Energy Targets

European Union

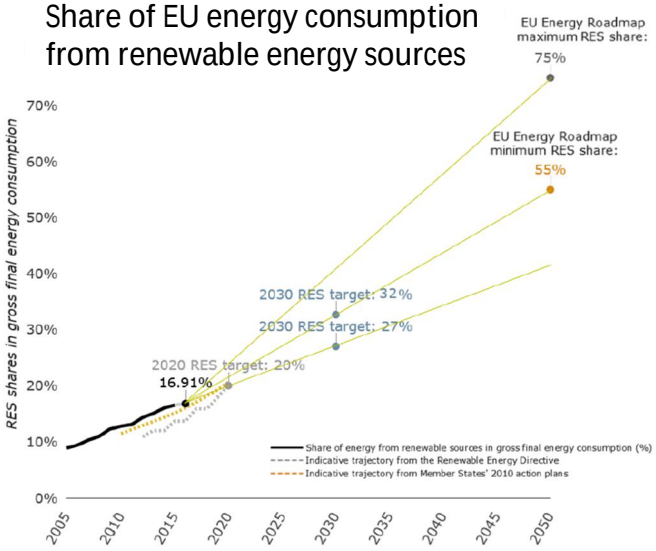
EU energy strategy

1. Energy security, solidarity and trust
2. A fully integrated European Energy market
3. Energy efficiency contributing to moderation of demand
4. Decarbonizing the economy
5. Research, innovation and competitiveness

EU targets from policy documents

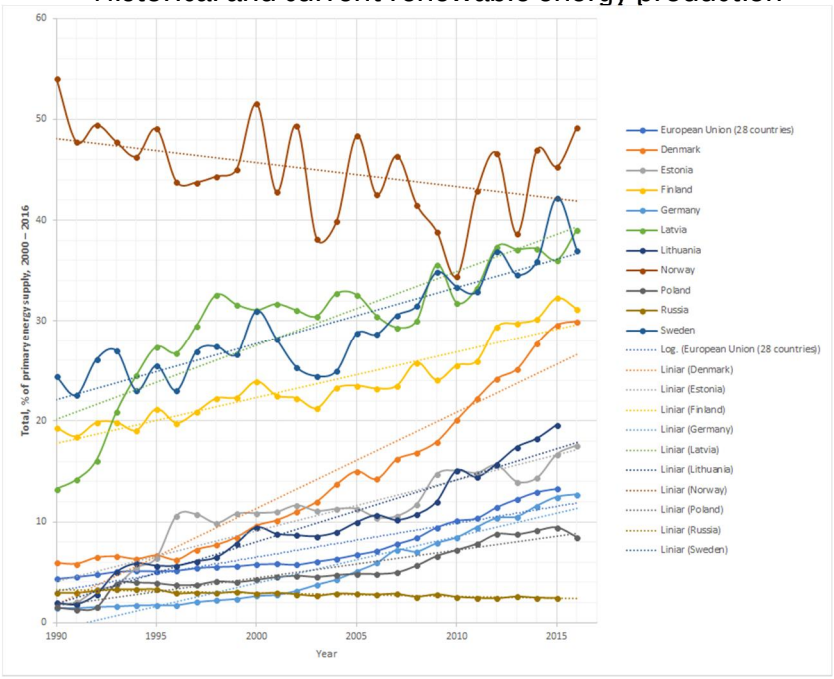
TARGET / YEAR	2020	2030	2050
GREENHOUSE GAS EMISSIONS	20%	40%	80-95%
RENEWABLE ENERGY CONSUMPTION	20%	32%	About 66%
ENERGY EFFICIENCY	20%	27%	41%

Share of EU energy consumption from renewable energy sources



Baltic Sea countries

Historical and current renewable energy production



National renewable energy targets

RENEWABLE ENERGY TARGETS	2016/ 2017 (RES-E)	2020 TOTAL (RES-E)	2030 TOTAL (RES-E)	2050 TOTAL (RES-E)
EU (28 COUNTRIES)	17.0% (29.63%)	20% (42.8%)	32%	66%
DENMARK	32.2%/ 35.5% (53.7%)	30% (51.9%)		
ESTONIA	28.8% (15.5%)	25% (4.8%)	>50%	
FINLAND	38.7% (32.9%)	38% (33%)		
GERMANY	14.8% (32.2%)	18% (38.6)	30% (45%-65%)	60%
LATVIA	37.2% (51.3%)	40% (59.8)	50%	
LITHUANIA	25.6% (16.8%)	23% (21%)	45% (55%)	80% (65%)
POLAND	11.3% (13.4%)	15% (19.13%)		
SWEDEN	53.8% (64.9%)	49% (62.9%)		(100%)

Questions / reflection

Do you think that:

1. your government will reach the targets set on the short term (e.g. between 2020 and 2025)? What are the main barriers for reaching it? And what are the opportunities?
2. your government should increase the target?
3. it is technically feasible to reach these targets by OWF on the short term?
4. targets provide a good direction for future renewable energy policy? Or is it better to focus on regulation, fiscal incentives, grid access or finance access?
5. targets should specify offshore wind specifically, or renewable energy in general?
6. targets should be specified until the period 2050?
7. there is enough political support in your country to implement these targets?
8. there is a need for a Baltic wide approach for the developing and monitoring renewable energy targets?
9. there is a need for stronger international cooperation in the implementation processes of offshore wind?

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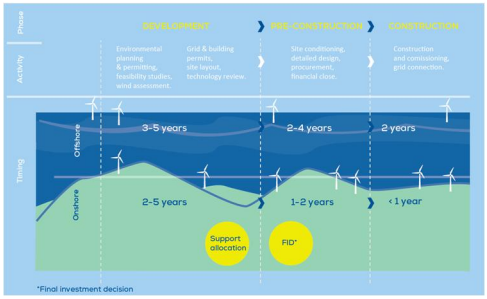
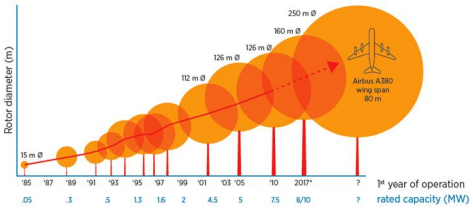
Future (industry) trends

Offshore wind project planning



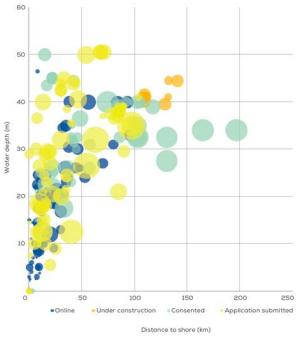
- Average project planning time long due to regulatory framework.
- In what phases could time be won?
- How about innovative technologies?

Turbines



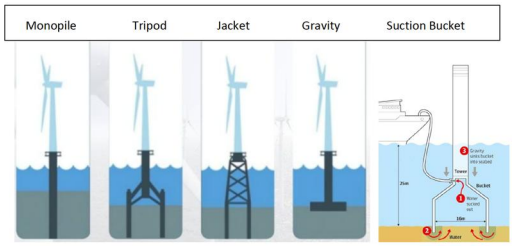
- Underlaying factor for costs competitiveness.
- Technological development and market demand have reduced unit costs and the power of wind turbines.
- Less turbines for the same MW. However, increasing distances between turbines.

Increased farm sizes



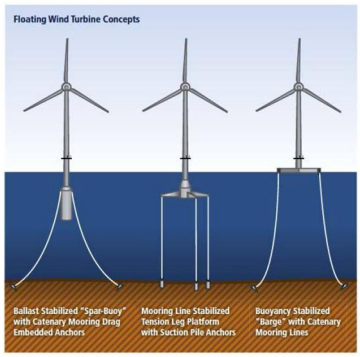
- Reduction of costs for purchasing, installing, operating and maintenance
- Impact the current approved plans in the Baltic
- Looking for synergies in construction.

Sub structures



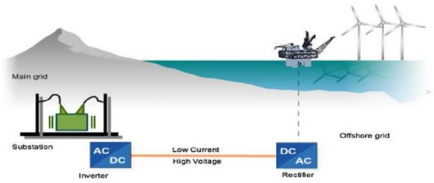
- 10 to 20% of overall costs
- Choice depending on sea bottom conditions.
- Different environmental impacts (e.g. noise) of the technologies

Floating wind



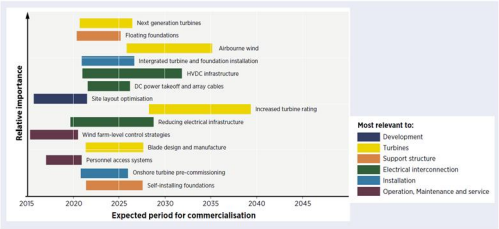
- Turbines are moored to the sea bottom floor
- Potential in areas with bigger sea depths.
- Challenges remain, e.g. ice coverage.

Transmission technology



- Short distances: use of HVAC
- Long distances: HVDC
- Break-even point depending on costs, capacity, distances, reliability, availability.
- In Baltic only HVAC is used until now.
- Clusters of farms better use HVDC

Technical development and research



- Bigger turbines put a strain on foundations, substructures, supply chain
- Optimal offshore grid design by using both HV and AC and connection points.
- Slow development of macro level European grid could become a bottleneck for OWF.

Multi-use of sites

- Possibilities with aquaculture etc.
- Depending on regulatory framework.
- Cultural change of stakeholders required

Decommissioning of OWF

- First Danish wind farms will be decommissioned.
- Full removal or party removal, using it for new parks or other uses?
- New parks on same location as old?

Questions / reflection

1. Which trends do you think are most relevant for the development of offshore wind in the Baltic Sea?
2. How can these trends influence the 2030 and 2050 spatial energy scenarios?

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Interconnection / Grid

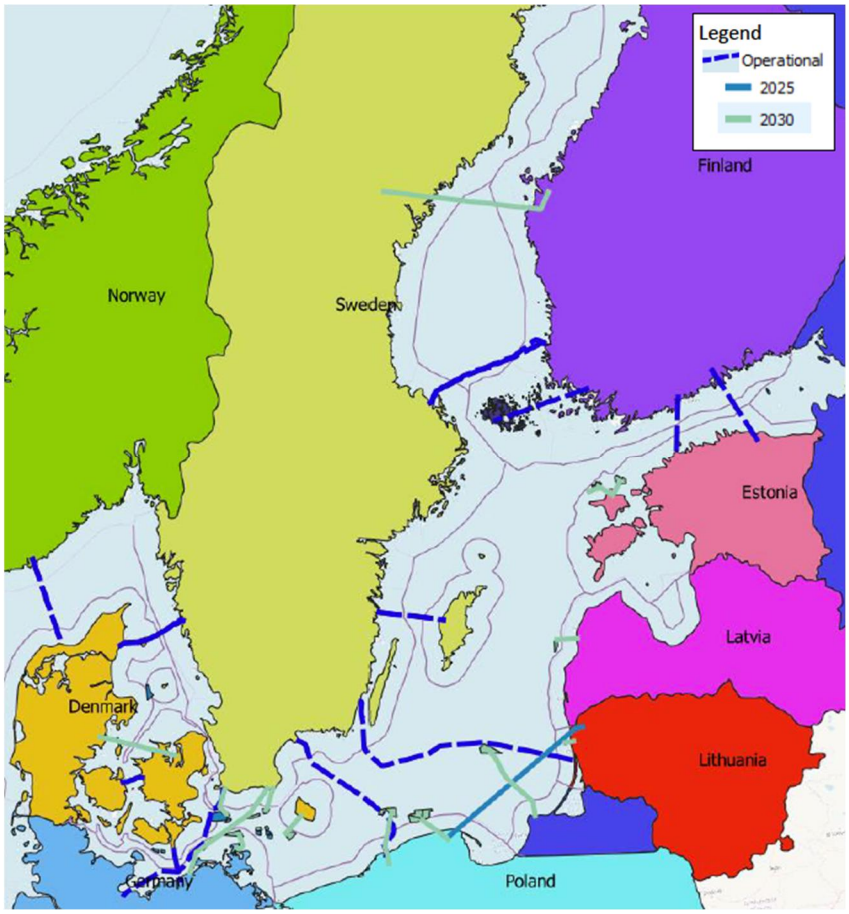
Measuring interconnectivity

a) the ratio of the nominal transmission capacity to the peak load (demand) >30% and
b) the ratio of the nominal transmission capacity to the installed renewable generation capacity (supply) >30%.
c) minimizing differences in their wholesale market prices. Additiona interconnections should be prioritized if the price differential exceec an indicative threshold of 2€ / MWh between Member States

Current and future interconnectivity levels in the Baltic Sea

Country	Interconnection levels in 2017	Expected interconnection levels in 2020
DE	9%	13%
DK	51%	59%
EE	63%	76%
FI	29%	33%
LT	88%	79%
LV	45%	75%
PL	4%	8%
SE	26%	28%
EE, LT, LV	22% (2016)	

Existing and planned offshore cable connections in the Baltic Sea



Main report findings

- Time perspective of the grid development planning by the European National System Operators ENTSO-E in TYNDP is reaching 2030, the category of future projects is also presented but not going much beyond 2030 when it comes to real projects and needs partially to 2040.
- According to TYNDP 2016 development of the offshore wind farms and interconnectors will generally run separately in BSR till 2030, but in 2018 the world's first grid project combining offshore wind and interconnecting will be commissioned (Kriegers Flak CGS).
- Bilateral HVDC cable lines will remain the main way to interconnect different national power systems. Combinations as planned in the North Sea are possible as well combining grid and O&M base harbors
- The impact of choice of transmission type is minor for the marine spatial planning while interconnection combination with offshore wind can have a bigger impact.
- Operational and currently planned offshore wind farm connections are based on the HVAC technology, not following the German trend from the North Sea to concentrate connection infrastructure in HVDC hubs and export cables
- Kriegers Flak CGS (Combined Grid Solution) is the first combined connection of wind parks to two different countries that will be commissioned under 2019/ 2020. The system is based on HVAC technique but has an HVDC component with a converter station onshore (back-to-back system).

Questions / reflection

Do you think that:

1. The current and planned interconnector projects are sufficient for the coming decades?
2. There needs to be better connections between the Baltic and other sea basins/regions?
3. The focus of new interconnectors should increasingly be on new developments of offshore wind and using them as connection points?
4. There is sufficient cooperation with land-based parties in the development of an offshore grid?
5. Energy islands could be established in the Baltic Sea (as is the plan in the North Sea)?
6. The Baltic Sea region can become the leader of interconnectivity between countries?