

I. Aims of the meeting

The internal workshop of Policy & Regulation aimed to:

- 1) Establish the status quo of the Inventory. The inventory serves as detailed guideline for the collection of information on the policy and regulatory framework for offshore wind and transmission infrastructure, notably interconnectors. The inventory will be completed for each Member State around the Baltic Sea region, with those countries represented by partners in 3.1 offering more detail and insights than those that are not represented.
- 2) Achieve a deeper understanding of the different skill sets and national contexts represented in the 3.1 Partnership
- 3) Create a common basis of understanding for the partners in 3.1 on general state of OWE and interconnecting infrastructure in the region by looking at each country's policy and outlook.
- 4) Gather thoughts on the Analytical Methodology to be deployed which will start once the inventory is completed in March 2017, running for 1 year. Comparative perspective, case studies, country pairings?

II. Shaping the Analytical Methodology (Phase 2) are the following factors:

The meeting narrowed down the possible approach for the Analytical Phase by establishing the several factors that must be considered:

a. **Disciplinary** expertise of the 3.1 Partnership:

When thinking about the structure and focus of the Analytical Phase of 3.1 (start: March 2017), it is important to remember the partners in 3.1 have different disciplinary backgrounds:

- ▶ 4 partners are **lawyers**/have a strong legal background:

Institution	Represented by
Aalto University	Kanerva Sunila
Aarhus University	Birgitte Egelund Olsen
IKEM	Francesca Klein
University of Tartu	Hannes Veinla

- ▶ 2 partners have an **economic / regulatory** / market background:

Institution	Represented by
IKEM	Ralf Ott Daniel Weber
Stiftung Offshore Windenergie	Andreas Wagner Thilo Krupp
Danish Technical University	Lise-Lotte Pade Claire Bergaentzlé followed by map

3.1 Overview

b. National expertise of the 3.1 Partnership:

Germany

- Legal perspective (IKEM)
- Economic/regulatory perspective (SOW)

Denmark


- Legal perspective: Acceptance issues (Aarhus)
- Economic regulatory perspective (DTU)

Finland

- Legal perspective (Aalto)

Estonia

- Legal perspective (Tartu)

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- 3.1 National partner (+ legal expertise)
 - - - Country involved in WP4
 - - - WP4 proposed connection
 - 3.1 National partner
 - No national partner for 3.1

c. Working Package 4

The research in 3.1 should align itself with / consider the case studies offered by WP4. This means focusing on the following two country connections:

- An OWF-interconnector between **Poland and Sweden**
- An OWF-interconnector between **Germany and Sweden**

Since Sweden and Poland are not represented in the 3.1 partnership, aligning the legal and regulatory research with these countries will be complicated. This factor must be considered when selecting the final focus for the analytical phase at the next meeting in early 2017.

III. Input to the Analytical Methodology: New Institutional Economics

1) Abstract Analysis

Daniel Weber and Ralf Ott from IKEM along with Johannes Heurich from the Technical University in Berlin presented an analysis approach following the method of New Institutional Economics. Their presentation was titled “Challenges of a coordinated offshore wind energy deployment in the Baltic Sea and resulting research questions” and touched on the following aspects:

a. Methodology and System of Objectives

- Analytical approach: New Institutional Economics
- Looking at problems regarding incentives, monitoring and commitments
- Taking into account the characteristics of transactions, actors and markets as well as the institutional framework
- Design suitable organizational models
- Steps: “Green field”, real conditions, feasibility
- Objectives: effectiveness, GHG reduction, security of supply, (Cost) efficiency, consumer, welfare, european/national?
- Development of a meshed grid = not an objective; may be a measure in order to achieve the objectives

b. Planning and Financing of Offshore Wind Parks (OWP)

- Electricity generation is highly dependent from the energy source and the site / location
- High uncertainty on generated electricity in a certain period
- Location has to be suitable for OWP: logistics, grid connection, surface / subsurface, environmental issues, tourism, fishery etc.
- High specificity of investments in OWP (very high costs for project development, barely any second-use-options)
- Capital costs (investment cost) have a high share of the total costs
- Barely any marginal costs during operation
- Suitability of regulation / standardized contracts (+)
- Output of OWP can be contracted quite good (“contractibility”)
- Very high influence of uncertainty on cost efficiency (costs of capital) due to high share of capital costs, low marginal costs and future electricity prices
- Regulation beneficial in order to reduce costs:
How to select OWP and what type of remuneration / refinancing mechanism? Depending on actors, their resources and the OWP process

- Actors: Developers, Sponsors, investors, Regulating bodies, OWP Suppliers (turbines, cables...), Banks, TSOs, Grid suppliers
- Resources of Actors: Know-how (Technology, Project development), Capital availability, access to capital, Suitable locations, System of objectives; Which actor to develop, build, and operate OWP?; How to determine actor?
- Designing capacity instruments:
 - Refinancing options for the provision of OWP capacity: Energy-only market or capacity instruments
 - Options to design capacity instruments
 - Basis for refinancing: kW or kWh
 - Duration of refinancing: period of time or amount of energy
 - Risk distribution between OWP investor and regulator (Inclusion of risks associated with market prices; No inclusion: fully cost-covering (FIT); Inclusion: sliding-premium, fixed market premium; Inclusion of risks associated with volume (electricity generated, electricity demand)
- Determination of support level: administrative or bidding process
- Criteria for suitability: Volume and specificity of OWP investments (in different project stages); Contractibility; Uncertainty regarding electricity prices and electricity demand; Scarcity of suitable locations; Diffusion of know-how (e.g. regarding technology, wind assessment)
- Preliminary Results: capacity instruments allocating only risks to investors which investors can influence; Due to specificity: predevelopment by regulatory bodies beneficial; What happens when two or more countries and/or their consumers refinance investments distributional effects?

c. Planning and Financing (Regulation) of a (meshed) Grid

- Sector characteristics:
 - Regular AC or DC interconnectors are an established technology for which knowledge is spread widely among transmission network operators, consultants and others
 - Connecting wind farms with AC technology is somewhat established
 - Connecting wind farms with DC technology is still rather difficult

- Combining DC power lines to a grid is likely possible, however there are high technological risks associated with it. Doing it offshore makes matters likely even more difficult / risky
- Small number of manufacturers / suppliers for AC/DC offshore cables and offshore transformer platforms
- In particular knowledge about offshore DC connections mainly at manufacturers
- In case of meshed DC grids potential manufacturers would be the only actors (maybe only one actor) with knowledge about the technology
- Managing knowledge and standardization are important areas to be considered
- For a potential regulator it would be difficult to acquire the knowledge to adequately regulate the grid provider

- Important areas for Analysis
 - Risk allocation between service providers and consumer (Risk sharing mechanisms)
 - (Un)bundling of different tasks / responsibilities
 - Determining the remuneration of the service provider (Input oriented/Output oriented approach)
- Idealistic Approaches
 - Incentive regulation (high risk transferred to service provider + bundling + output oriented remuneration determination)
 - Monitoring / cost-oriented regulation (relatively low risk transferred + bundling + oriented remuneration determination)
- Organizational issues: responsibility for interconnector construction; Bilateral negotiations between countries / TSOs; role of EU entities; interconnection obligation; distribution of congestion rent and of risks and investment costs; inconsistency in regulatory regimes

d. Challenges of International Cooperation and Multilateral Contracts regarding Offshore Wind Projects

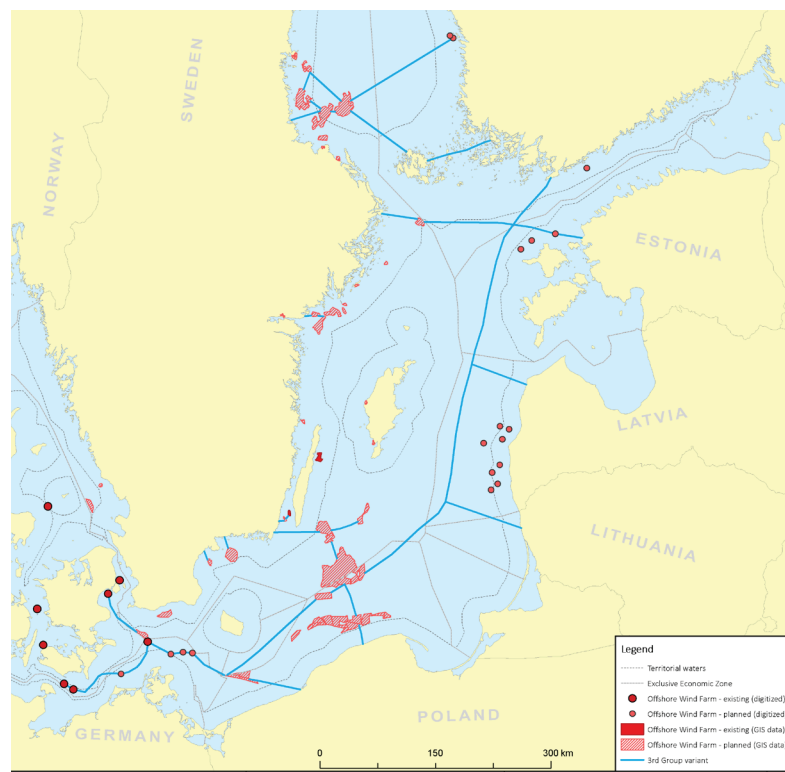
- High transaction costs: Distributional effect / Division of costs and benefits of a meshed offshore grid
 - Division of investment costs
 - Effects on the dispatch of power plants

- Creation of jobs and fiscal revenues
- Negative external effects (e.g. on national fishing industry or tourism)
- Costs of a (domestic) grid expansion
- Effects on security of supply
- Problems of contractibility: Influencing factors on distributional effects and incomplete contracts
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- Changes in the technical system (e.g. [de]commissioning of power plants)
- Changes in the institutional framework (e.g. raise of emission taxes)
- Further external shocks (price changes for fossil fuels)
- Radial and "local coordination": Dispatch related distributional effects are easier to predict
- "international coordination": distributional effects are determined by the price differences of both states
- The case of a meshed grid = more complicated and the contractibility is lower
- bi- or multilateral contracts will always be incomplete which leads to opportunistic behavior

Conclusion:

Baltic Backbone would have high transaction costs; Inevitable to accept that distributional effects can neither be predicted nor fully compensated. Recommended to start with selection of (single) interconnection projects between two states.

Baltic Backbone concept from DE to FI (designed in Gdansk) and aligned with 50 Hertz idea 'string of pearls'



2) Brainstorming: Gathering Ideas

Participants were asked to brainstorm on the analysis objectives, objects, and approach.

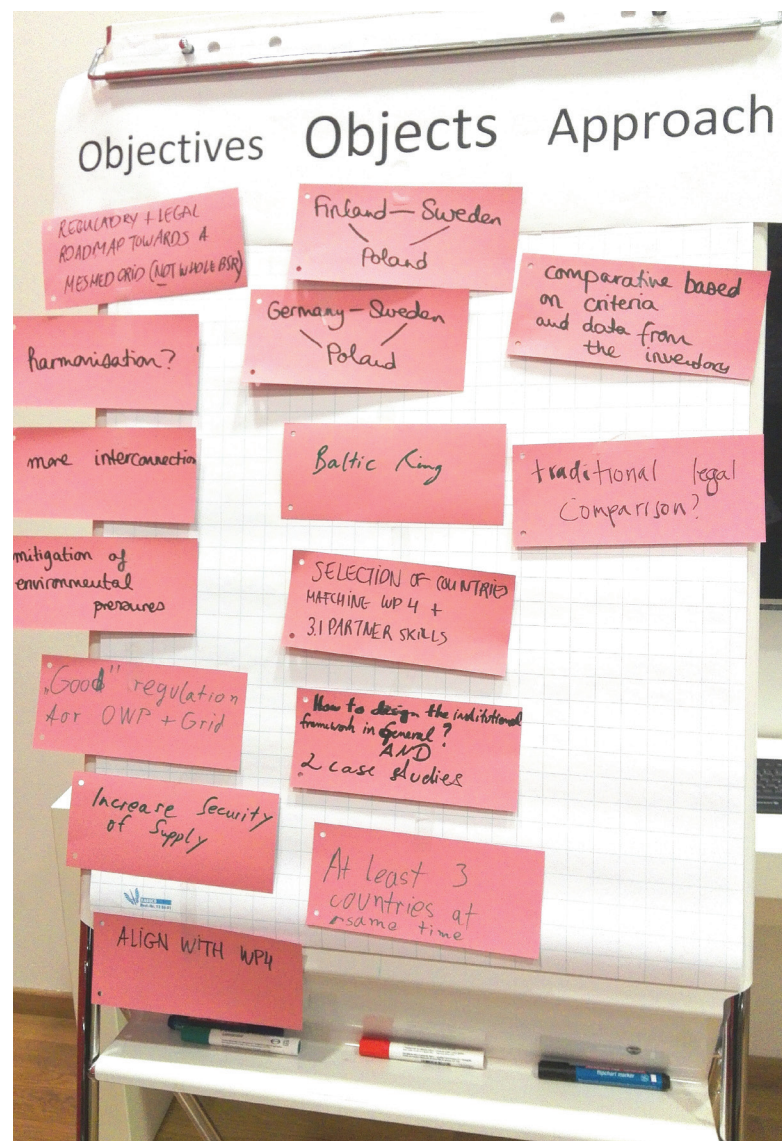
The following thoughts on how we could proceed in the analysis phase were brought up:

- ▶ Aligning the analysis objects with those of the prefeasibility study of WP4
- ▶ Using the objects and objectives from the TYNDP and BEMIP Action Plan
- ▶ Splitting the analysis into an economic and a legal part. The economic analysis would be based on the New Institutional Economics approach, whereas the legal analysis would follow a descriptive and comparative approach.
- ▶ Splitting the abstract analysis into a generation (which Daniel and Ralf could work on) and a transmission part (which possibly the DTU could work on).

The Transmission part could address the following:

- Which regulatory regime is suitable to regulate offshore power lines / offshore grids? Common regulatory regimes are incentive regulation and monitoring / rate-of-return regulation. There are also other possibilities to finance the provision of power lines: e.g. bundling the investment in offshore wind parks and power lines.
- Determination of the remuneration level and risk allocation: Should the risk be transferred to the network provider in order to incentivize costs reductions? How are grid fees / the remuneration level determined?
- Quality of service: How does the regulatory regime ensure that the quality of service meets the requirements (e.g. availability)?
- Extent of monitoring: Which activities should be more closely monitored by the regulator? (e.g. only the location of new lines or even the used components?)

- Interconnectors / interconnected offshore grids: Organizational questions and distributional issues between different countries and actors.
- Who is planning / responsible for decisions concerning the construction of new interconnectors? (Bilateral negotiations between countries / TSOs? European institutions [e.g. ENTSO-E or European Commission] supporting the construction of new interconnectors? Can grid operators be forced to construct new interconnectors?)
- How is the congestion rent distributed between countries / TSOs? (cf. Regulation 714/2009 and other relevant sources)
- How are the risks and investment costs distributed between the involved parties?
- Are there problems arising from different (inconsistent) regulatory regimes in different countries during planning and operation?



IV. Input from Baltic InteGrid target groups

Stakeholder consultations

► 50Hertz: Jonas Kraeusel



Regional interconnectors increasing in importance in the light of the energy transition.

About wind energy:

Wind integration requires grid expansion on national and international level. Drivers for interconnectors are:

- RES integration
- welfare gains
- avoidance of redispatch and curtailment of RES in-feed
- fostering of the European Internal Electricity Market (15% interconnector capacity for each country)
- security of supply

About interconnectors:

- Interconnectors to regions with sufficient storage capacities may play an important role for systems with high shares of fluctuating RES generation.
- Comparison of spot price levels (yearly average of spot prices) between two markets has been a good indicator for promising interconnector projects and trigger investment.
- Other drivers such as energy trade in shorter time frames (hours and shorter), use of interconnectors for balancing purposes, the consideration of interconnectors for cross-border capacity markets and security of supply are likely to gain importance.

About Kriegers Flak CGS:

- The importance of CGS for system adequacy rises, impact of volatility will relatively become more important than an annual average price level.
- Simulated flows indicate that trade from Germany to Denmark will decrease slightly in the longer run
- Market simulations for CGS show:
 - German market prices increasingly influenced by offshore wind production
 - Higher impact of wind production in neighbouring areas makes spot prices converge in DK and DE which slightly decreases price spreads
- Connecting Germany and Sweden via the Hansa Power Bridge:
 - Volatility of hourly price differences makes Hansa PowerBridge a profitable project although the annual average price difference is low.
 - Interconnection potential between Germany and Scandinavia not yet fully exploited
 - World Energy Council (2012) study showed potential of 7 to 12 GW of additional interconnections between Germany and Nordic countries.

New "storage links" under development

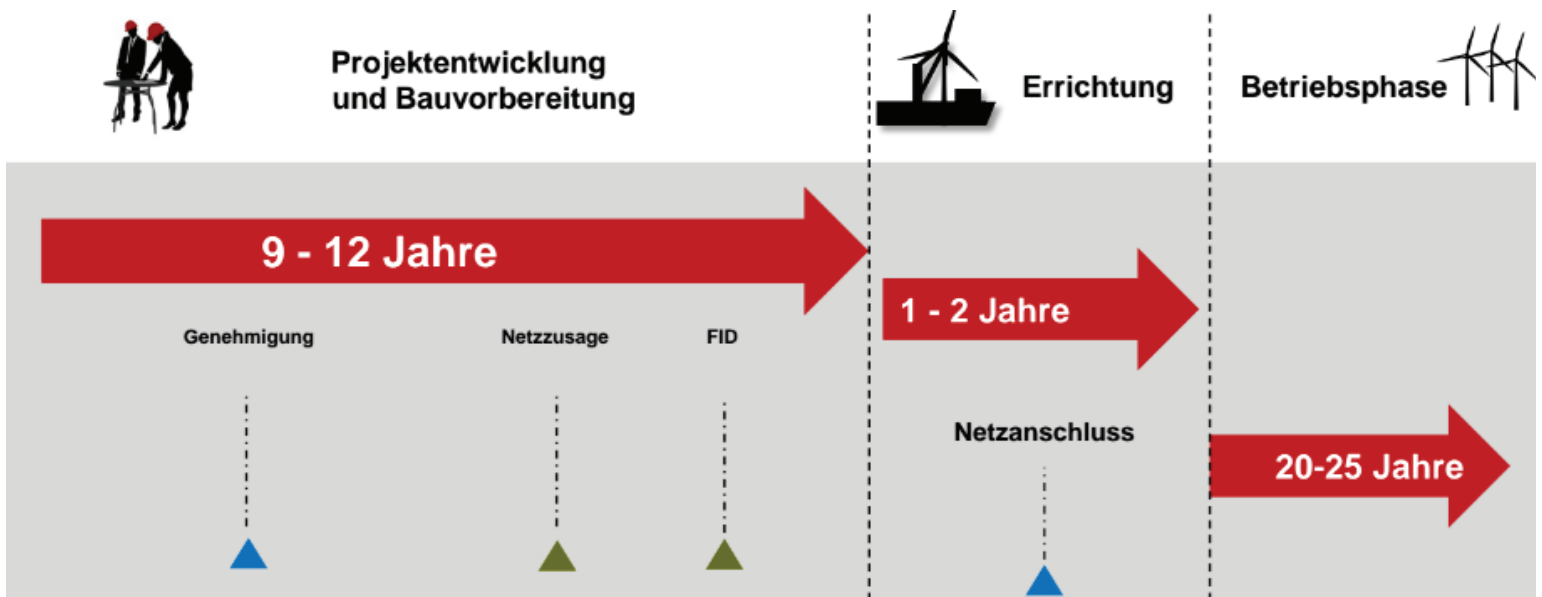


► DONG Energy: Lasse Sundahl

Internalizing positive externalities and paying it forward: The need for incentives to develop a Meshed Grid

DONG Energy's Lasse Sundahl voiced the need for correct pricing of externalities, whether they are negative like carbon pricing, or positive, like the positive socio-economic benefits a meshed offshore grid entails. Since the latter offers long term socio-economic benefits but requires an initially higher upfront investment, it is crucial that the benefits are translated or monetized into incentives/compensation to the investor of meshed offshore grids (TSO or project developer like DONG).

The OWE market is already complex, involving lengthy planning and development processes, and reducing complexity is key to the continuous attracting of investments. In the current context, without an adequate compensation scheme in place, a meshed offshore grid increases complexity for developers and investors, thereby increasing risk and decreasing the attractiveness of financial investments. The economic and societal benefits of a meshed offshore grid must be moved forward, and allocated to investors as an incentive. *Without this transfer of benefits it will be difficult to imagine how a meshed offshore grid can developed.* The internalization of positive externalities could be in the form of, for instance, a meshed grid top-up bonus.



► Groningen Centre for Energy Law: Ceciel Niewenhout

The PROMOTion project investigates the benefits of meshed offshore transmission grids to the European electricity market. Their regulatory work will:

- Develop recommendations for a coherent EU and national regulatory framework regarding DC offshore grids
- Develop recommendations for financing mechanisms for offshore grid infrastructure deployment

The issue of incentives was raised: Will a national support scheme for renewable electricity also apply to an offshore wind farm located outside the national EEZ when directly connected to the national grid via a meshed offshore grid? What will come first, a pilot project or an adequate regulatory system including several countries? A pilot project may be good place to start, highlighting the realistic potential of a meshed grid and attracting the necessary research and political attention to further the regulatory framework's development.

The application of competence (EU or national), highly dependent on the location of the offshore wind farms and the hubs, is one of the questions that will be answered in the research on proposals for a regulatory and financial framework. PROMOTION will outline the latter and thereby support coordinated planning, construction and operation of integrated offshore infrastructures. The project will, among others, produce an offshore grid deployment plan (roadmap) for the future offshore grid system in Europe in which regulation and legal questions will be considered as well.

The Baltic InteGrid will connect with CECIAL regularly to share information and learn from each others approach.

V. Key messages and next steps

- Inventory on transmission finishes end November
- Inventory on generation begins 1 December and ends end of February 2017
- Analytical phase starts March 2017 and ends March 2018, methodology in progress.

The 3.1 partners identified several options for the Analytical methodology:

- 1) Comparative approach region wide, narrowing focus to WP4 country pairings, or
- 2) Building on BEMIP and/or TYNDP plans for interconnecting the region, coupling to OWE plans and check regulatory compatability, or
- 3) Further conducting the Abstract Analysis with the Transmission part supported by the DTU. In a next step, legal case studies could build upon it or connect to it, or
- 4) Integrating the financial incentive issue raised by DONG energy into research and recommendations, or
- 5) Conducting economic/regulatory analysis on a number of countries (possibly WP4 countries) to ascertain compatibility, conflict and road ahead, in close collaboration with Abstract Analysis. Specific legal studies on country pairings or issues like acceptance will be produced parallel.
or a combination of the above. New input from the partners is of course encourage!

Important when concepting the final Analysis Methology:

- ▶ Alignment possibility with WP4: PO-SE and DE-SE?
- ▶ Keep in mind the expertise of 3.1 partners (legal or regulatory)
- ▶ Remember the countries that are covered by the partnership (DE, DK, FI and EE). Other countries can probably only be covered superficially.
- ▶ Define a time horizon: 2030 / 2050 aligned with WP4 and GoA 3.6

Next steps

- 1) All partners will think about and make suggestion to the suggested options for the Analytical Methodology.
- 2) KEM will provide relevant inspiring literature / readings as well as more detailed research suggestions
- 3) Date to be set for meeting in March 2017 (Hamburg) to finalise structure of the Analysis phase**