PROMOTioN
PROGRESS ON MESHED HVDC OFFSHORE TRANSMISSION NETWORKS

Economic Framework for a Meshed Offshore Grid

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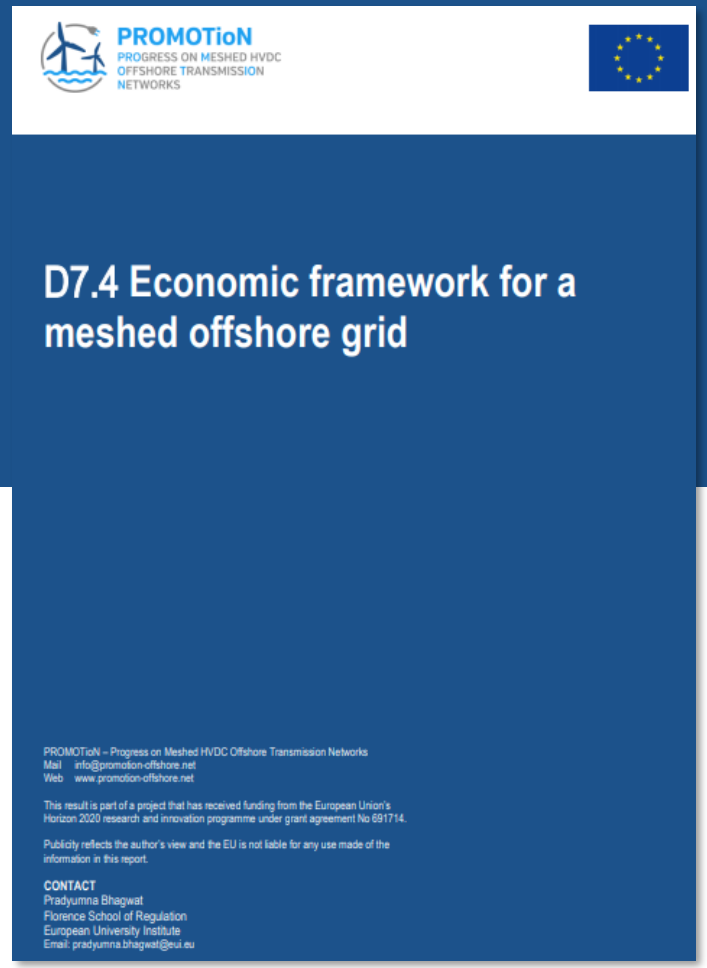
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691714.

CONTENTS

- Research Overview
- Detailed discussion



Report link: https://www.promotion-offshore.net/fileadmin/PDFs/D7.4_Economic_framework_for_a_meshed_offshore_grid.pdf

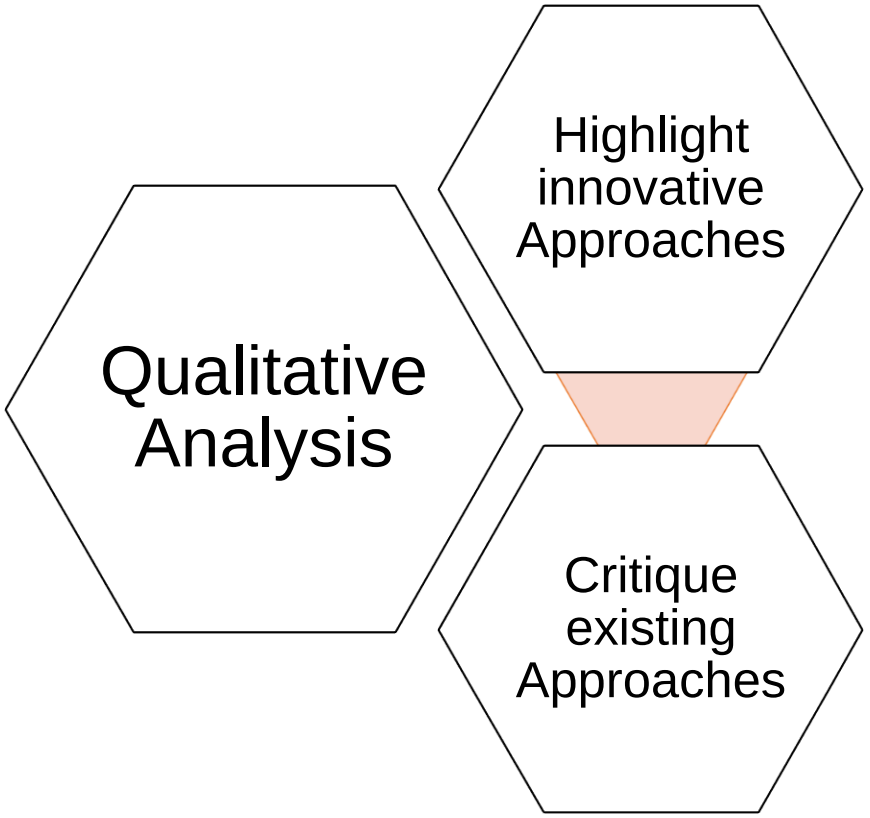
RESEARCH OVERVIEW

The research process

FRAME

- Planning
- Investment
- Operations

METHOD



OUTCOME

- Conclusions
- Recommendations

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REASEARCH OVERVIEW

Topics treated in WP7.2

Economic framework for offshore grid

Planning	Investment	Operation

CBA Analysis	Onshore - Offshore coordination	Public participation	RES cooperation mechanisms	Transmission Tariffs	Incentives	CBCA	Balancing mechanism

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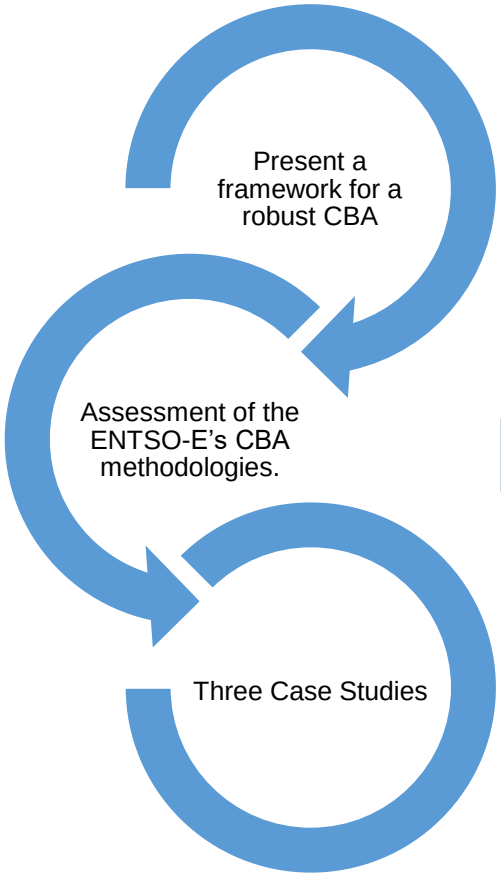
Cost benefit analysis for offshore electricity grid infrastructure



Recommendation I

- *Dealing with interactions between (offshore) PCIs*

Recommendation II

- *Gain trust and public acceptance*

Recommendation III

- *Reduce the politics in valuation of (offshore) PCIs*

WP7.6: CBA methodology for a MOG

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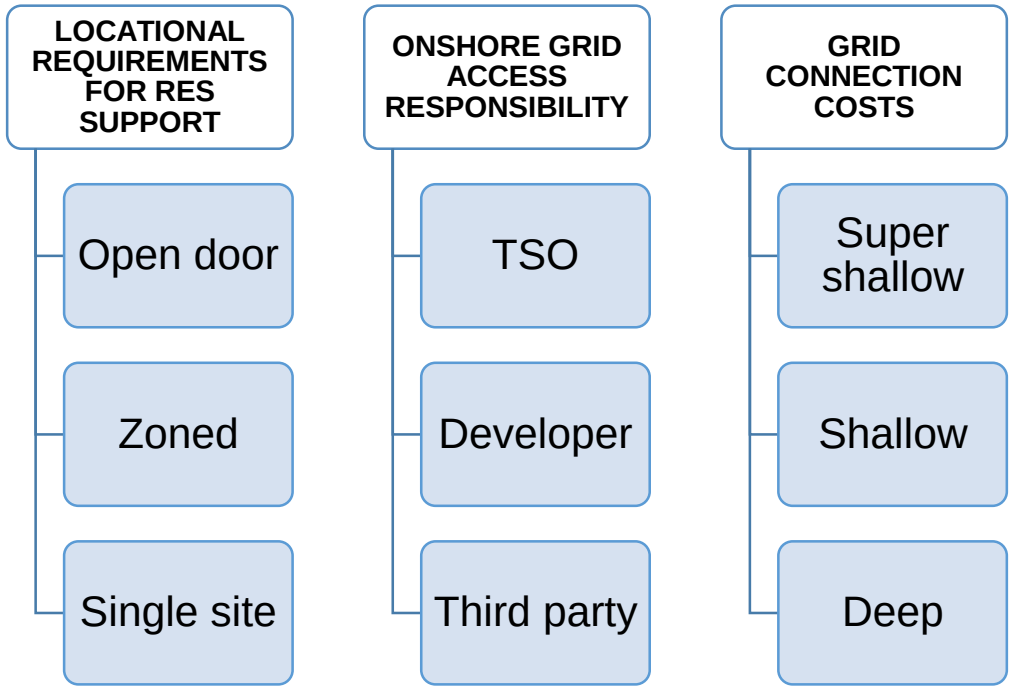
COORDINATING ONSHORE-OFFSHORE GRID PLANNING

Recent policy iteration

Leading example of regulation

Unique regulatory framework

Limited offshore development



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PUBLIC PARTICIPATION IN OFFSHORE WIND INFRASTRUCTURE DEVELOPMENT

Understanding Public Perception

Understanding Public Participation

Case studies

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COOPERATION MECHANISMS FOR RENEWABLE SUPPORT

What are renewable support schemes?

- Price or Quantity based
- National Renewable Support Schemes around the North Sea
- Evolution of renewable support schemes around the North Sea

What are cooperation mechanisms discussed in Directive 2009/28/EC?

- Statistical Transfers
- Joint Projects
- Joint Support Schemes

Case studies on use of cooperation mechanisms

- Case Study A: Germany-Denmark joint PV auction
- Case Study B: Sweden/Norway Joint Support Scheme

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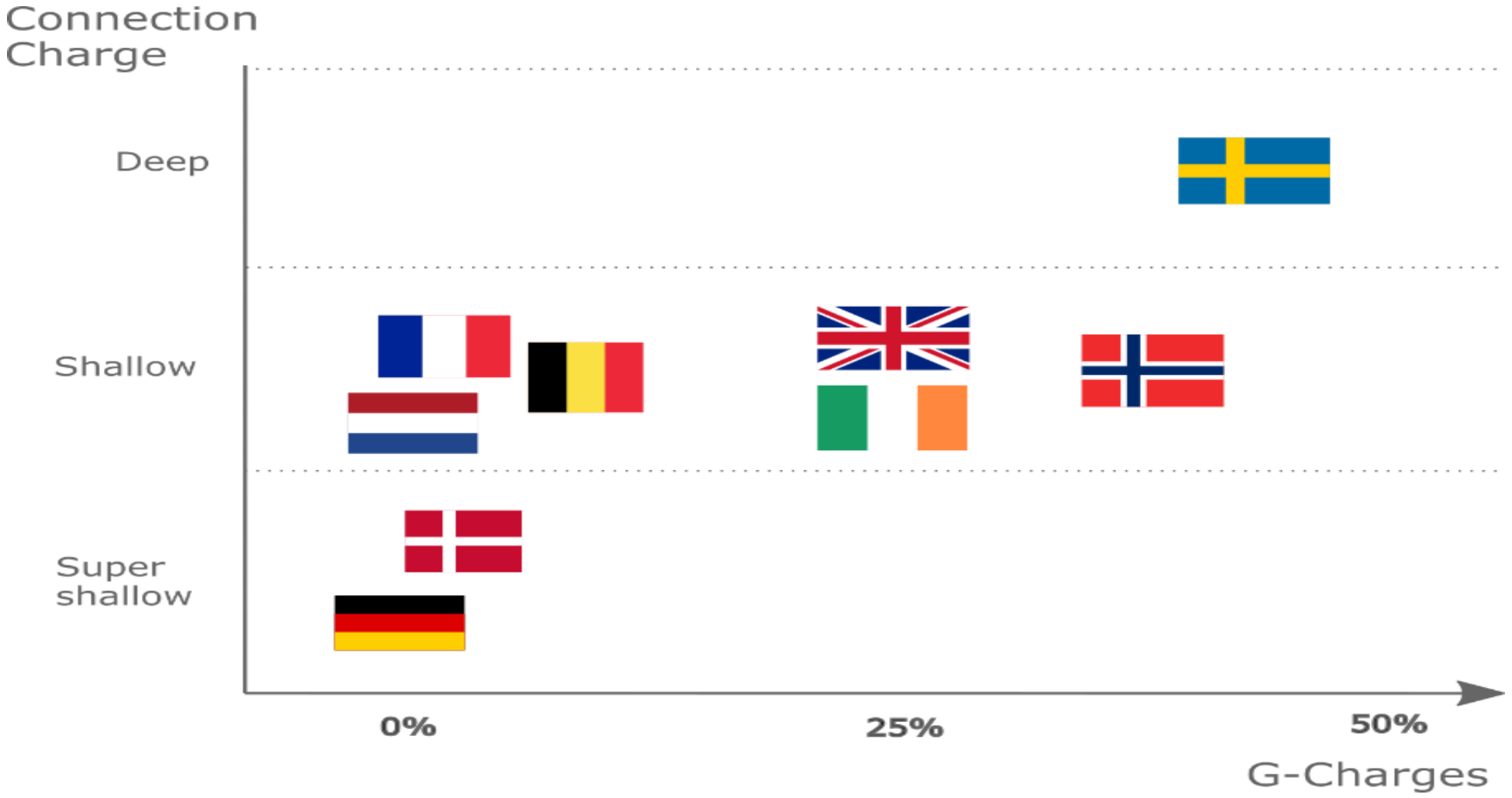
Transmission Tariff Design



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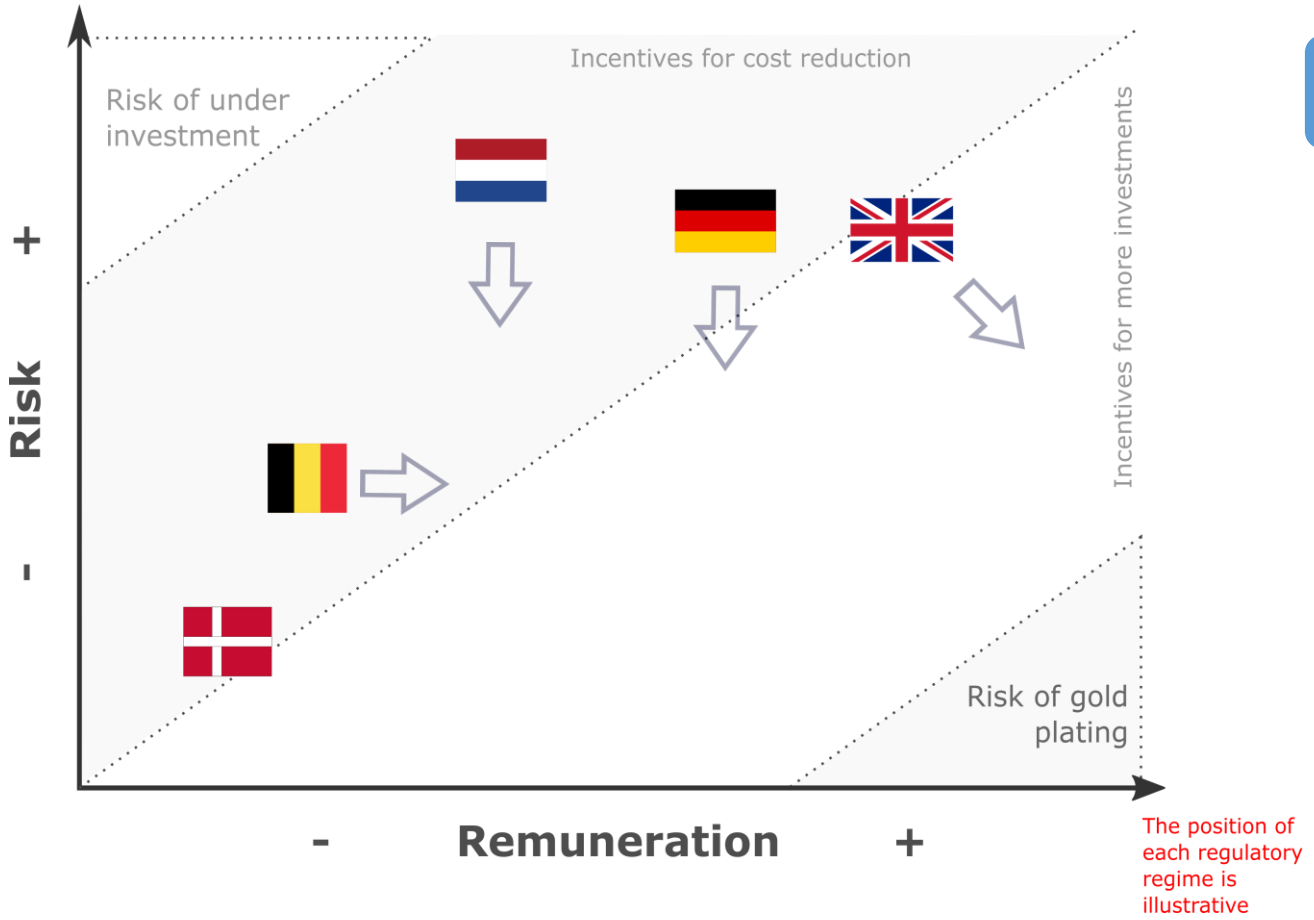
INVESTMENT - III

Dedicated Incentives



Conclusions

- *Default regulatory frameworks have not moved towards the investment zone*
- *The use of dedicated incentives has increased as a way of fostering strategic investments*
- *Dedicated incentives can be a solution to ensure sufficient incentives for development of meshed offshore grids*

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Why CBCA?

TEN – E Regulation

- *"This Regulation lays down guidelines for the timely development and interoperability of priority corridors and areas of trans-European energy infrastructure set out in Annex I ('energy infrastructure priority corridors and areas')"*
- *"The efficiently incurred investment costs, which excludes maintenance costs, related to a project of common interest falling under the categories set out in Annex II.1(a), (b) and (d) and Annex II.2 shall be borne by the relevant TSO or the project promoters of the transmission infrastructure of the Member States to which the project provides a net positive impact,.."*
- *"The basis for the discussion on the appropriate allocation of costs should be the analysis of the costs and benefits of an infrastructure project on the basis of a harmonised methodology for energy-system-wide analysis,…"*

MOG Context

- The MOG would be a project involving several actors and borders
- In such multi-jurisdictional projects CBCA would be critical.
- Offshore interconnectors can be considered as an early step in the evolution of a MOG

Research Scope

- Offshore interconnector CBCA case studies – Biscay bay, cobracable, EWIC
- Development of meshed offshore grids

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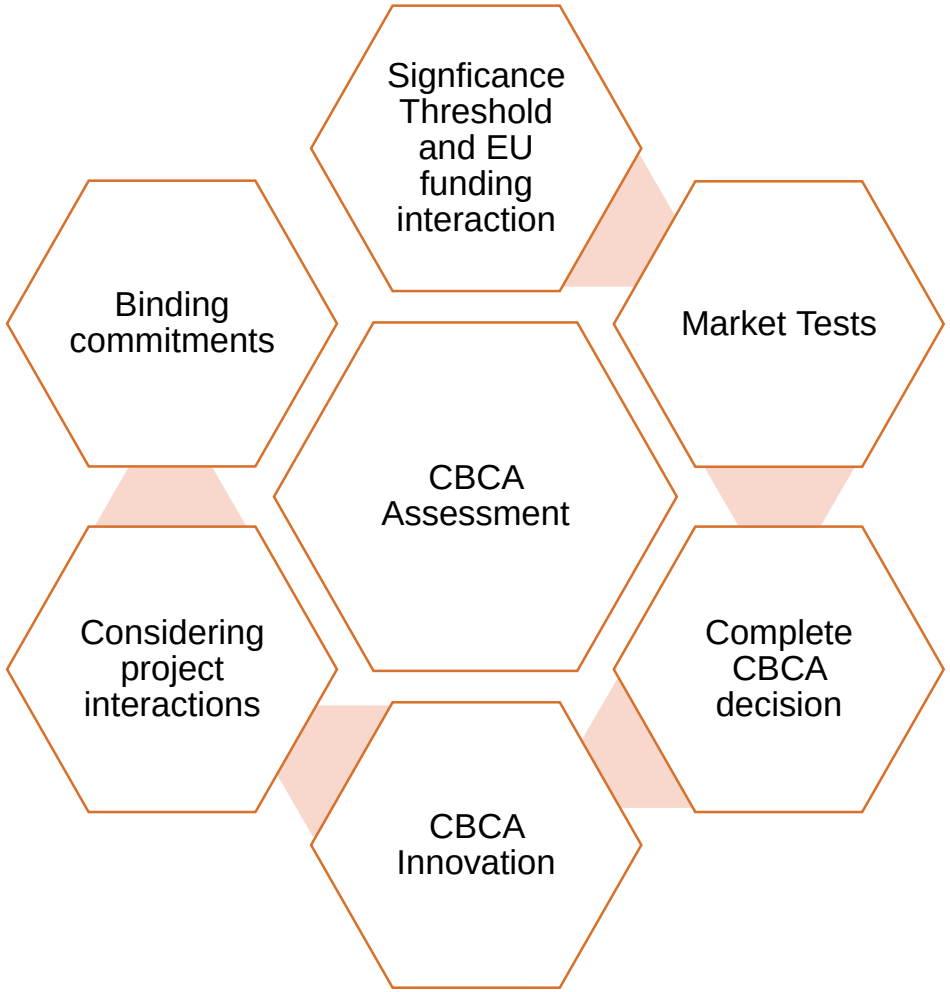
Analytical Framework & Key insights



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Comparative Analysis

	Biscay Gulf	COBRACable	EWIC
Use of significance threshold for CEF	Not explicitly	EEPR grant was provided for reasons of Innovation	No – CBA only considered Ireland
Market tests	No	No	No
Binding contract	No	No	N/A - 100% by EirGrid
Considering project interactions	ENTSO-E CBA has been used	Impact on congestion revenues at other interconnections is considered in CBA	Interactions were not considered in the business case
CBCA Innovation	Some degree innovation used to ensure positive French NPV.	No – 50/50 with EEPR grant	No (Pre-TEN-E regulation)
Complete CBCA Decisions	No – CEF grant	No - EEPR grant	No - EEPR grant.

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Key insights

Formalize the CBCA as a binding contract between the involved parties with specification of non-compliance penalties

A common CBCA for a group of projects within the MOG could be a key enabler for their development (Coordinate CBCA decisions for complementary projects).

In multi-country projects such as the MOG, the significance threshold may become a barrier in allocating costs and reaching a complete CBCA.

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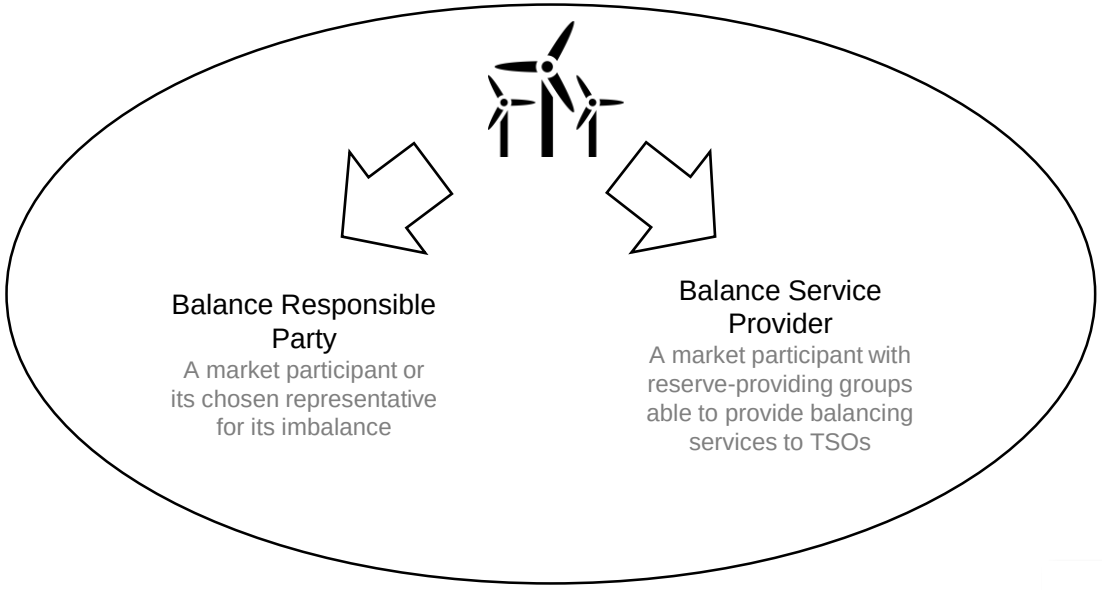
Three perspectives to balancing mechanisms



Article 4

Balance responsibility

1. All market participants ▌ shall be ▌ responsible for ***the*** imbalances they cause in the system. ***To that end, the market participants*** shall either be balance responsible parties or ***contractually*** delegate their responsibility to a balance responsible party of their choice. ***Each balance responsible party shall be financially responsible for its imbalances and strive to be balanced or help the power system to be balanced.***

COMMISSION REGULATION (EU) 2017/2195
of 23 November 2017
establishing a guideline on electricity balancing
(Text with EEA relevance)

Article 17

Role of balance responsible parties

1. In real time, each balance responsible party shall strive to be balanced or help the power system to be balanced. The detailed requirements concerning this obligation shall be defined in the proposal for terms and conditions related to balancing set up pursuant to Article 18.

2. Each balance responsible party shall be financially responsible for the imbalances to be settled with the connecting TSO.

3. Prior to the intraday cross-zonal gate closure time, each balance responsible party may change the schedules required to calculate its position pursuant to Article 54. TSOs applying a central dispatching model may establish specific conditions and rules for changing the schedules of a balance responsible party in the terms and conditions related to balancing set up pursuant to Article 18.

4. After the intraday cross-zonal gate closure time, each balance responsible party may change the internal commercial schedules required to calculate its position pursuant to Article 54 in accordance with the rules set out in the terms and conditions related to balancing set up pursuant to Article 18.

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Six dimensions of balancing mechanisms

Dimensions	Description
Imbalance settlement rule	A financial settlement mechanism for charging or paying BRPs for their imbalances - Single pricing mechanism - Dual pricing mechanism
Imbalance settlement period	The time unit for which BRPs' imbalance is calculated
Product and service definition	- Minimum bid size - Contract period - Product symmetry - Time-lag
Scarcity pricing	Settlement mechanism to reflect reservation cost when the available reserves are scarce
Intraday market	Market for adjusting positions with respect to day-ahead market
Integrating balancing markets	- Lower balancing volume due to risk pooling - Improve Allocative efficiency - Enhance competition - Standardisation of product definitions

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Assessment

Dimensions	Perspectives		
	SYSTEM	**OWF BSP**	**OWF BRP**
Settlement rule	Single pricing	Single pricing	Single pricing
Imbalance settlement period	Short	Short	Long
Product and service definitions	Costs and benefits of removing entry barriers need to be assessed.	Following rules are desirable to reduce entry barriers: - Smaller bid sizes - Smaller contract period, - Close to real-time gate closure	Indirectly affected
Scarcity pricing	Desirable (lower costs)	Desirable (Incentive to participate)	Undesirable (Risk of price spikes, but benefit if costs reduce)
Intraday market	Desirable (lower costs)	Desirable (Another trading opportunity)	Desirable (Lower costs)
Integrating balancing markets	Desirable (lower cost)	Desirable (Greater market liquidity)	Desirable (Lower costs)

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Assessment Results

- **Imbalance settlement rule:** a single price rule is the desirable solution from all perspectives. This view is also supported by the EB GL.

- **Imbalance settlement period:** A convergence to an ISP of 15 mins is foreseen and supported by the EB-GL with possibility of temporary exemption. A conflict between the user and service provider perspective occurs.

- **Product and service definition:** Smaller bid sizes and contract periods, gate closure as close to real time as possible and asymmetric balancing products are desirable for OWF.

- **Scarcity pricing:** System cost may reduce possible greater competition. BSPs too would benefit from better valuation of their services. For BRPs, scarcity pricing may add risk from possible price spikes.

- **Intraday market:** a well functioning liquid intraday market with gate-closure as close to real time as possible would be beneficial from all three perspectives.

- **Integrating balancing market:** greater integration is desirable. However, current market designs need to evolve further to effectively realise benefits from the integration and also from intraday markets.

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Thank You!

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APPENDIX

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