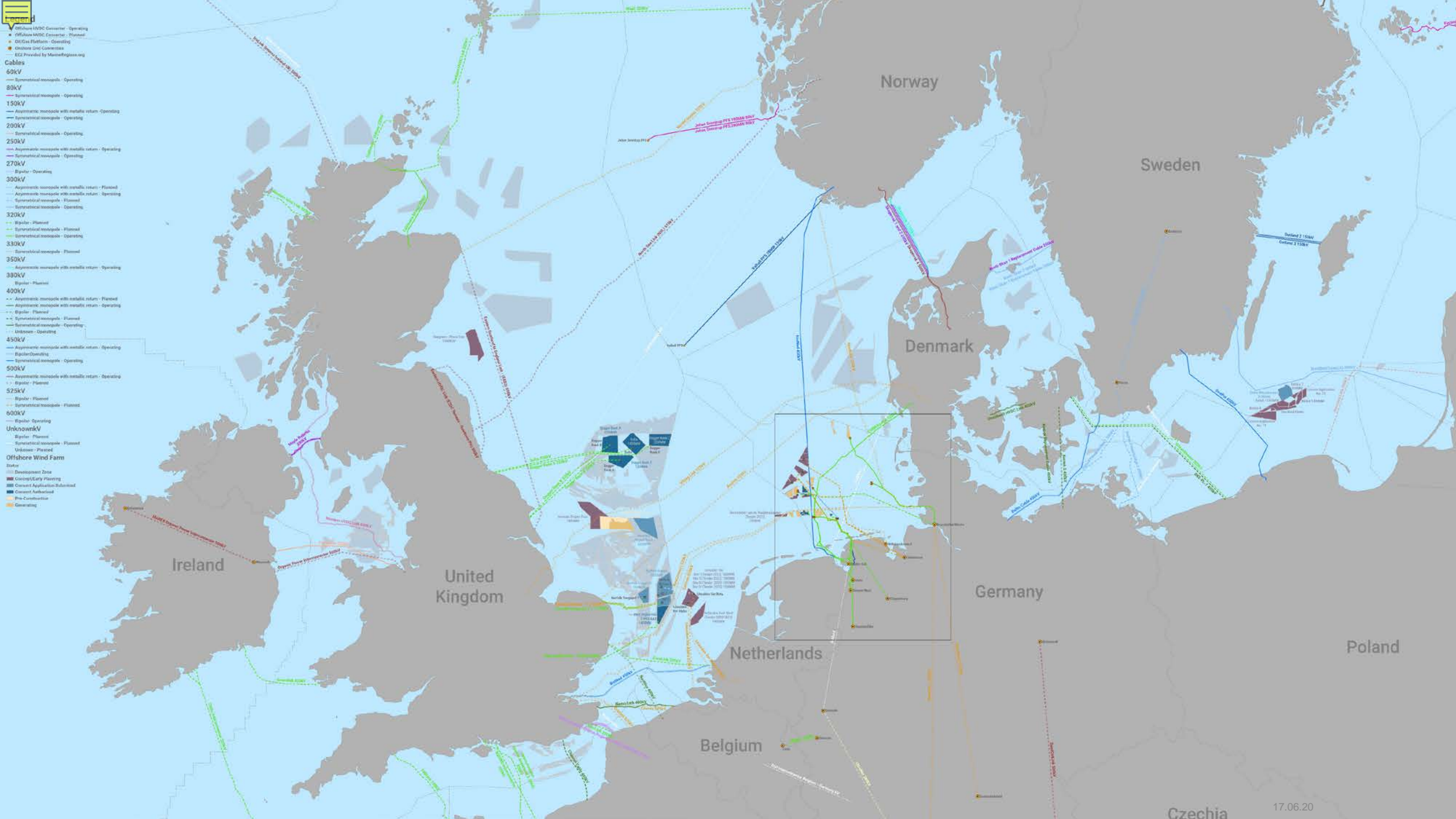


Progress On Meshed HVDC Offshore Transmission Networks

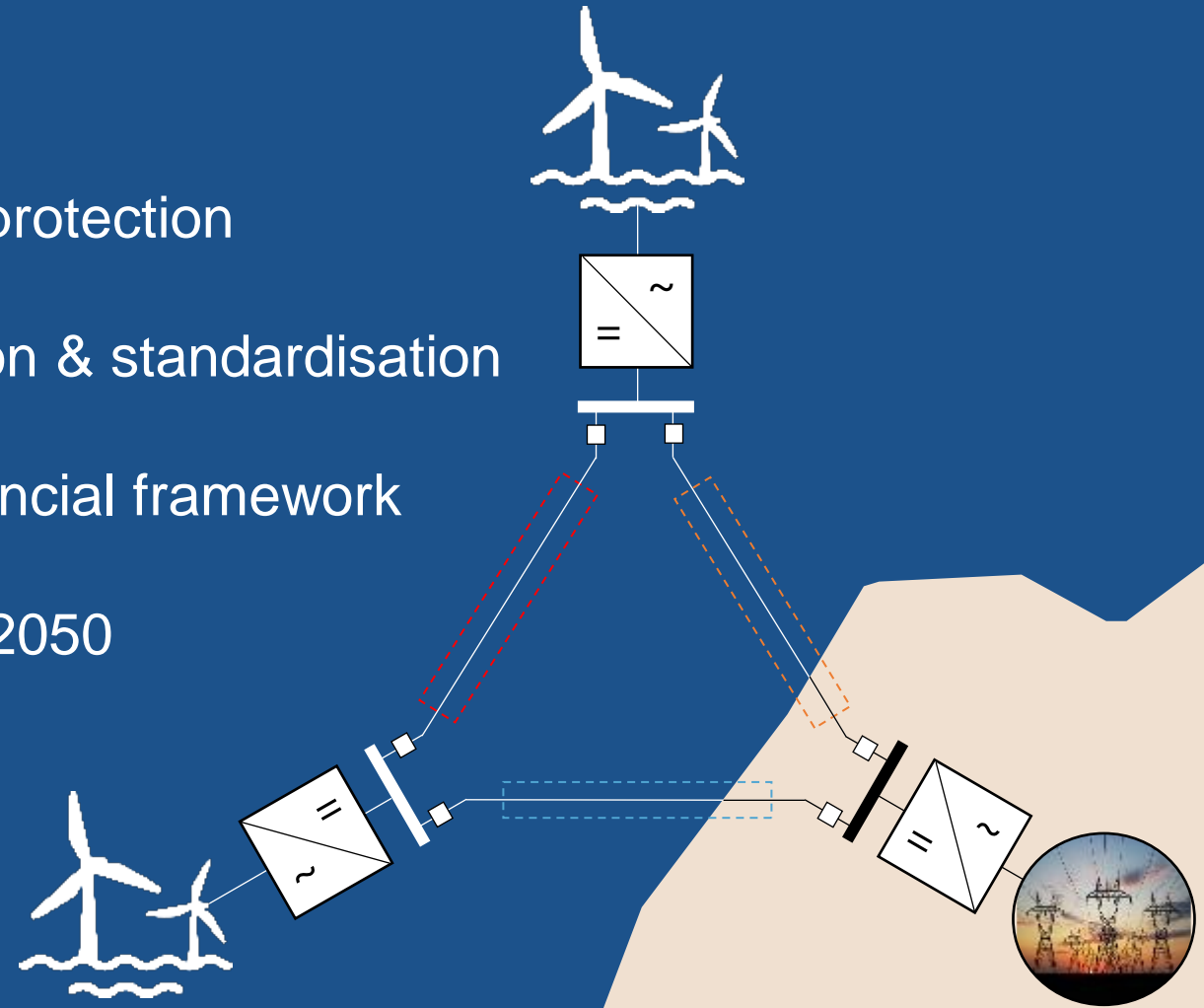
InnoGrid | Online | 18th of June 2020



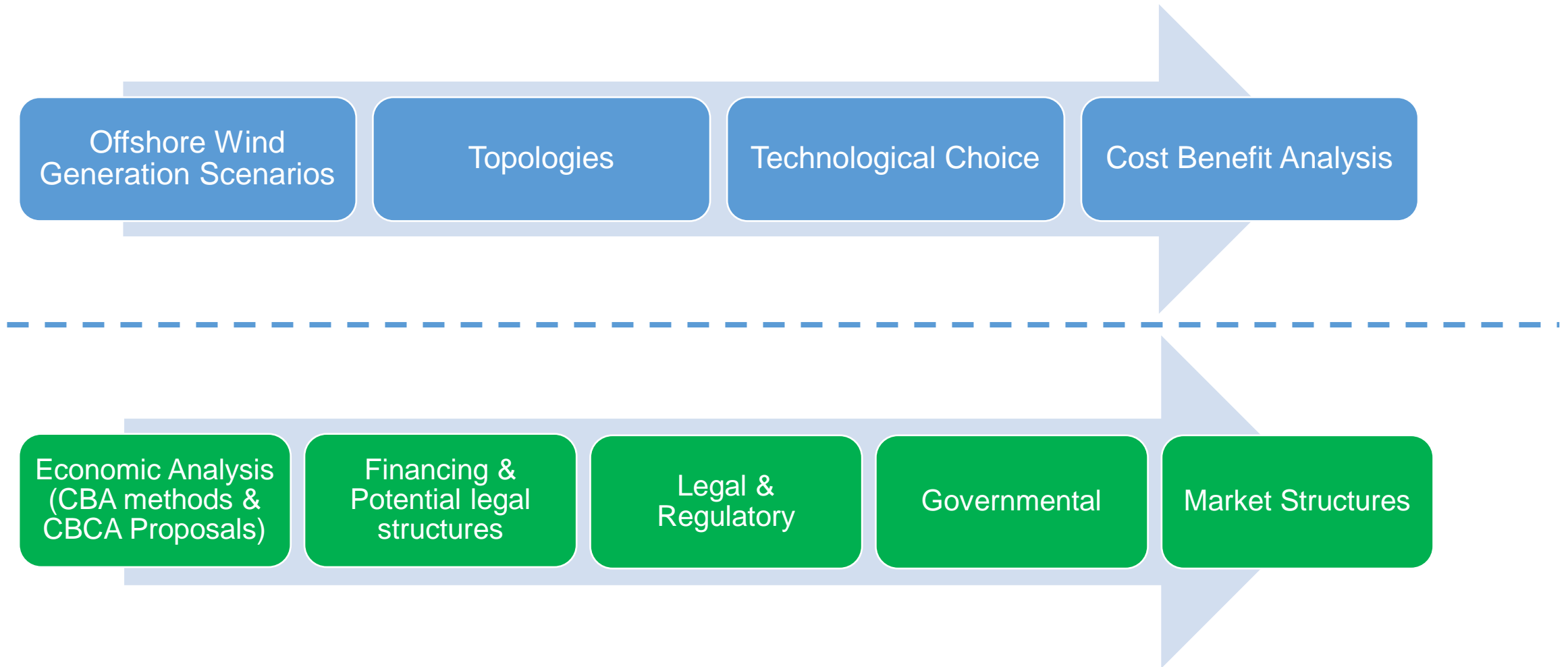
Progress on Meshed Offshore HVDC Transmission Networks

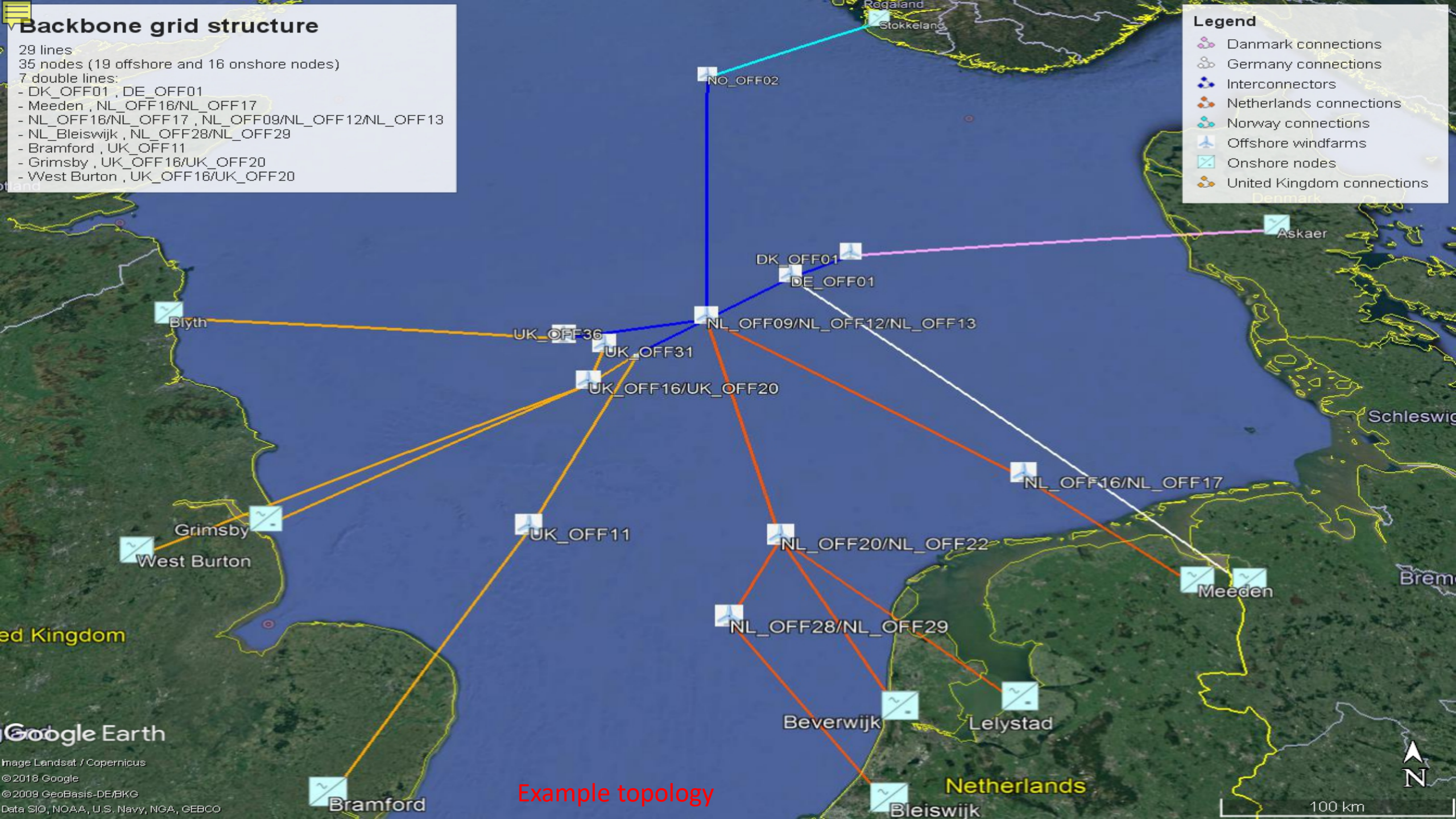
Enabling the North Sea power house

- Develop cost effective & reliable control & protection
- Achieve interoperability through coordination & standardisation
- Recommendations for EU regulatory & financial framework
- Deployment plan for implementation up to 2050
- Full scale technology demonstrations



Two parallel paths to a Deployment plan:





HVDC Grid Control



TRL

9
8
7
6
5
4
3
2
1

HVDC Grid Protection



TRL

9
8
7
6
5
4
3
2
1

HVDC Circuit Breakers



TRL

9
8
7
6
5
4
3
2
1

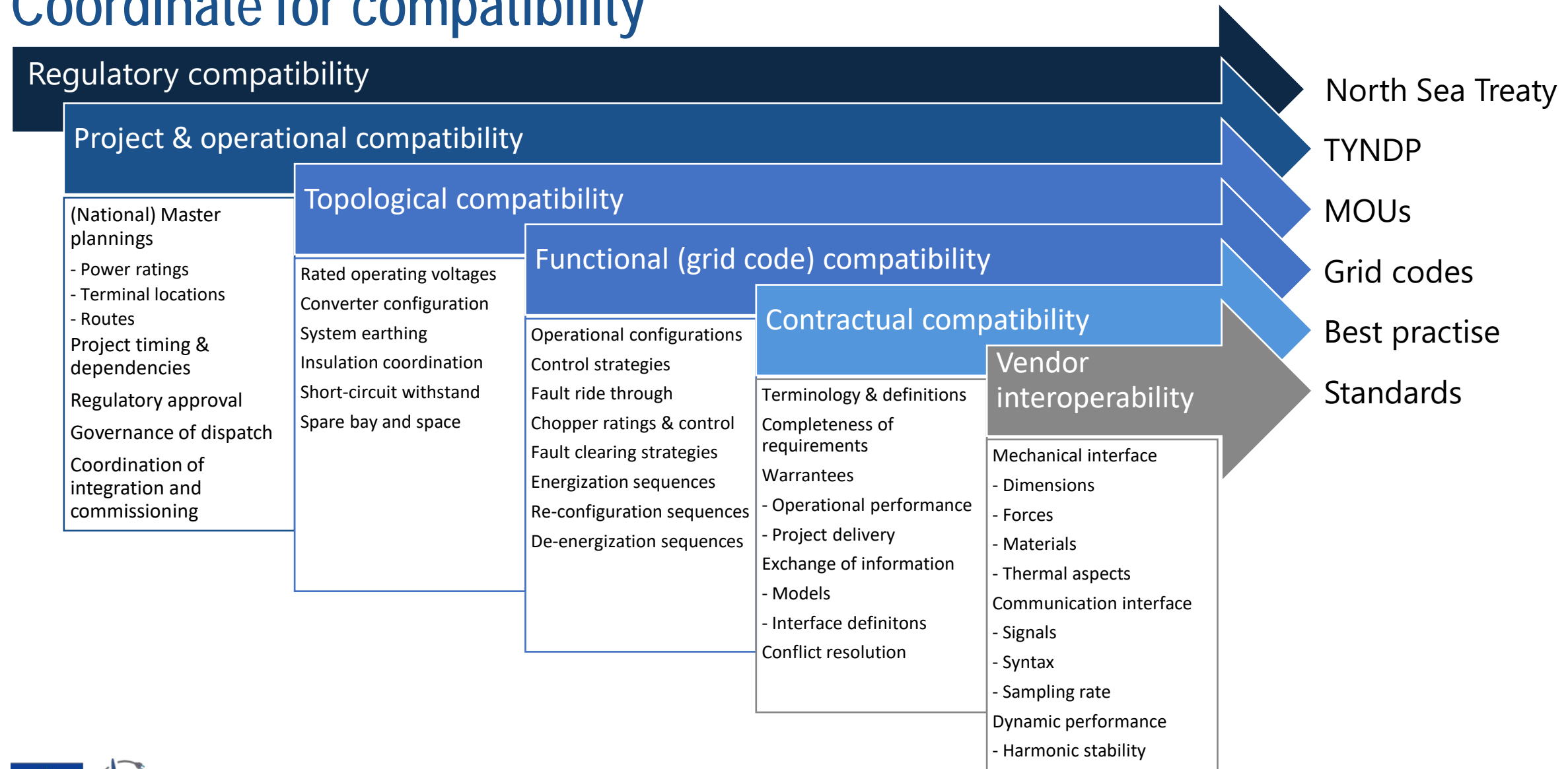
HVDC Gas Insulated Systems



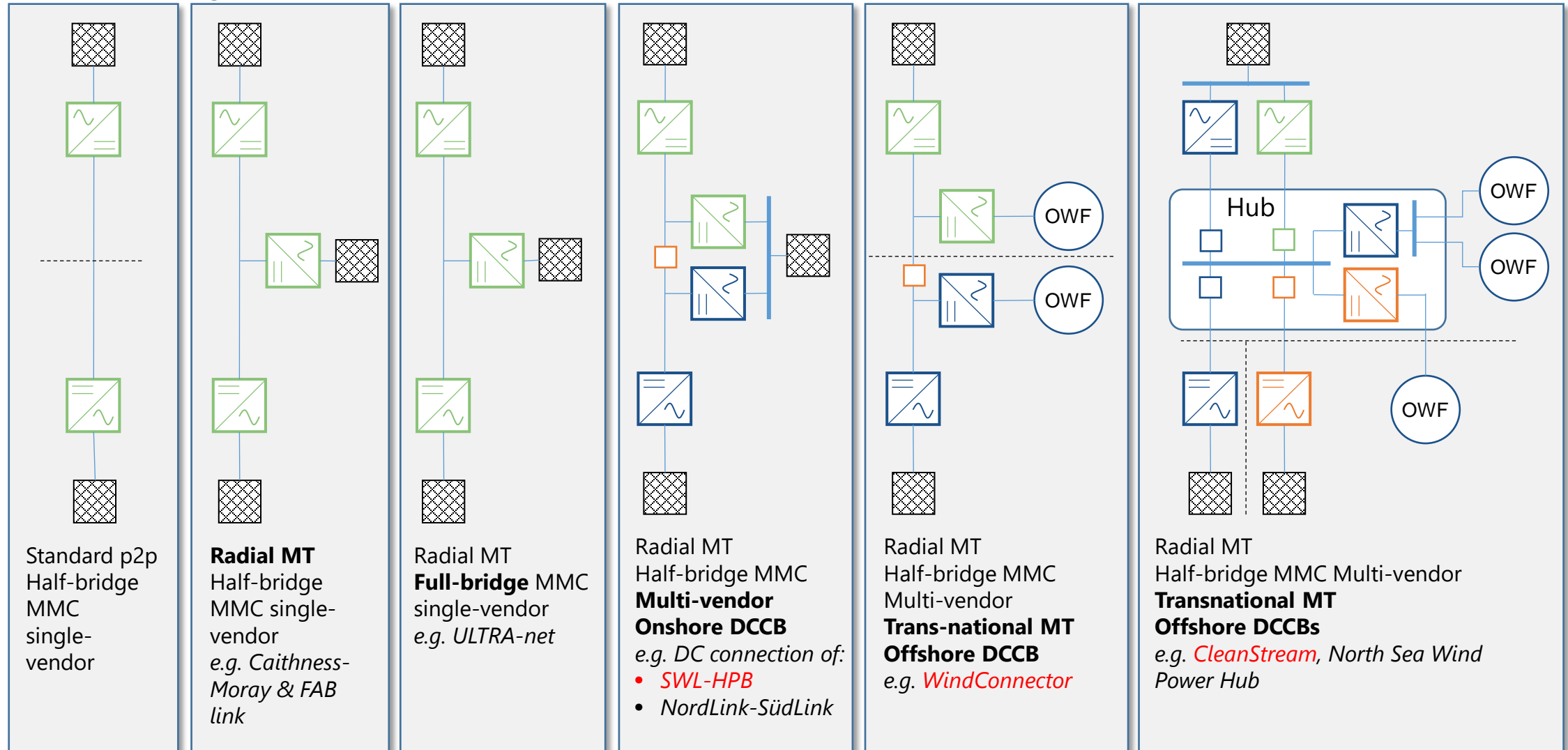
TRL

9
8
7
6
5
4
3
2
1

Coordinate for compatibility



Pilot projects: Steps towards international multi-vendor DC Grids





Conclusions

- **Technology ready** for multi-terminal HVDC grid development
- Further **standardisation** work needed on multi-vendor HVDC grid integration
 - Functional compatibility
 - Procurement & contractual compatibility
 - Multi-vendor interoperability
- International **collaboration & coordination** key to establish:
 - Regulatory & legal compatibility
 - Project & planning compatibility
 - Topological compatibility
- **Full-scale pilot project** best to demonstrate feasibility and realize benefits



Join our final **ONLINE** PROMOTioN conference

North Sea Grid for the European Green Deal

How to unlock Europe's Offshore Wind potential - a deployment plan for a meshed HVDC grid

Pre-conference Breakout Sessions

August 24th - September 18th 2020

Final Event

September 21st 2020

Registration opens by the end of June 2020



APPENDIX

DISCLAIMER & PARTNERS

COPYRIGHT

PROMOTiON – Progress on Meshed HVDC Offshore Transmission Networks
MAIL info@promotion-offshore.net WEB www.promotion-offshore.net

The opinions in this presentation are those of the author and do not commit in any way the European Commission

PROJECT COORDINATOR

DNV GL Netherlands B.V.
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
Tel +31 26 3 56 9111
Web www.dnvgl.com/energy

CONTACT

Cornelis Plet
Cornelis.plet@dnvgl.com
+31 6 115 240 83

PARTNERS

DNV GL Netherlands B.V., ABB AB, KU Leuven, KTH Royal Institute of Technology, EirGrid plc, SuperGrid Institute, Deutsche WindGuard GmbH, Mitsubishi Electric Europe B.V., Affärsverket Svenska kraftnät, Alstom Grid UK Ltd (Trading as GE Grid Solutions), University of Aberdeen, Réseau de Transport d'Électricité, Technische Universiteit Delft, Statoil ASA, TenneT TSO B.V., Stiftung OFFSHORE-WINDENERGIE, Siemens AG, Danmarks Tekniske Universitet, Rheinisch-Westfälische Technische Hochschule Aachen, Universitat Politècnica de València, SCiBreak AB, Forschungsgemeinschaft für Elektrische Anlagen und Stromwirtschaft e.V., Ørsted Wind Power A/S, The Carbon Trust, Tractebel Engineering S.A., European University Institute, Iberdrola Renovables Energía, S.A., European Association of the Electricity Transmission & Distribution Equipment and Services Industry, University of Strathclyde, ADWEN Offshore, S.L., Prysmian, Rijksuniversiteit Groningen, MHI Vestas Offshore Wind AS, Energinet.dk, Scottish Hydro Electric Transmission plc, SCiBreak AB

