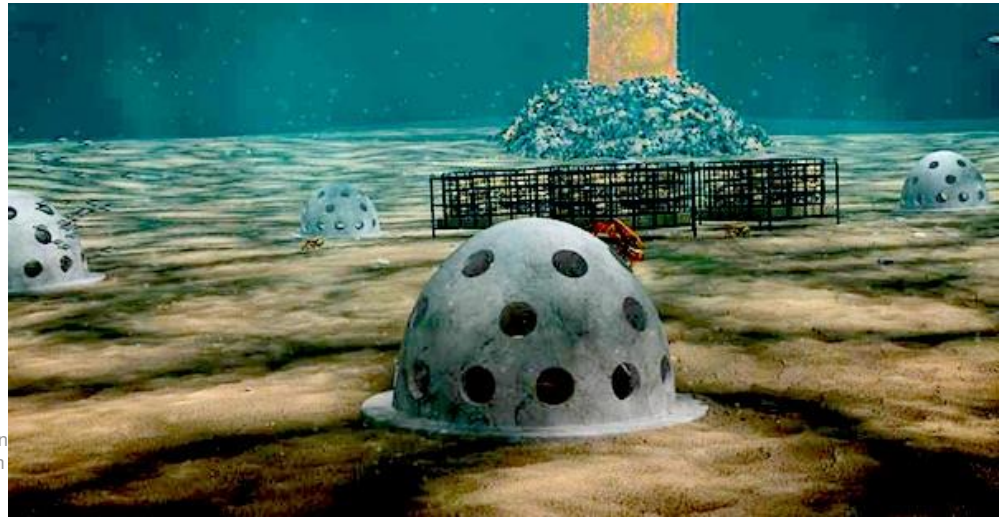
Future Scenarios: Dual Use of OWF areas

- Many possibilities
  - Ecosystem development
  - Aquaculture
  - Routes for small vessels (tourism)
  - Floating solar panels
  - Power to gas/ Power to x

- Regulatory requirements
  - Safety zones
  - Liability for damages
  - Ownership
  - Remuneration



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Conclusion

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Conclusion

- PROMOTioN analyses what the grid looks like in 2050 and how we get there
- Future scenarios offshore grid: difficult to project, depends on many variables
- Regulatory framework shapes OWF development: depends on who takes the initiative
- Regulatory framework offshore grid: important role network development plans
- Future scenario: important role for dual use of OWF areas

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APPENDIX

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