

Facilitating the development of offshore wind in Europe: market design and cost allocation rules

EPRG Spring Seminar
Expanding Offshore Wind

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Overview




- I. Background for the presentation
- II. General context
- III. The strategic role of hybrids
- IV. Why a regulatory roadmap?
- V. Background considerations for the regulatory roadmap
- VI. Review of the proposed regulatory roadmap

I - Background for the presentation



Green Platform Ocean Grid – SP1.3 – Regulatory Conditions – Deliverable D1.6 – Public



GREEN PLATFORM OCEAN GRID

Project period: 2022-2024
Duration: 36 months

D1.6 - Report on regulatory barriers

Catherine Banet and Silke Goldberg, *Mapping of regulatory barriers to offshore wind hybrid projects from Norway to Europe*


First delivery date: 24 February 2023
Revised version: 05 January 2024

Organization name of lead participant for this deliverable:
University of Oslo

Grant Agreement No 328750
Ocean Grid is a Green Platform project financed in part by The Research Council of Norway

Dissemination Level		
PU	Public	X
CD	Confidential, only for members of the consortium	

February 2024



GREEN PLATFORM OCEAN GRID

Project period: 2022-2024
Duration: 36 months

**M1.2
Intermediary report on regulatory models and market conditions**

Catherine Banet, *Market design alternatives and cost and revenue sharing models for hybrid offshore wind projects from Norway to Europe*


First delivery date: 11 December 2023
Revised version: 25 January 2024

Organization name of lead participant for this deliverable:
University of Oslo

Grant Agreement No 328750
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Dissemination Level		
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July 2024



GREEN PLATFORM OCEAN GRID

Project period: 2022-2024
Duration: 36 months

**D1.7
Synthesis report**

Regulatory Roadmap for developing hybrid offshore wind projects between Norway and Europe


Final version: 2 December 2024

Organization name of lead participant for this deliverable:
University of Oslo

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Electricity Market Design Alternatives for Hybrid Offshore Wind Projects under EU Law
by C. Banet

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II – General context:

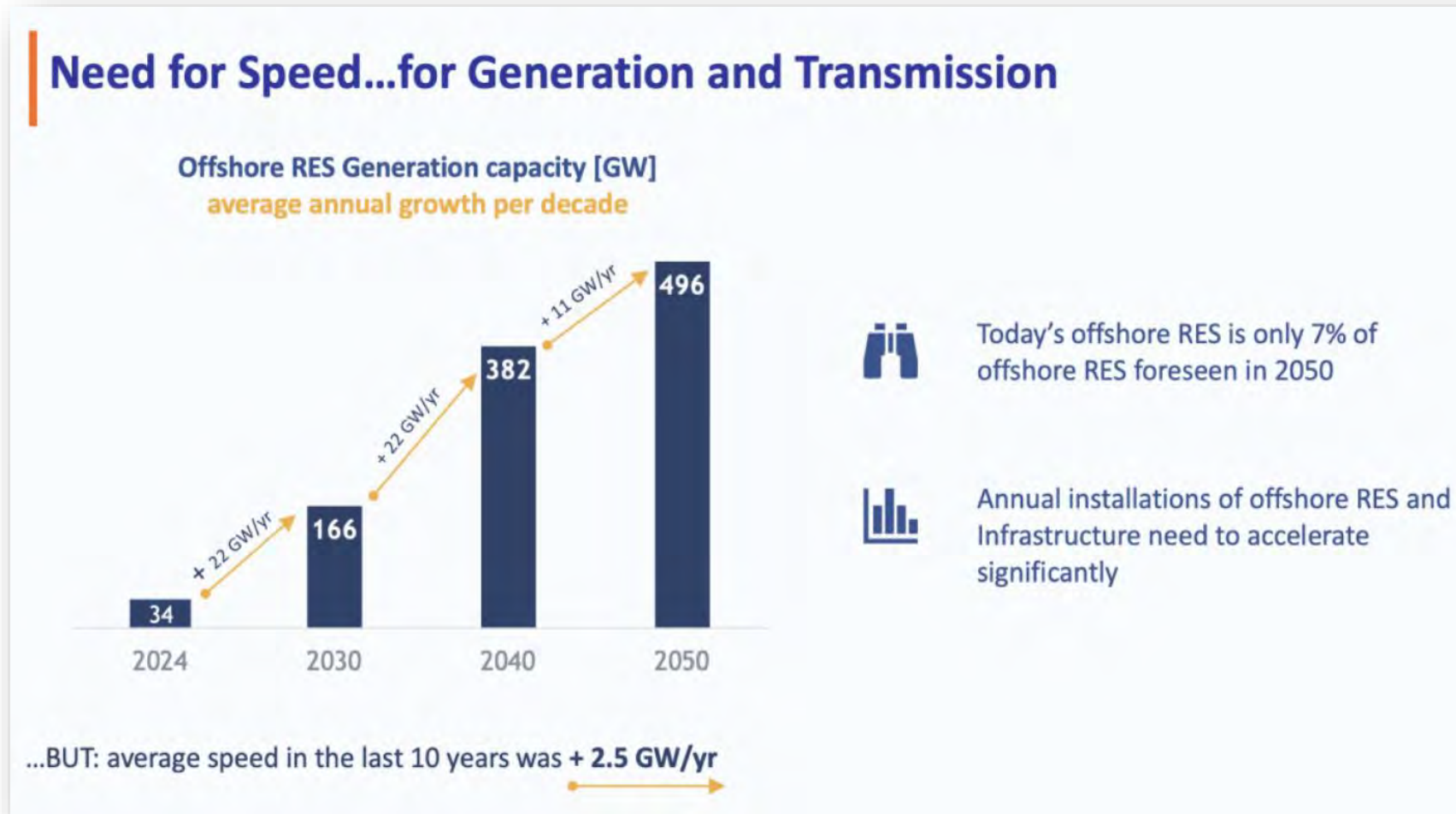
A changing offshore wind landscape

**Ambitious targets and a pillar in attaining net zero goals:
Offshore Renewable Energy (ORE) Strategy, REpowerEU.**

- EU policy targets at EU level: 300 GW of offshore wind and 40 GW of ocean energy installed capacity in the EU by 2050;
- Neighbouring countries of the 5 EU sea basins: joint targets for OW, e.g. April 2023 Ostend Declaration with at least 300 GW by 2050 in the North Seas.
- Cumulative OW goals by MS: 317 GW by 2050 (2023).
- Increased EU RE target in REDIII to at least 42.5% by 2030.



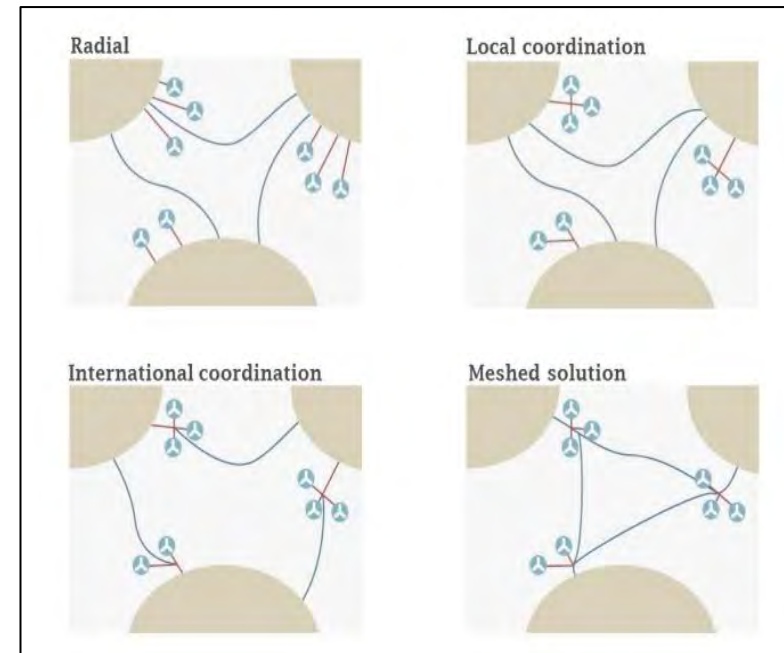
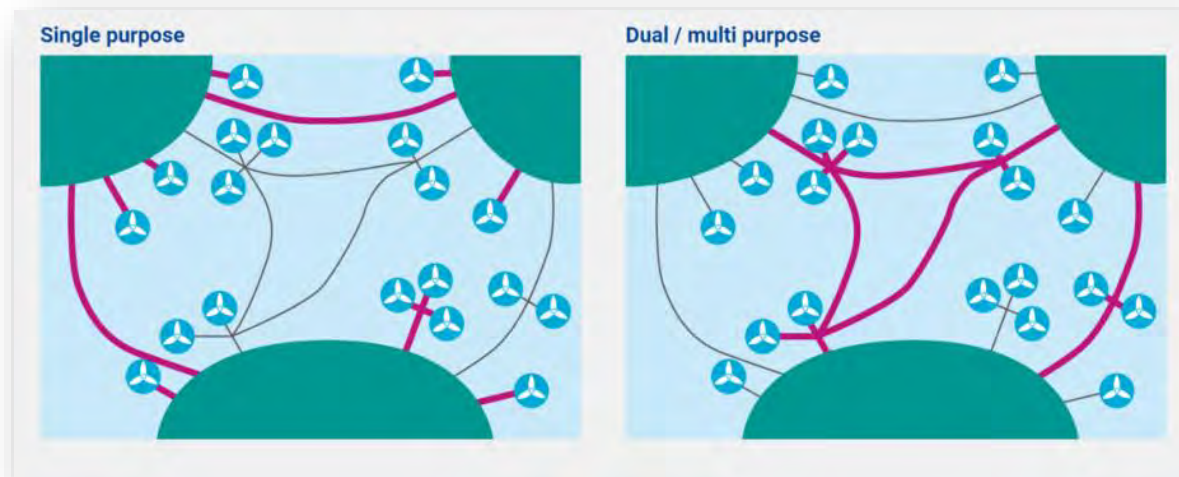
A change of speed in grid development



Source: ONDP 2024

III – The strategic role of hybrids: A change of grid architecture

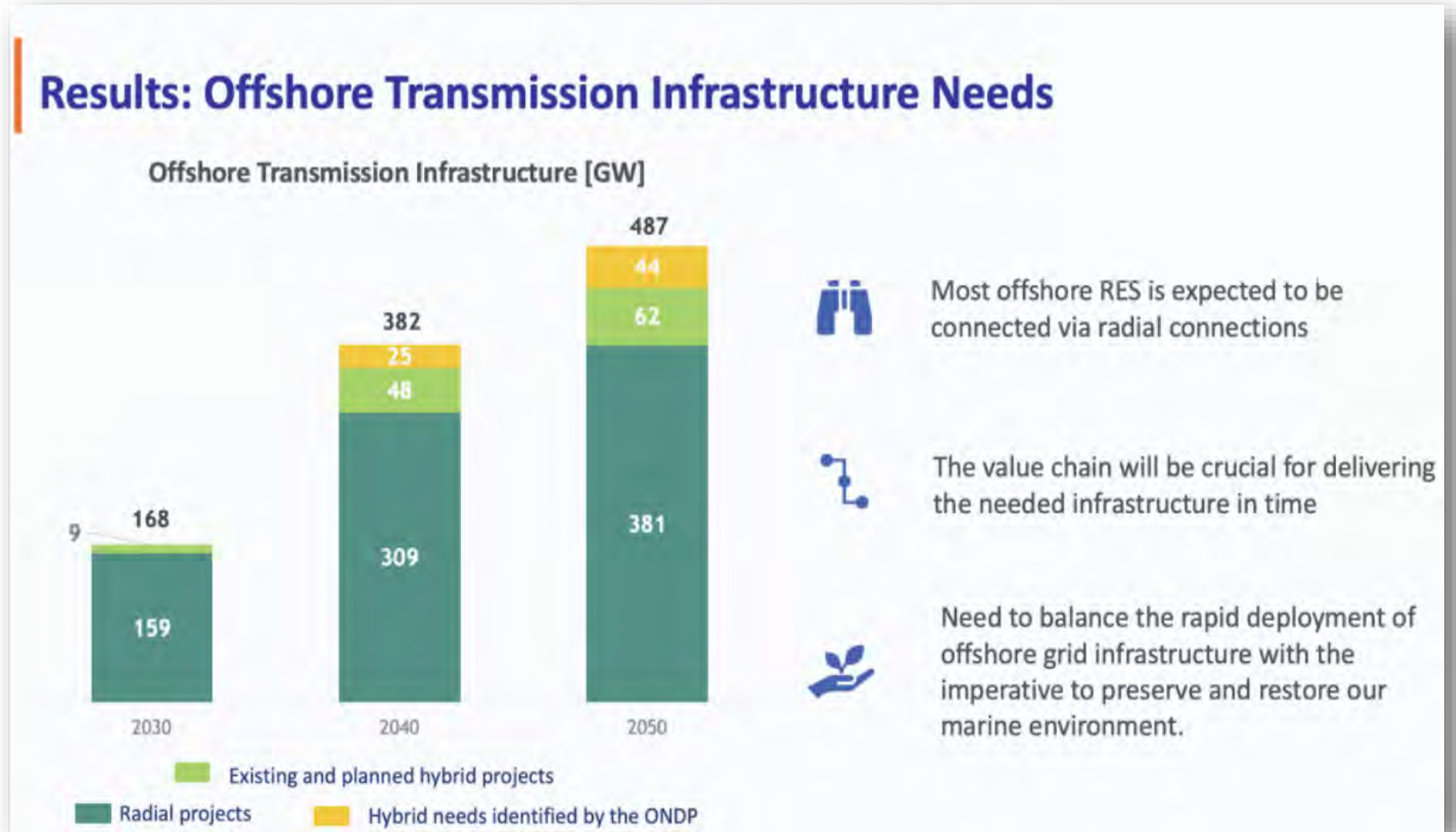
- **Alternative grid configurations:**
 - **Radial connection:** single purpose.
 - **Hybrid projects:** hybrid solutions could extend from **dual purpose solutions to multipurpose solutions** (across sectors, with offshore consumption)
 - **Energy hubs / energy islands**
 - **Meshed grid**



Assumed general pattern of the Offshore Grid Development.
Source: The North Seas Countries' Offshore Grid Initiative - Initial Findings, Final Report Working Group 1 – Grid Configuration, November 2012, p.8

And indeed:

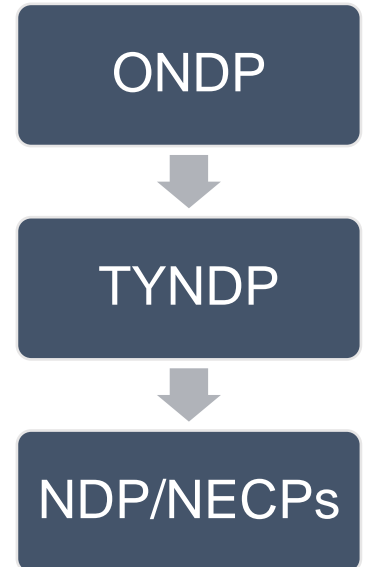
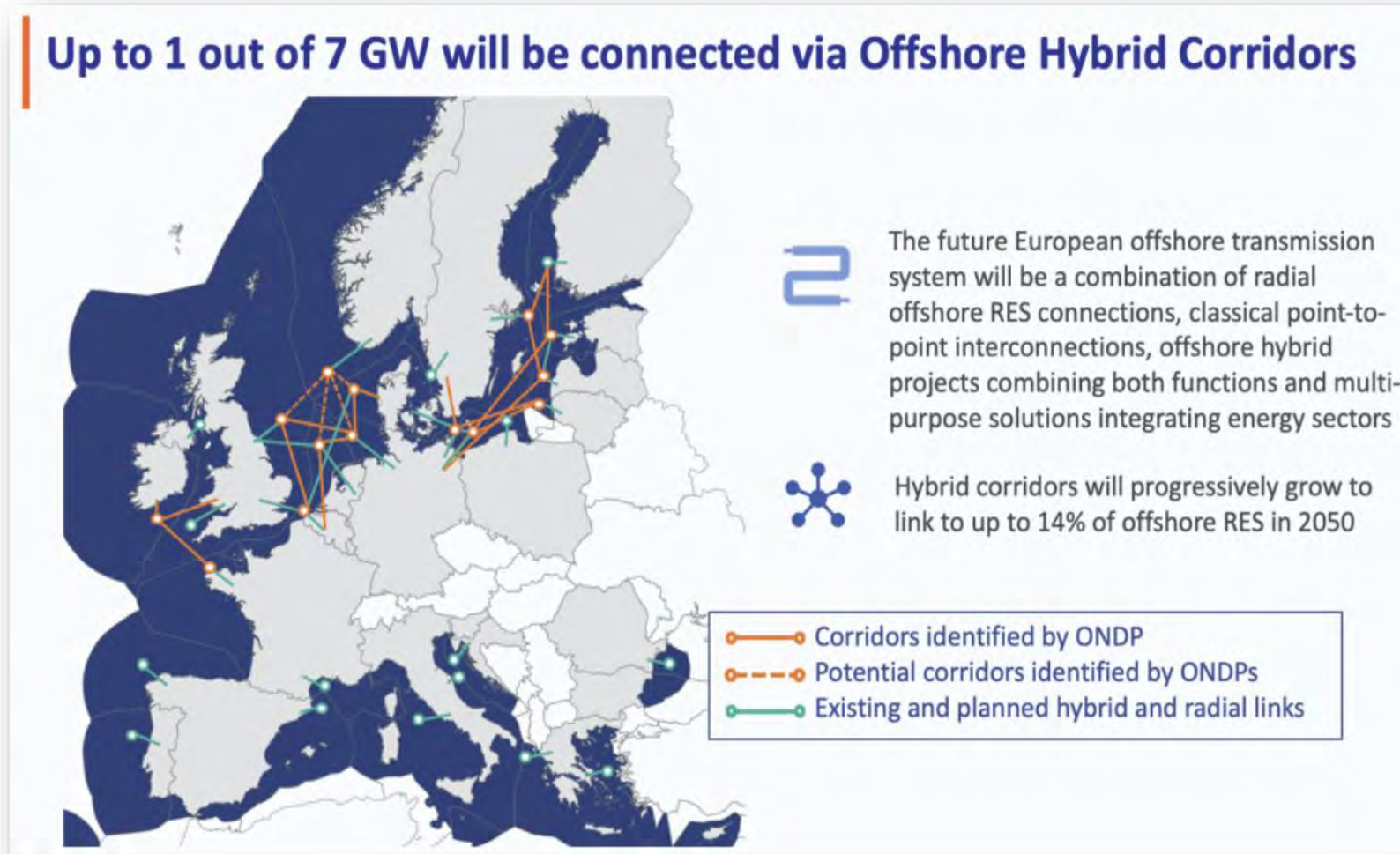
Hybrids:
a cost-efficient and
sustainable solution.



Source: ONDP 2024

First Offshore Network Development Plan (ONDP)

23 January 2024



Status of hybrid offshore wind projects in Europe

	Hybrid Project Name	Countries	Status
1	Kriegers Flak	Denmark-Germany	operational
2	ELWIND	Latvia-Estonia	cooperation signed. PCI.
3	Lion Link (previously Eurolink)	The Netherlands-GB	cooperation signed
4	Bornholm Energy Island	Denmark-Germany	cooperation signed. PCI.
5	North Sea Wind Power Hub	Denmark-Germany-the Netherlands	cooperation signed. PCI.
6	Triton Link	Belgium-Denmark, including energy islands Energiø Nordsøen (DK) and Princess Elisabeth Island (BEL). (The plan is to connect Triton link to the North Sea Energy Island mentioned above in point 5.)	Cooperation signed. PCI status.
7	North Sea Energy Island	Denmark-Germany-the Netherlands-Belgium	under discussion
8	Nautilus	GB-Belgium (to Princess Elisabeth Island).	under discussion. GB approved. Included in the Belgian Federal Development Plan. PMI status.
9	Baltic WindConnector	Estonia-Germany	under discussion
10	Sørlige Nordsjø II / Sørvest F	From the Norwegian continental shelf	Under discussion. Not yet decided.



ation.

IV - Why the need for a regulatory roadmap?

De-risking through law.

Hybrids can develop under today's legislation, **but** not clear enough to provide certainty for investors, operators and regulators in the long run.

Considerations:

- A holistic approach, looking at both generation and grid solutions
- Both a project specific perspective and a cross-border perspective
- A multi-actor approach
- Norway/EU/GB



V – Background considerations for the proposed regulatory roadmap



1. Address **fundamental regulatory barriers** to hybrid offshore wind projects in the North Sea basin
2. Decide on **market design alternatives** for hybrid offshore wind projects
3. Set **market conditions**: map costs and incomes per actor, develop cost-benefit allocation models
4. **Choice of regulatory approach**

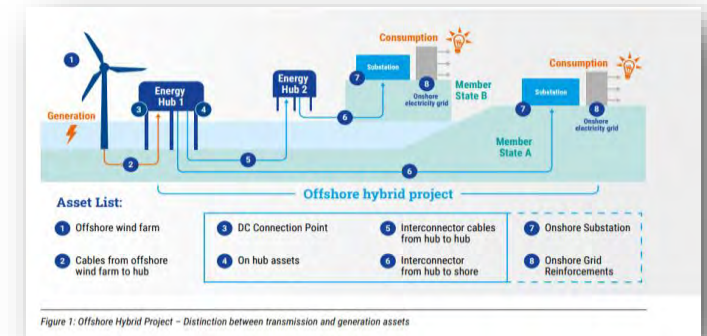
1. Address fundamental regulatory barriers to hybrid offshore wind projects between Norway and Europe

■ Legal definition of hybrids

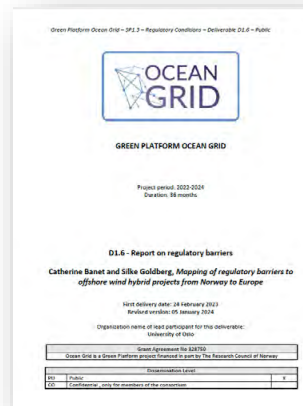
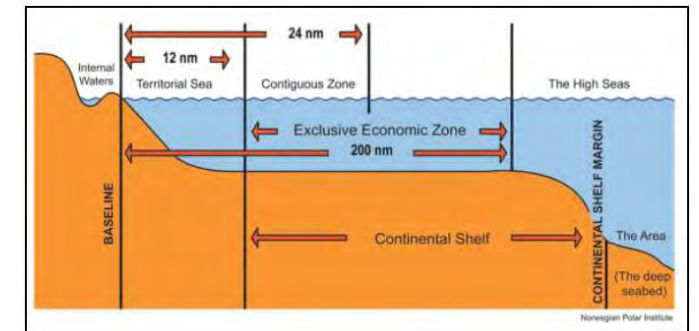
- Structure and functions. Possibilities of grid extensions.
- Alternative models available: central vs asset-based approach, one owner vs multiple owners

■ Jurisdiction over the different parts of the hybrid projects.

- Hybrids, energy islands: which jurisdiction (territorial and functional)? Which legislation to apply to which part of the assets?



Source: ENTSO-E



■ **Central EU requirements for advancing hybrids**

EU legislation will play an important role on the regime for hybrid offshore wind projects connected to Norway, particularly on the following points:

- planning (marine areas, energy grid infrastructures);
- permitting of generation and infrastructure (including rules on strategic impact assessment / environmental impact assessment, auctioning, permit-process timing, etc.);
- market design, including grid regulation;
- financing mechanisms.

The following EU requirements have been identified as **particularly influential for the regulatory regime for hybrid projects**:

- application of the regime for project of common interest (PCI) or project of mutual interest (PMI) under the TEN-E Regulation, including for planning and permitting (ex: Nautilus);
- unbundling rules;
- capacity allocation, including the so-called 70% rule;
- grid connection;
- metering;
- balancing.

- Legal regime around the North Sea (EU – Norway – GB):
 - How to address the **EEA backlog** and the legal situation with **GB** (market re-coupling negotiations, 2026)
 - Available alternatives:
 - Harmonisation
 - Bilateral / multilateral agreements
 - Soft law guidance
 - **What needs to be regulated in legislation vs in agreements to move forward?**



2. Market design alternatives for hybrid offshore wind projects

- A choice of regulatory approach: only **one power system**:
 - Is there a need for a dedicated regime for hybrid projects?
 - Same market rules onshore and offshore !!!
- A two-step process:
 - **Market design** alternatives
 - +
 - **Cost and revenue sharing** models

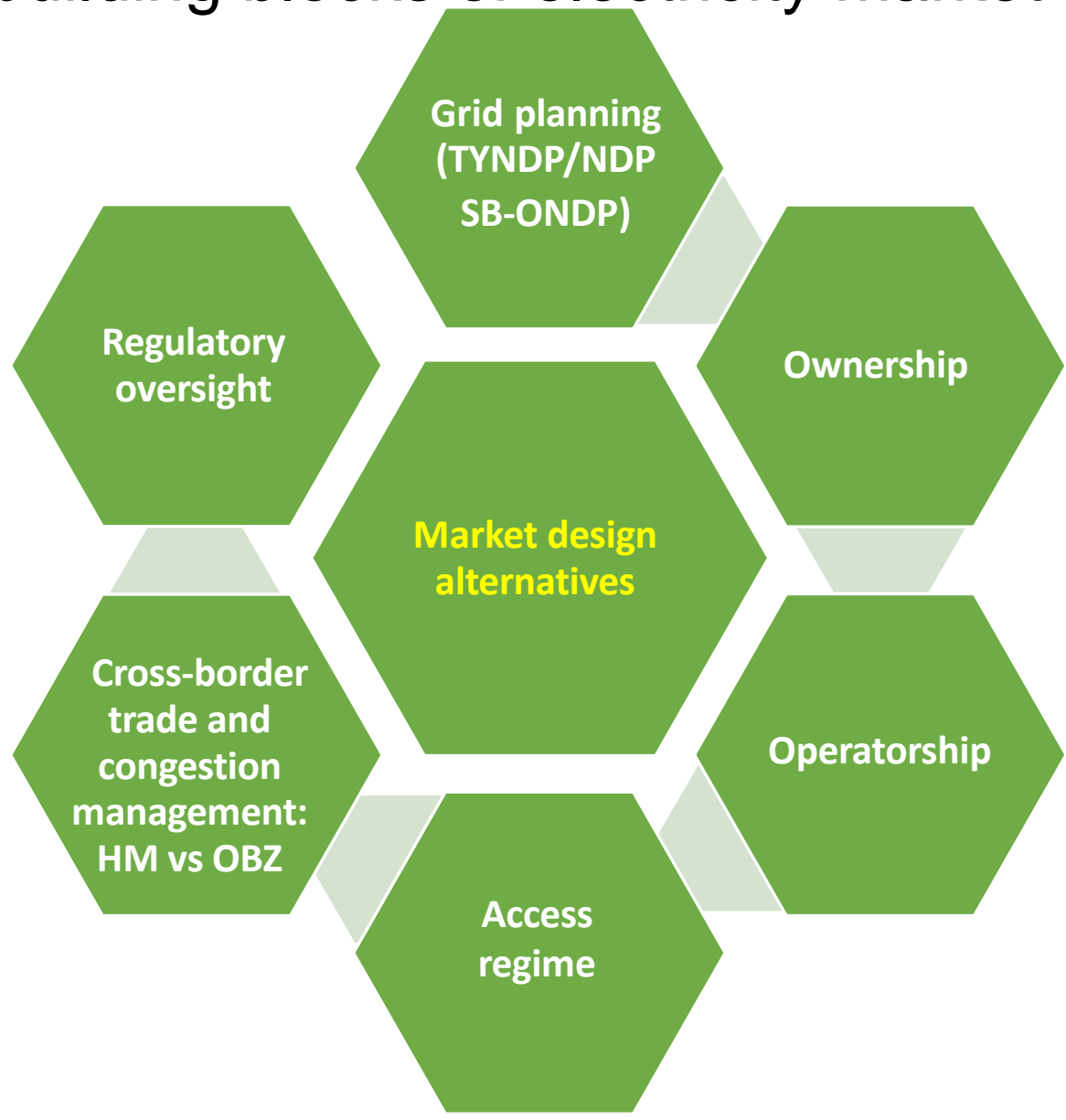


[Market design alternatives and cost and revenue sharing models for hybrid offshore wind projects between Norway and Europe – oceangridproject.no](https://oceangridproject.no)

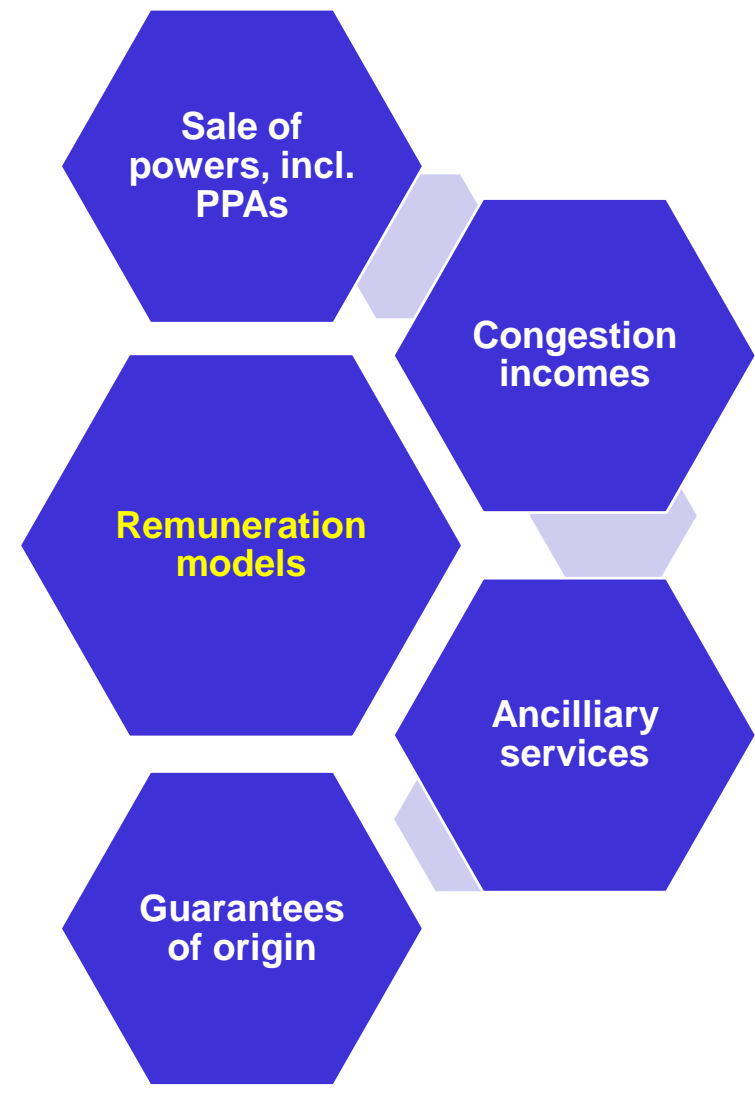


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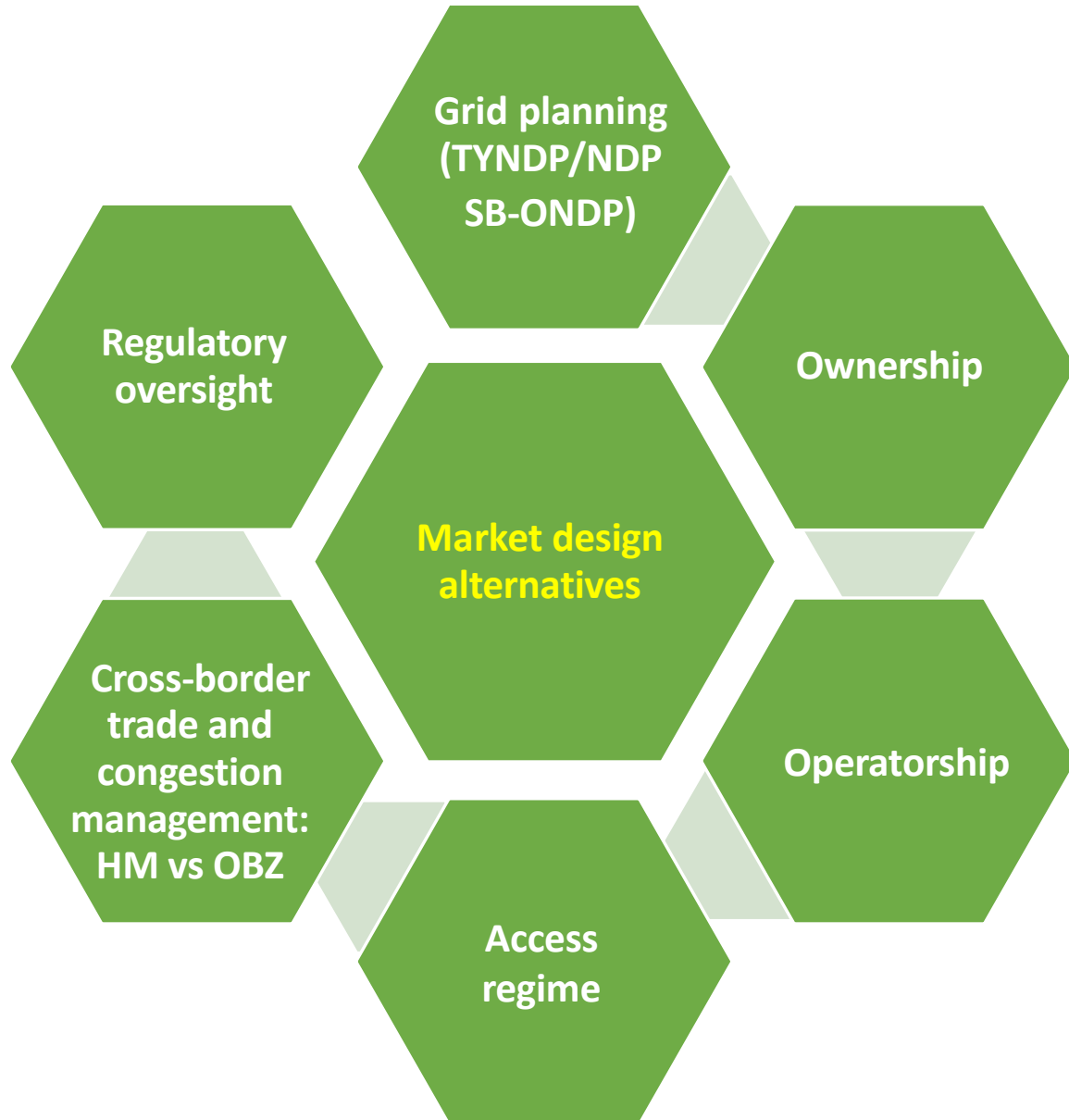
The building blocks of electricity market design legislation offshore (C. Banet)



MARKET DESIGN



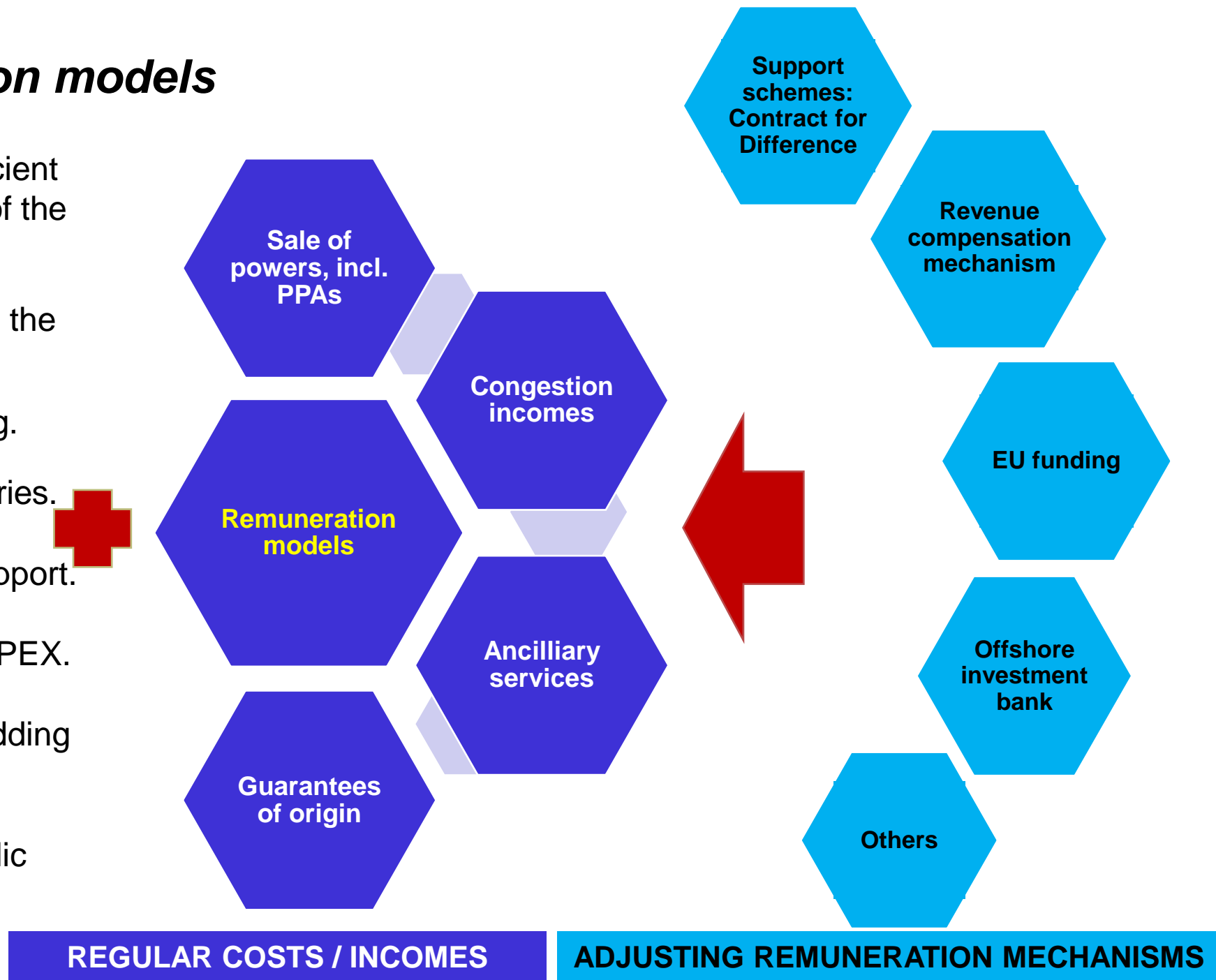
COST-BENEFIT ALLOCATION MODEL(S)



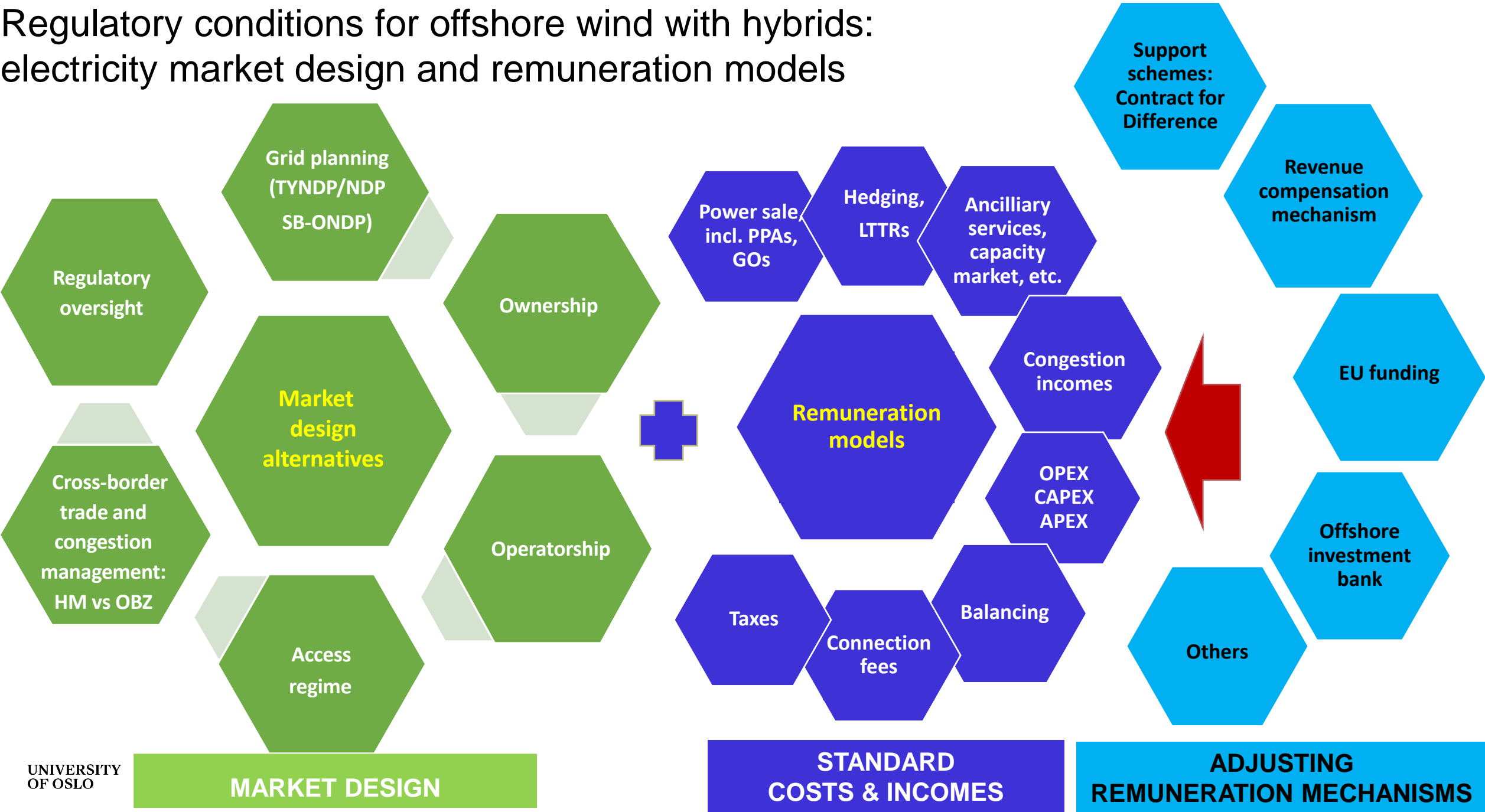
- ❑ Cross-border anticipatory grid investments. EC path: EMD reform (Art. 18 EI. Reg.) and EU Grid Action Plan / EU Grids Package. Tariff methodology, guiding principles.
- ❑ Grid stability, balancing power
- ❑ Operatorship of hybrids and role of TSO/ISO offshore, incl. market dispatch and balancing responsibilities.
- ❑ The creation of a dedicated offshore bidding zone (OBZ) to manage structural congestion for hybrids and ensure effective market mechanisms.
 - ❑ HM vs OBZ
 - ❑ Could be solved under today's legislation.
 - ❑ Probably not one big bidding zone per sea basin, but several ones, and based on congestion management.
- ❑ Challenge: GB outside EU market-coupling (as of now)
 - ❑ TSOs: EU and UK to address inefficiencies
 - ❑ Political issue between EU and UK re TCA

3. Costs benefit allocation models

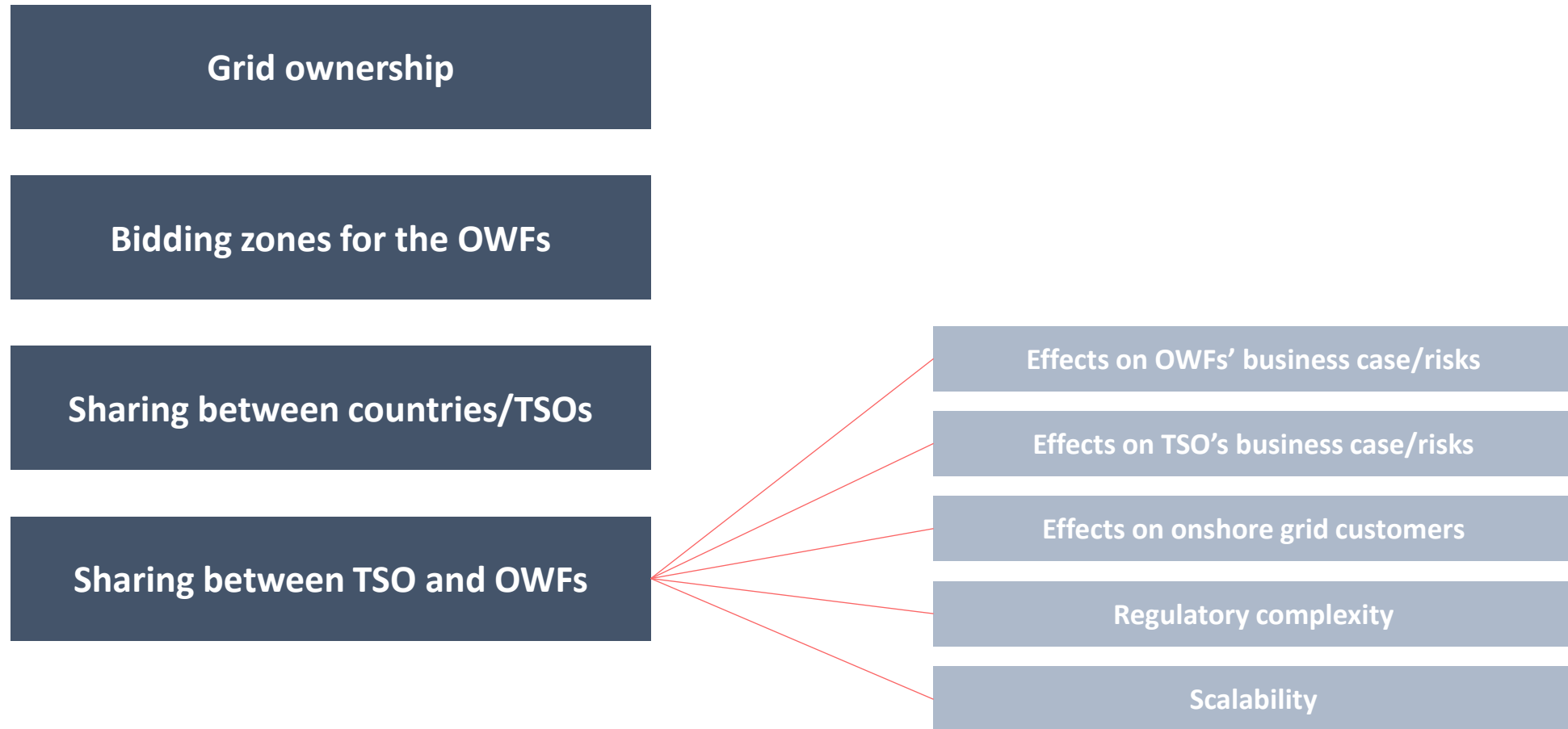
- ❑ Next question: how to ensure sufficient revenues to OWFs and fair share of the costs?
 - ❑ OW producers may get lower incomes with an OBZ than with the HM approach. Could be compensated.
 - ❑ Fairness for final customers (e.g. payment of connection fee).
 - ❑ Fairness for all benefiting countries.
- ❑ Transparent terms, not indirect support.
- ❑ High expenditures: CAPEX and OPEX.
- ❑ Volume risk specific to offshore bidding zones.
- ❑ **Mitigation instruments**, incl. public support.



Regulatory conditions for offshore wind with hybrids: electricity market design and remuneration models



What influences allocation of grid costs and revenues?



OWF = Offshore Wind Farm

4. Regulatory approach: gradual development of the regulatory regime and business model for offshore wind hybrid projects between Norway and Europe

- **Regulatory approach:**

- **a stepwise approach with gradual adjustment to the legislative framework and harmonisation when necessary.** European Commission's ORE Strategy: *'hybrid projects will form an intermediate step between smaller-scale national projects and a fully meshed, offshore energy system and grid'*.
- **Not all elements of the regulatory framework for hybrids at sea basin level can and will be clarified in the short term.** Waiting for the adoption for a fit-for-purpose regulatory framework and remuneration model for hybrids **should not be used as an excuse for not moving forward with hybrid projects.** Hybrid projects can develop under current legislation framework, but legal certainty needs to be provided through different instruments while pursuing efforts to work on better regulatory frameworks on the long term.
- **Preserve the interests of the early movers / first project developers.**

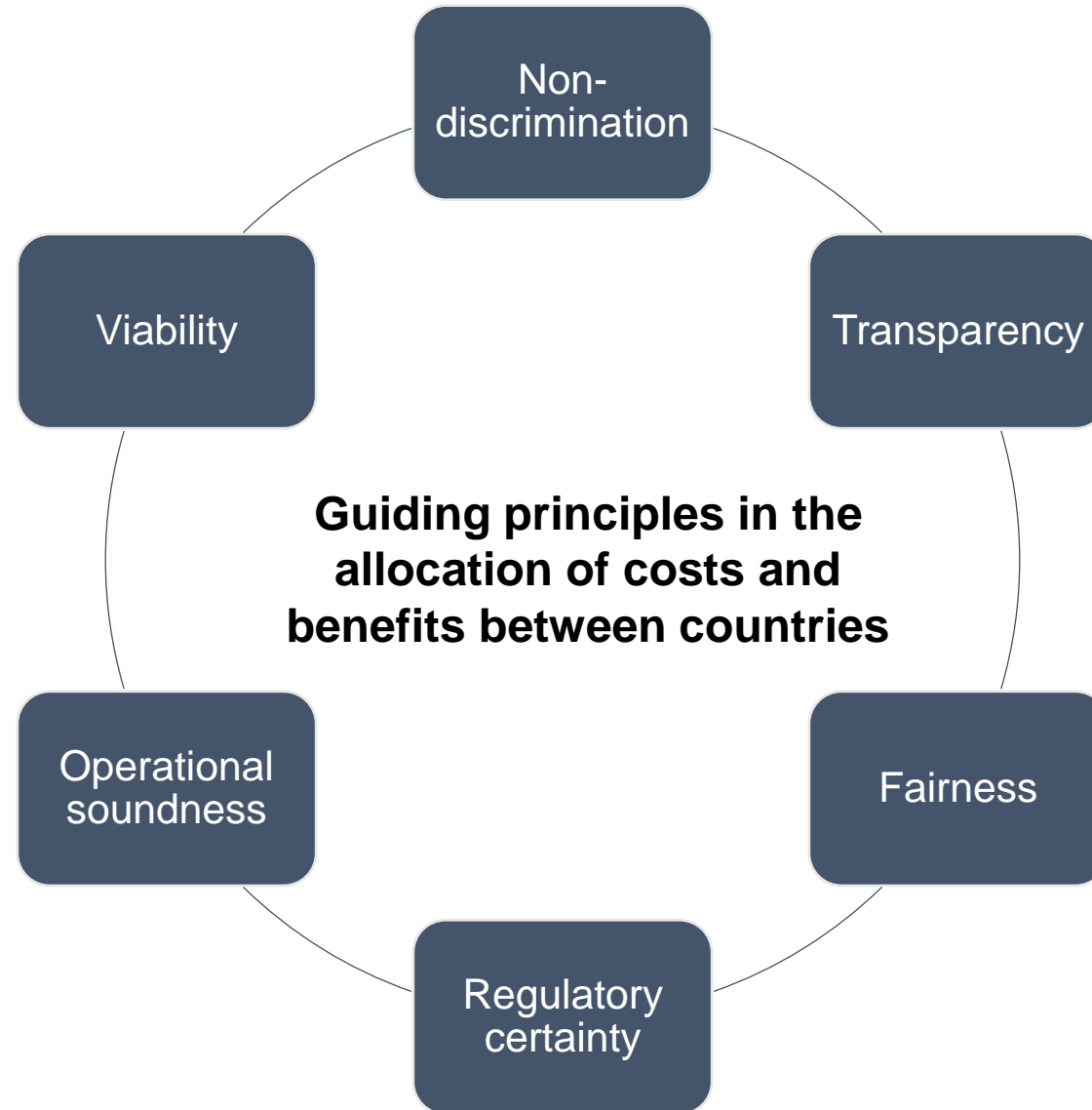


VI - Content of the regulatory roadmap

In this gradual development of the regulatory regime, several processes are identified.

These processes constitute the recommended **regulatory roadmap** to develop hybrid offshore wind project between Norway and Europe:





Regulatory roadmap for developing hybrid offshore wind projects between Norway and Europe



Regulatory approach to be favoured:

A gradual development of the regulatory regime and business model for hybrid offshore wind projects between Norway and Europe is recommended. It relies on a stepwise approach with gradual adjustment to the legislative framework and the adoption of harmonisation measures when necessary.

Not all elements of the regulatory framework for hybrids at sea basin level can and will be clarified in the short term. This should not prevent moving forward.

Hybrid projects can be developed under the current legislative framework.

However, legal certainty to be provided through different instruments while pursuing efforts to work on better regulatory frameworks in the long term.

Effects on ongoing projects of new harmonised legislation affecting the economic model of the hybrid projects must be carefully assessed.

Legal clarification is needed on:

Fundamental definition issues related to:

- Legal definition of hybrids and project scope
- Applicable jurisdiction over the different parts of a hybrid project

Degree of regulatory alignment with key EU requirements:

- Grid planning, permitting, financing for cross-border infrastructures
- Electricity market design rules

Choice of market design alternatives within the common framework chosen:

- Grid & system planning
- Ownership
- Operatorship
- Access regime
- Cross-border trade & congestion management (HM/OBZ)
- Regulatory oversight

Agreement on remuneration models:

- At project level
- Between states

Legal clarification can be provided by:

- Legal definition: legislation, agreement between TSOs
- Jurisdiction: international maritime boundary delimitation treaties, bilateral/regional agreements (project-specific or energy wide), soft law/MoUs

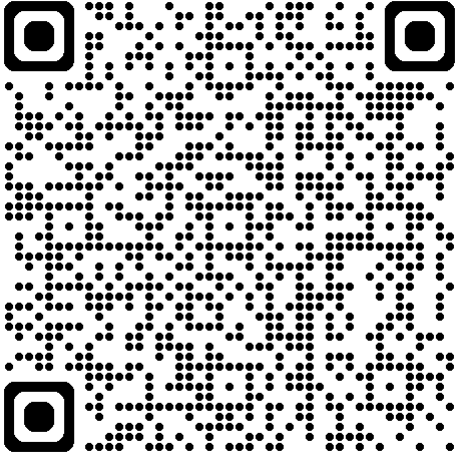
Regulatory alignment: incorporation into the EEA Agreement, bilateral agreement or soft law guidelines. Legally binding solutions to be favoured.

Market design alternatives: legally binding solutions, by legislative amendments (law and implementing legislation)

- Project: legislation, project specific multiparty agreements, connection agreements, project specific CBCA decisions
- States: EU/EEA legislation, targeted bilateral/regional agreement per sea basin, infrastructure agreement, EC guidance



Access the full report here:



[Regulatory Roadmap for developing hybrid offshore wind projects between Norway and Europe – oceangridproject.no](https://oceangridproject.no)



Thank you for your attention!

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