Connecting Seas

NorthSEE – Baltic LINes MSP conference

Energy Workshop

Malena Ripken, Kirsty Wright, Andronikos Kafas, Riku Varjopuro, Simon Stark, Dominic Plug

Time	What	Responsibility
14:15 – 14:20 (5 mins)	Introduction to session	Dominic
14:20 – 14:50 (30 mins)	Joint presentation	Andronikos & Riku presenters Dominic chair
14:50 – 14:55 (5 mins)	OESA presentation	Simon Stark
14:55 – 15:10 (15 mins)	Comparison table – cross-border	Kirsty & Riku
15:10 – 15:20 (10 mins)	Step-by-step approach Baltic LINes	Riku
15:20 – 15:40 (20 mins)	Interactive discussion – what's missing & future collaboration	Malena and Dominic
15:40 – 15:45 (5 mins)	Wrap up and main messages	Andronikos

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Energy Workshop Agenda

Energy Session

Connecting Seas

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Planning issues, criteria & tools

Andronikos Kafas (NorthSEE) & Riku Varjopuro (BalticLINes)

North SEE

Interreg North Sea Region European Regional Development Fund EUROPEAN UNION

Baltic LINes

Interreg Baltic Sea Region EUROPEAN UNION EUROPEAN REGIONAL DEVELOPMENT FUND

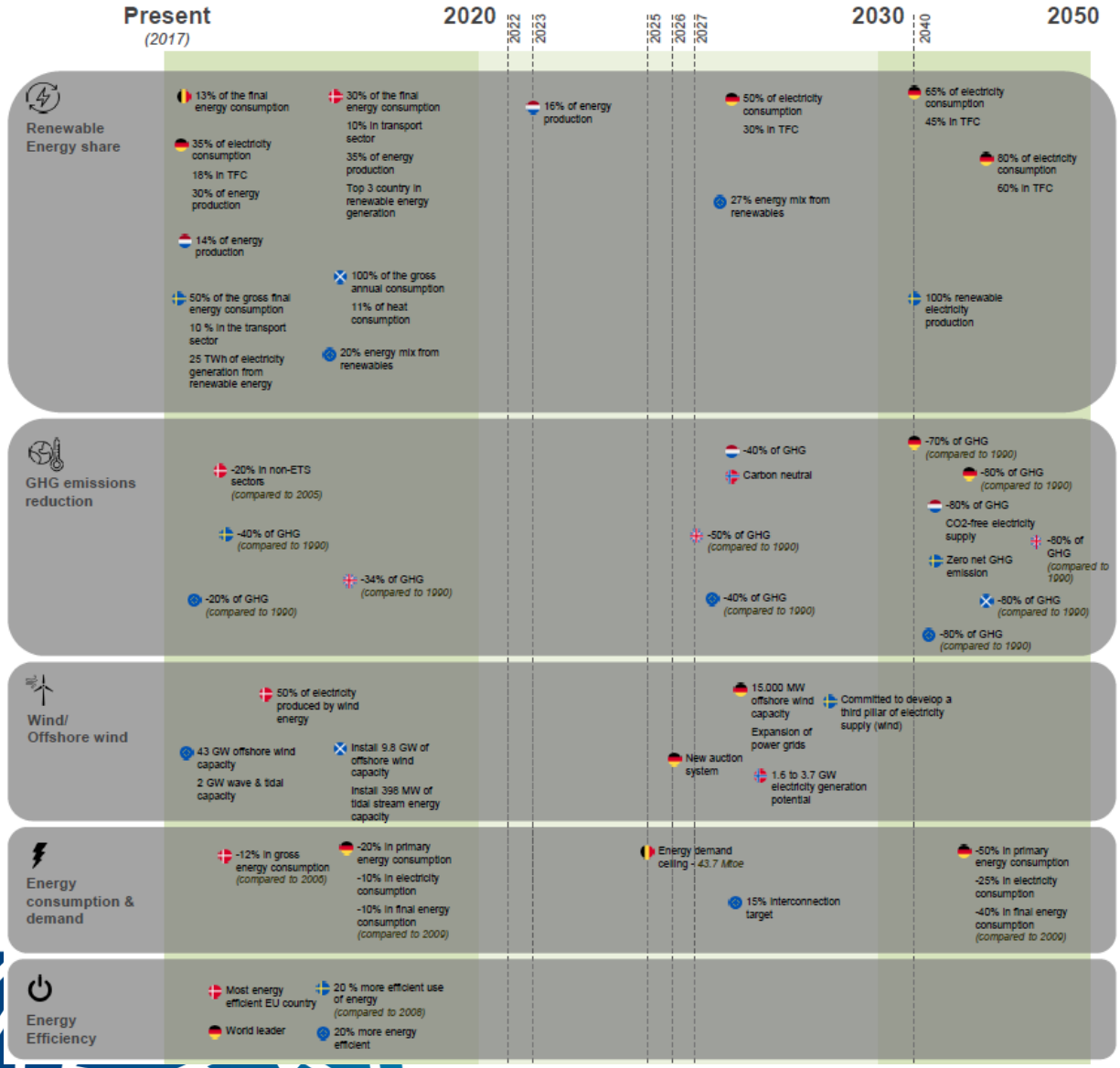
Overview – 8 main comparison topics

1. EU energy and MSP policies and goals
2. Energy policies
3. Drivers & Barriers for offshore wind
4. Transnational energy cooperation – initiatives and EU projects
5. Status Quo – energy profiles of countries, GIS maps of offshore renewables
6. Status Quo – MSP status of countries
7. The role of MSP for offshore energy developments – planning provisions
8. Spatial planning criteria and spatial designations for offshore renewable energy

EU energy policies & targets

- EU Energy Union and Energy Strategies for 2020, 2030 and 2050
  - binding EU target of at least a 40% reduction in GHG emissions by 2030, compared to 1990 levels,
  - binding target of at least 27% share of renewable energy consumption in the EU,
  - an energy efficiency increase of at least 27%, to be reviewed by 2020 potentially raising the target to 30%, by 2030, and
  - the completion of the internal energy market by reaching an electricity interconnection target of 15% between EU countries by 2030, and pushing forward important infrastructure projects.
- EU 15% interconnection target by 2030

Environmentally-friendly energy policies & targets



Drivers and Barriers for offshore wind Baltic Sea

Drivers	Barriers
Political priorities and signaling the targets	Grid capacity (short-term)
Grid design and development	Challenges in licencing procedures (e.g. NIMBY)
Investments into offshore wind energy	Lack of space (in some parts of Baltic Sea)
Communication involvement of companies and stakeholders	Lack of clear political targets for OWE (uncertainty for the investors)
Transmission capacity	Slow planning and policy processes vs. rapid OWE technology development
Availability of space	
Cost development (technology development)	
Price development	
Demand for renewable energy	

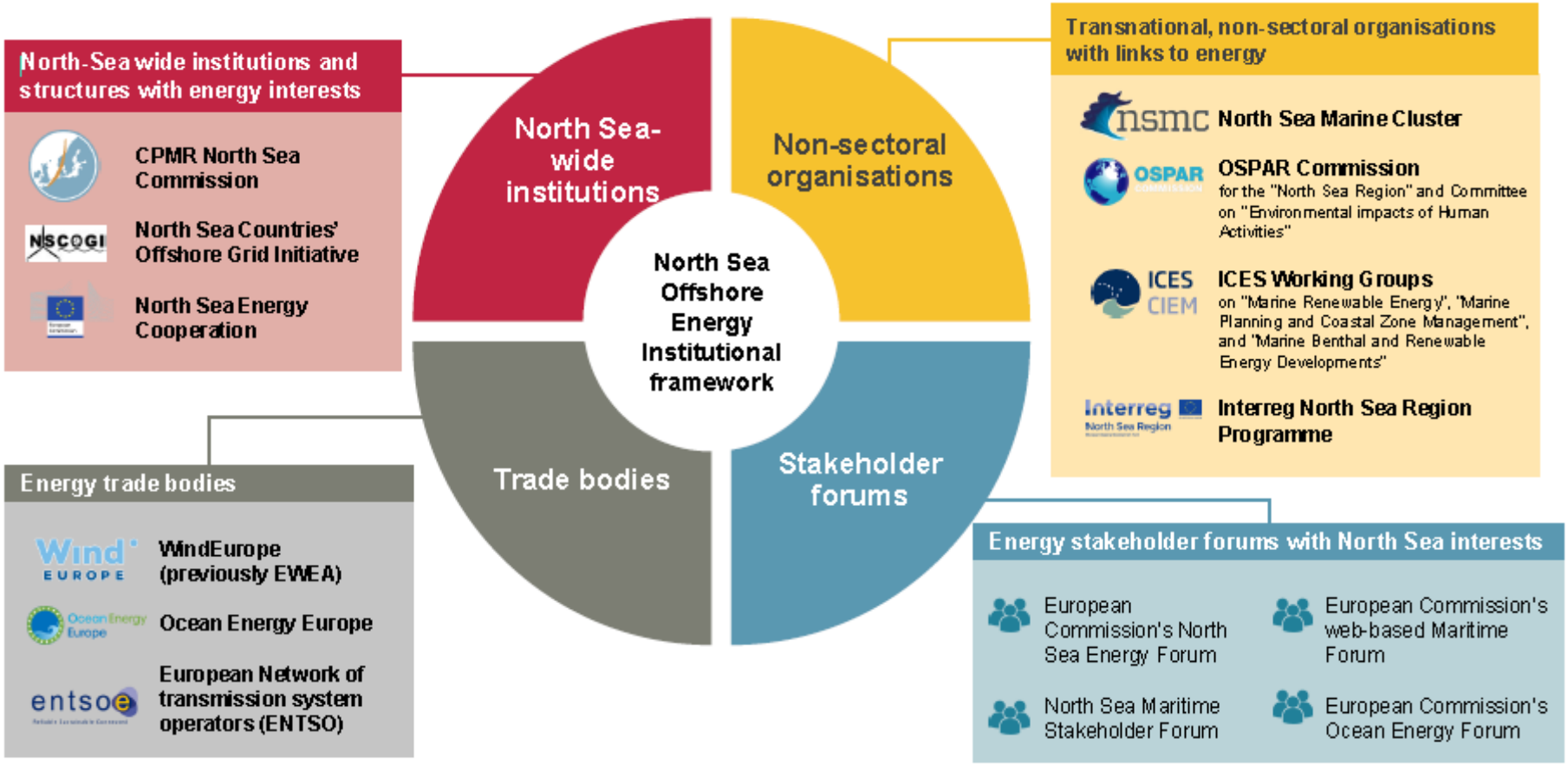
Drivers and Barriers for offshore wind North Sea

Drivers	Barriers
EU commitment to achieving climate and energy goals	Legislation
Global environmental commitments	Lack of investment
Energy security	Lack of social acceptance
Investments into offshore wind energy	Lack of grid connection/capacity
Transition to 'greener' renewable energy	Regulation of liability and of insurance
	Cost-effectiveness & availability of technology
	Current job market situation
	Administrative procedures (planning and licensing)

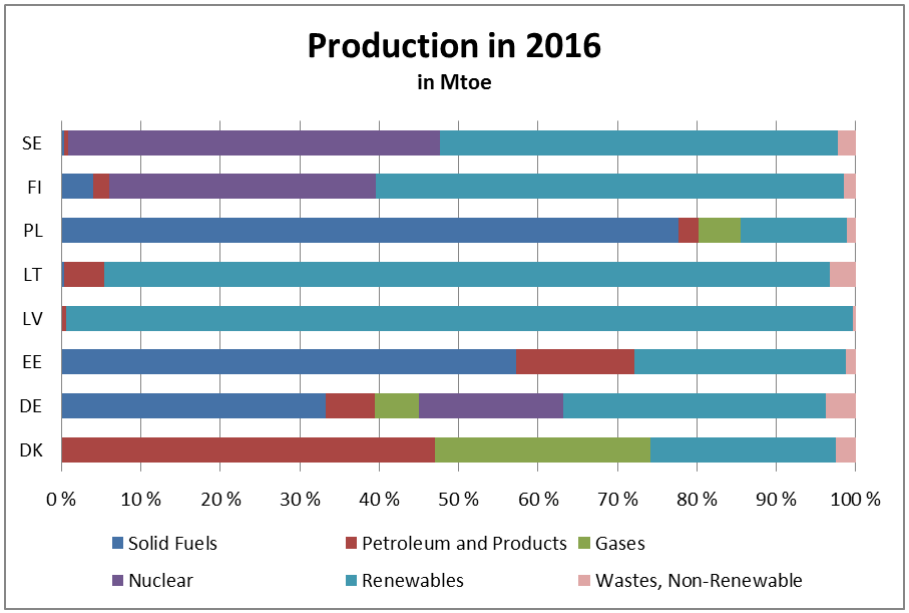
Transnational energy cooperation in the Baltic Sea

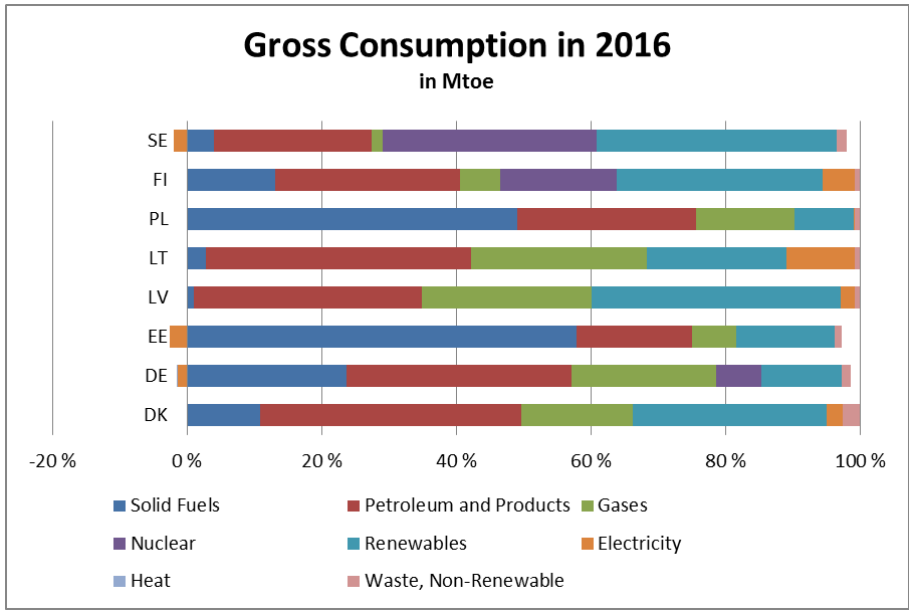
- The Baltic Sea Region lacks an established intergovernmental collaboration dedicated to coordinating activities in the offshore energy field
- Energy collaborations:
  - Until 2015 the Baltic Sea Region Energy Cooperation (BASREC) fostered intergovernmental cooperation, including in offshore energy issues
  - The Baltic Energy Market Interconnection Plan (BEMIP, since 2009) initiative to design of an integrated electricity and gas market through the development of infrastructure projects renewable energies and interconnections.
    - In 2018-2019 a study on potential of offshore wind and grid development
  - EU Strategy for the Baltic Sea (EUSBSR) has a dedicated policy area for energy

Existing international MSP institutional framework in the North Sea



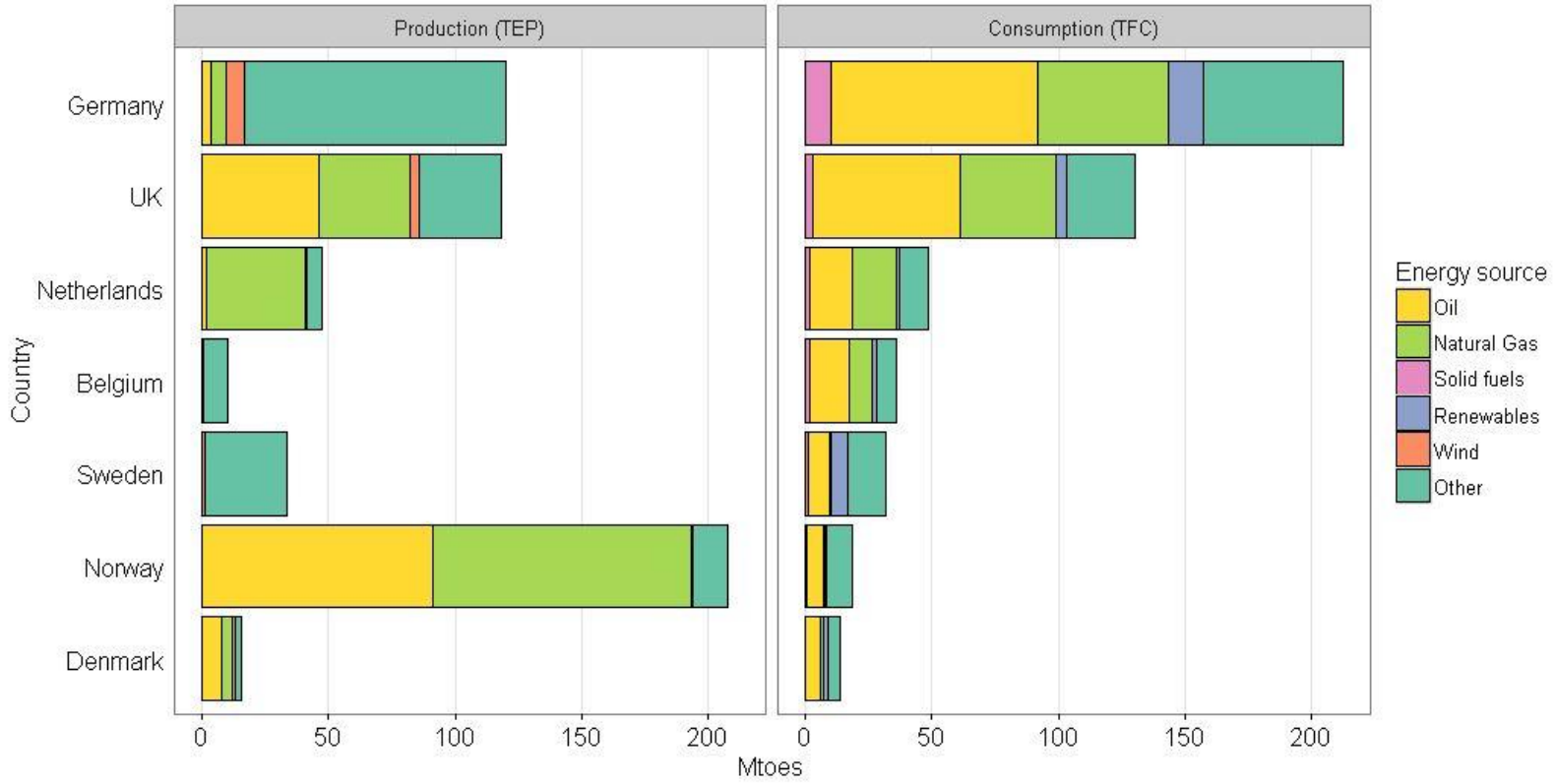
Status Quo – energy profiles of Baltic Sea countries





Source Eurostat
https://ec.europa.eu/energy/sites/ener/files/documents/countrydatasheets_august2018.xlsx

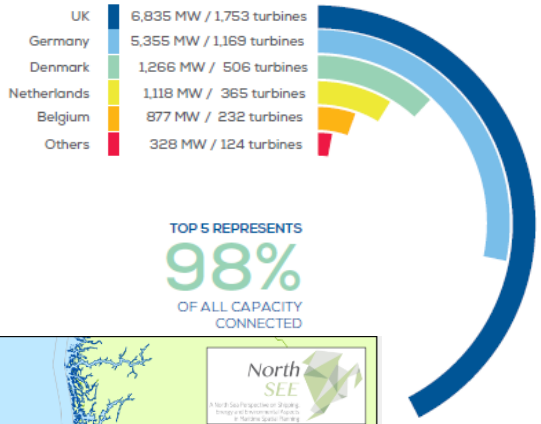
National energy profiles of North Sea countries



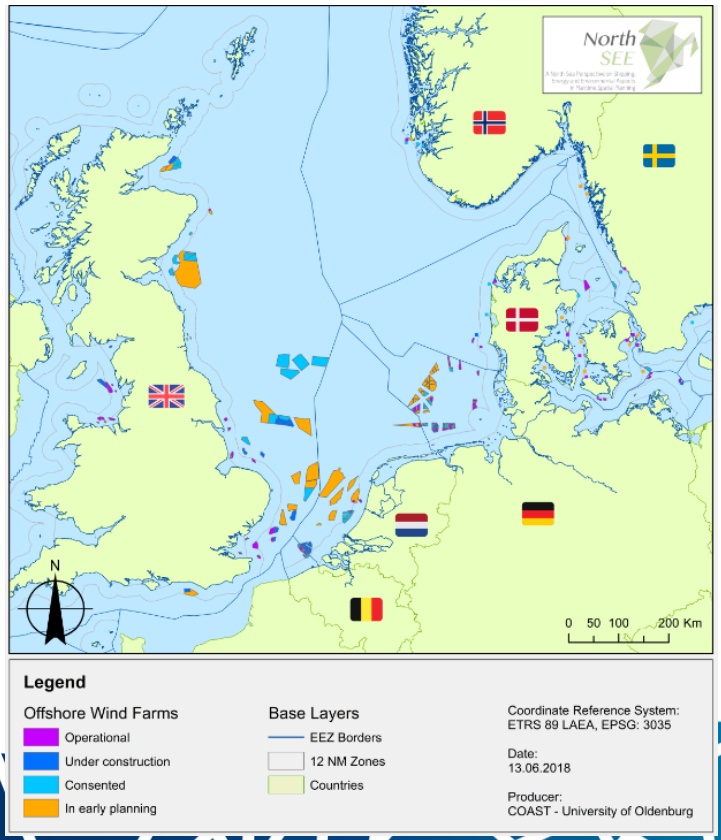
Status Quo – North Sea

Offshore wind

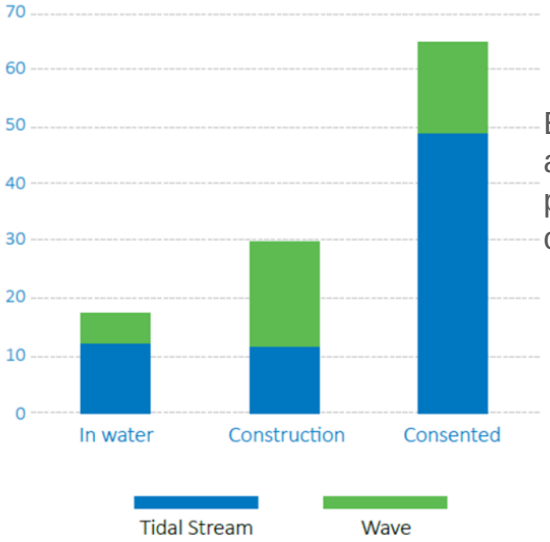
Installed offshore wind capacity in the North Sea (2017)



Source: WindEurope



Ocean energy



European wave and tidal energy projects at the end of 2016

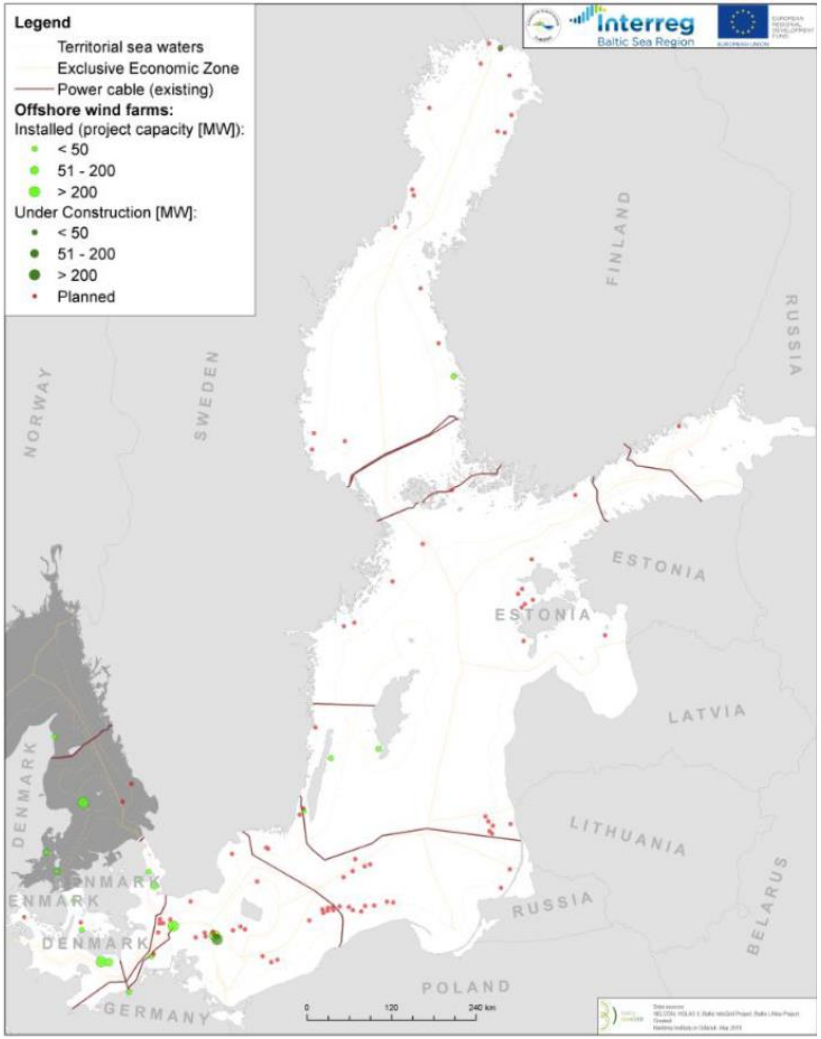
North SEE

Inter North Sea

EUROPEAN REGIONAL DEVELOPMENT FUND

Status Quo – Baltic Sea

	Status in 2017
DK	13 offshore wind farms (880 MW), 3 under preparations
EE	0 wind farms, 8 projects expressed interest
FI	1 wind farm (90 MW), 10 projects in different phases
DE	3 wind farms, (689 MW), 1 in construction, 1 approved
LV	0 wind farms, Several expressions of interest
LT	0 wind farms, Three finished EIAs
PL	0 wind farm, 1 project has a permit, 1 project has finalized EIA
SE	5 wind farms (206 MW), 7 OWF approved, several in preparation



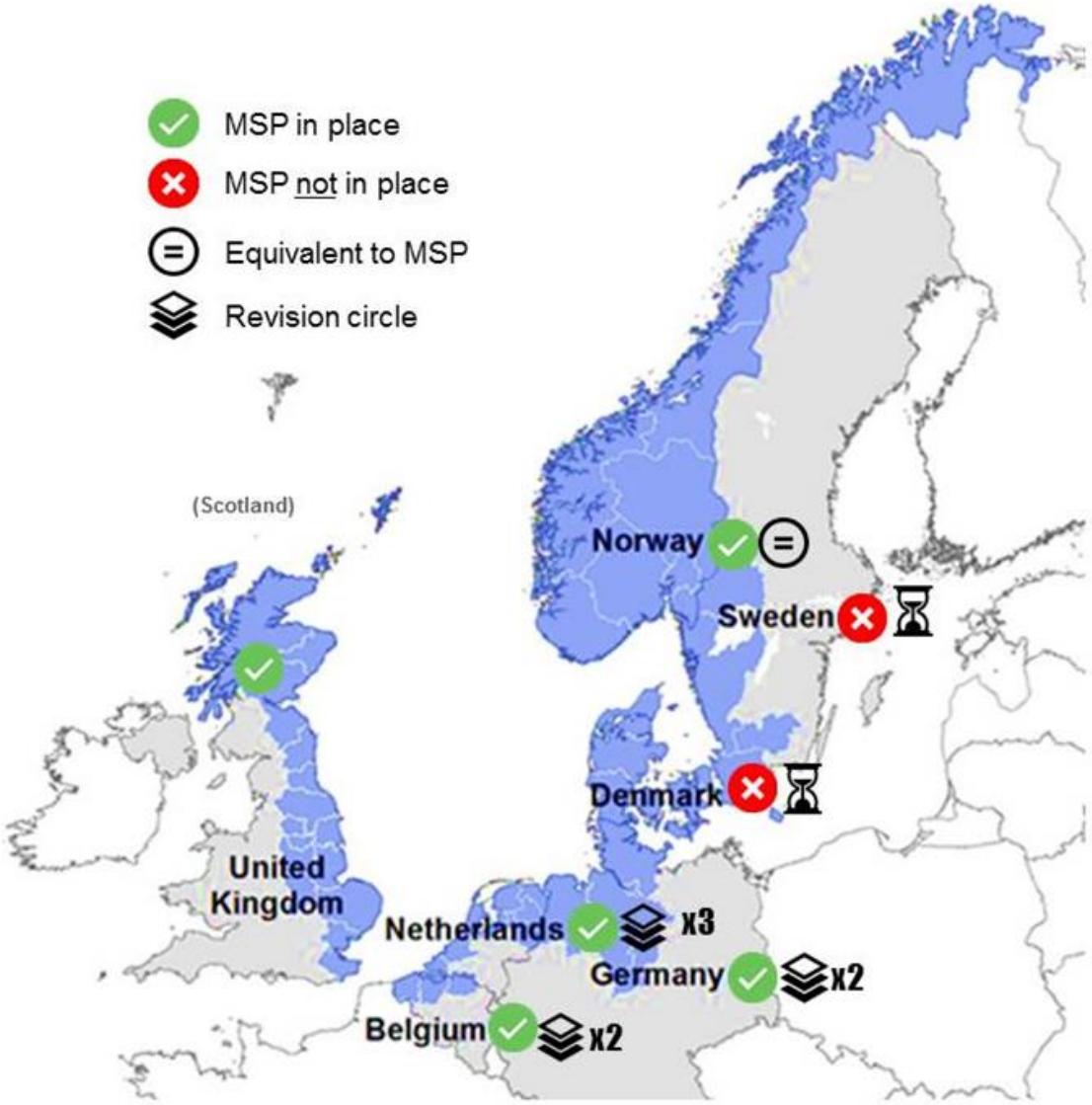
MSP status of Baltic Sea countries

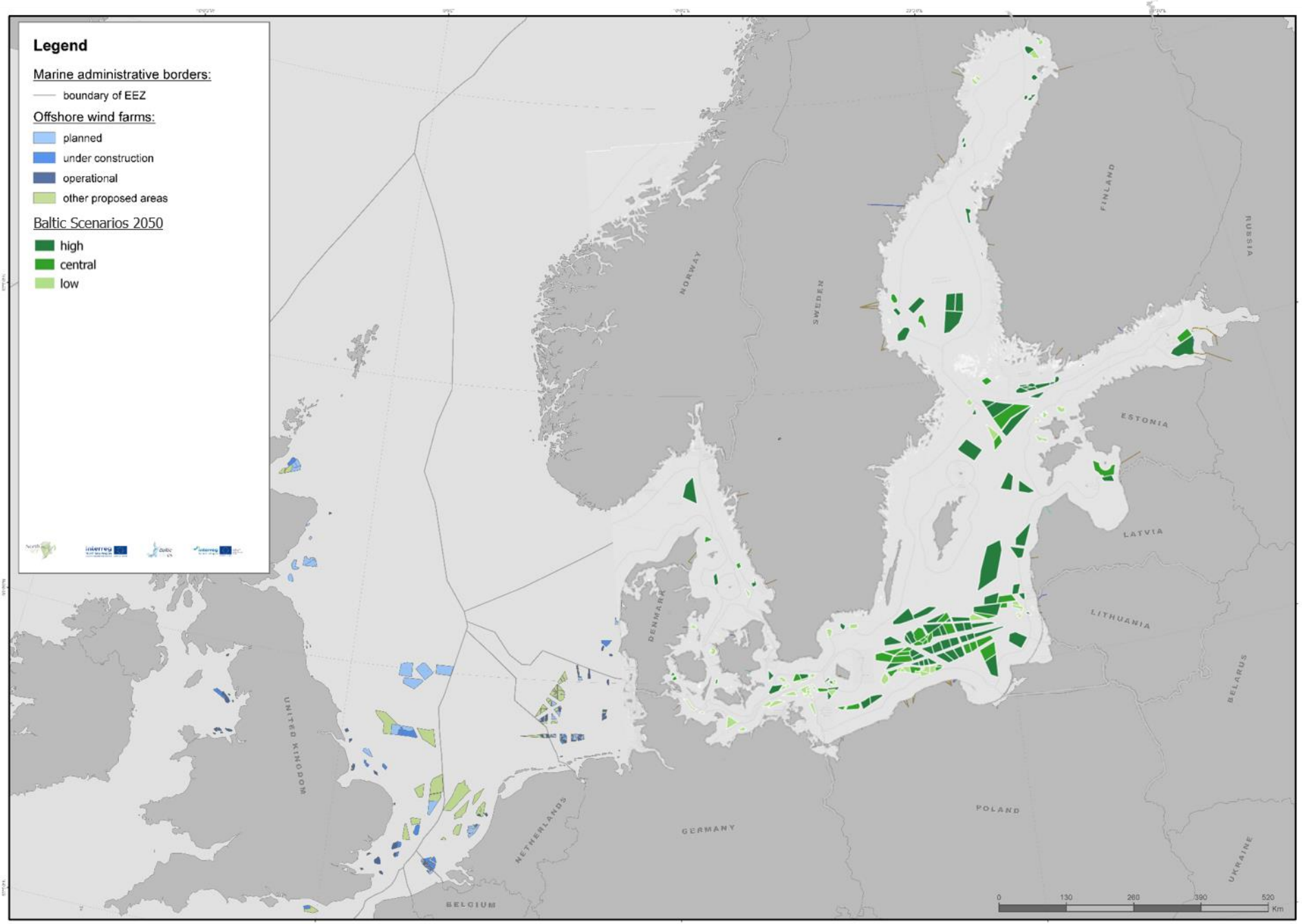
	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Sweden
Number of planning areas	1 National MSP	1 (+2) 2 earlier regional plans incorporated into national MSP	3 +1 3 Regional MSPs 1 Åland	1+3 1 EEZ 3 Territorial Waters	1 National MSP	1 National MSP	1 Coordinated between 3 Maritime offices	3 Regional MSPs (from 1nm zone)
Number of levels of spatial planning at sea	1	1	3 MSP (sub-national), regional (sub-national), municipal	1 Federal and state level planning are separate (not hierarchical)	2 National, municipal up to 2km from the coast	1	1 + several more specific plans	2 MSP (national level), municipal
Expected progress in MSP (national plans)	1st edition 1st draft: ~ 04/2019, MSP: ~12/2020	1st edition 1st draft: ~07/2018, MSP: ~09/2019	1st edition 1st draft: ~04/2020; MSP: ~03/2021	2nd edition 1st draft:01/2019 MSP: ~01/2020	1st edition 1st draft: ~12/2016 MSP: ~12/2018	2nd edition 1st draft: ~06/2019 MSP: ~06/2020	1st edition 1st draft: ~04/2018 MSP: ~07/2019	1st edition 1st draft: ~04/2017 MSP: ~12/2019
Scale of MSP	Not decided yet	1:200.000	Not decided yet	1:400.000	1:200.000	1:200.000	1:200.000	1:700.000 – 1:1.000.000
Planning horizon	~2050	~2030	Not decided yet	Not decided yet	~2030	~2050	~2030	~2050
Binding/non-binding MSP	Binding	Binding for all structures, incl. OWE installations	Very strategic, non-binding	Binding	Non-binding	Binding	Binding	Non-binding

MSP status of countries in BSR

- HELCOM-VASAB MSP working group – est. 2010
  - Official collaboration for all Baltic Sea region countries
  - Baltic Sea broad-scale maritime spatial planning (MSP) principles (2010)
  - Regional Baltic MSP Roadmap 2013-2020 (2013)
  - Guidelines
    - Transboundary consultations, public participation and co-operation
    - Implementation of ecosystem-based approach
    - Cartographic presentation of MSP (not adopted)

MSP Status of North Sea Countries




Legend
Marine administrative borders:
boundary of EEZ
Offshore wind farms:
planned
under construction
operational
other proposed areas
Baltic Scenarios 2050
high
central
low
NORWAY
SWEDEN
FINLAND
RUSSIA
ESTONIA
LATVIA
LITHUANIA
BELARUS
DENMARK
UNITED KINGDOM
NETHERLANDS
GERMANY
POLAND
UKRAINE
BELGIUM
0
130
260
390
520
Km

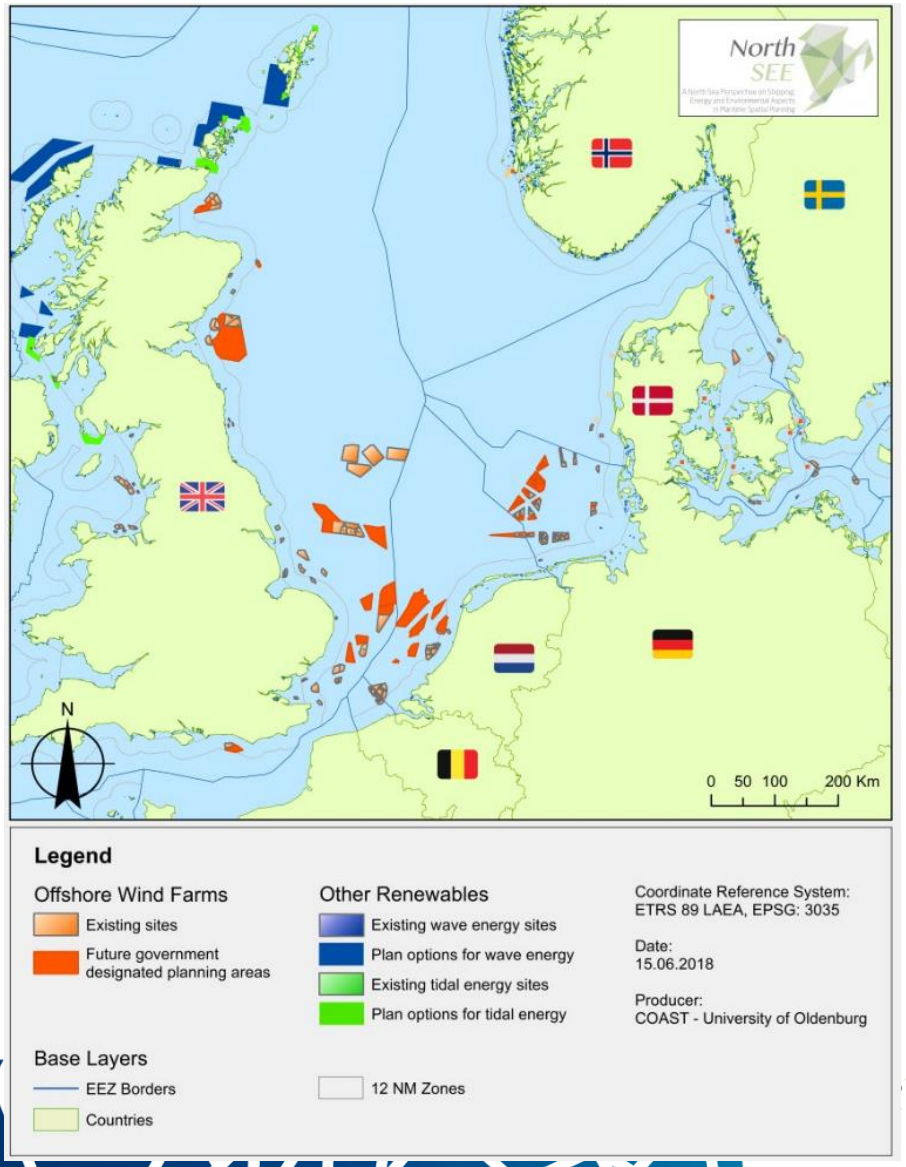
The role of MSP for offshore energy developments – Baltic Sea

	Role of MSP in guiding OWE	Open doors or state calls
DK	Until now sectoral decision-making, MSP in progress	State call for tender
EE	After MSP is in force, exclusive	Open door
FI	Probably no area designations	Open door
DE	Binding "Site development plan" for EEZ and TS soon to be published. Linked to MSP	Changing to state call for tender
LV	MSP will show suitable areas, not exclusive	Mix: 1st step Open door, 2nd step state tender
LT	MSP shows potential areas, exclusive	Government call for tender (under development)
PL	After MSP is in force, exclusive	Open door (under development)
SE	MSP will show suitable areas, not exclusive	Open door

The role of MSP for offshore energy developments – Baltic Sea

- The obvious:
  - The outcome of locating OWE is an interplay of MSP, sector authorities' and operators' decisions and actions
  - The weight of MSP in this differs between countries
- The picture is changing
  - Previously initiatives by the operators have been driving the process, now national coordination is becoming stronger
    - often within MSP processes
    - MSP theory works!

Spatial designations for offshore energy developments – North Sea



- Most NSR countries have designated spatial areas for offshore renewable energy, except Norway & Sweden
- Allows energy targets to be met and balance of conflict & synergies

Spatial planning criteria – Baltic Sea

	National planning criteria for OWE
DK	A set of criteria is used by the energy authority
EE	No use for a fixed set of planning criteria
FI	Not needed for MSP, regional sets of criteria are used
DE	A set of criteria is being developed
LV	A set of criteria is used in MSP
LT	A set of criteria is used in MSP
PL	Research projects have developed sets of planning criteria
SE	An indicative list exixts, but always case by case

Spatial planning criteria – North Sea

	National planning criteria for OWE
BE	A set of criteria is used by the MSP authority
DK	A set of criteria is used by the energy authority
DE	A set of criteria is being developed
NL	A set of criteria is used by the MSP authority
NO	No existing criteria
SE	An indicative list exists, but always case by case
SCOT	A set of criteria is used by the MSP authority

Different limits for the same criteria

Wind conditions

- >9m/s (NorthSEE project);
- In Uusimaa regional plan in Finland >6m/s
- In Latvian MSP, >7,5-8,5m/s

Depth

- Latvia <60m
- Lithuania 20-50m
- Sweden <40m

Distance from the shore

- Denmark
  - Smaller turbines located between 4 and 20 km
  - Large turbines are located > 15 km distance
- Estonia
  - Hiiumaa >12 km
  - Pärnu bay >10 km
- Latvia > 8km
- Poland >22,2 km (EEZ=12nm)

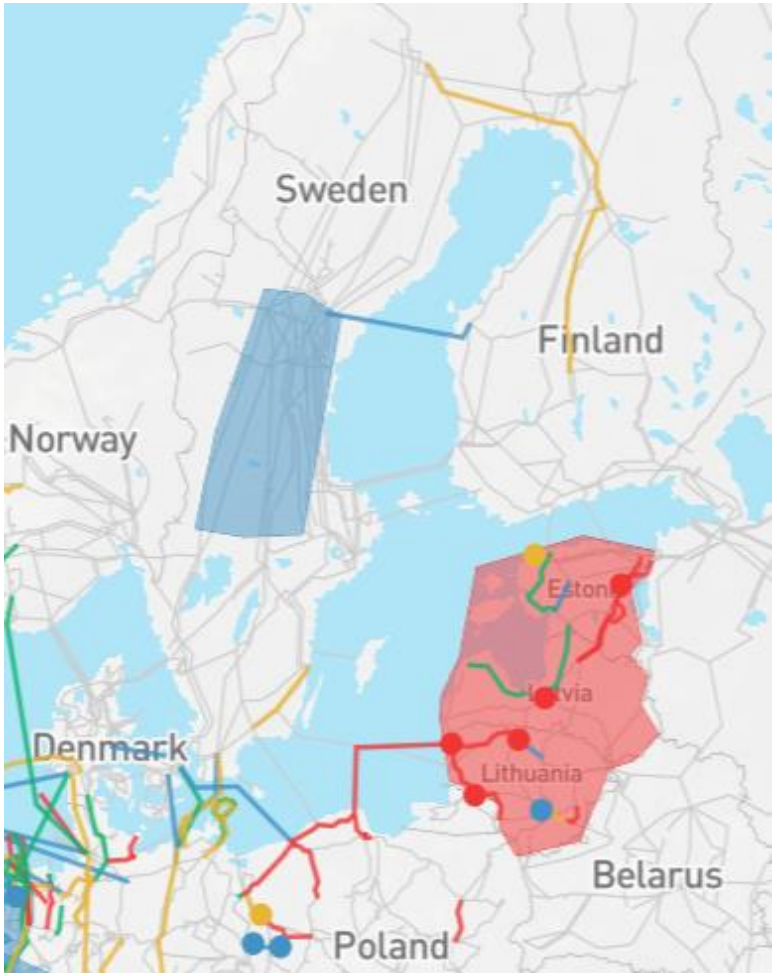
Interconnector development – Baltic Sea

Baltic LINes stakeholder workshop foresees strengthening of interconnections:

- Market benefits
- Increase consumption of electricity
- Energy security
- Possibility to support OWE

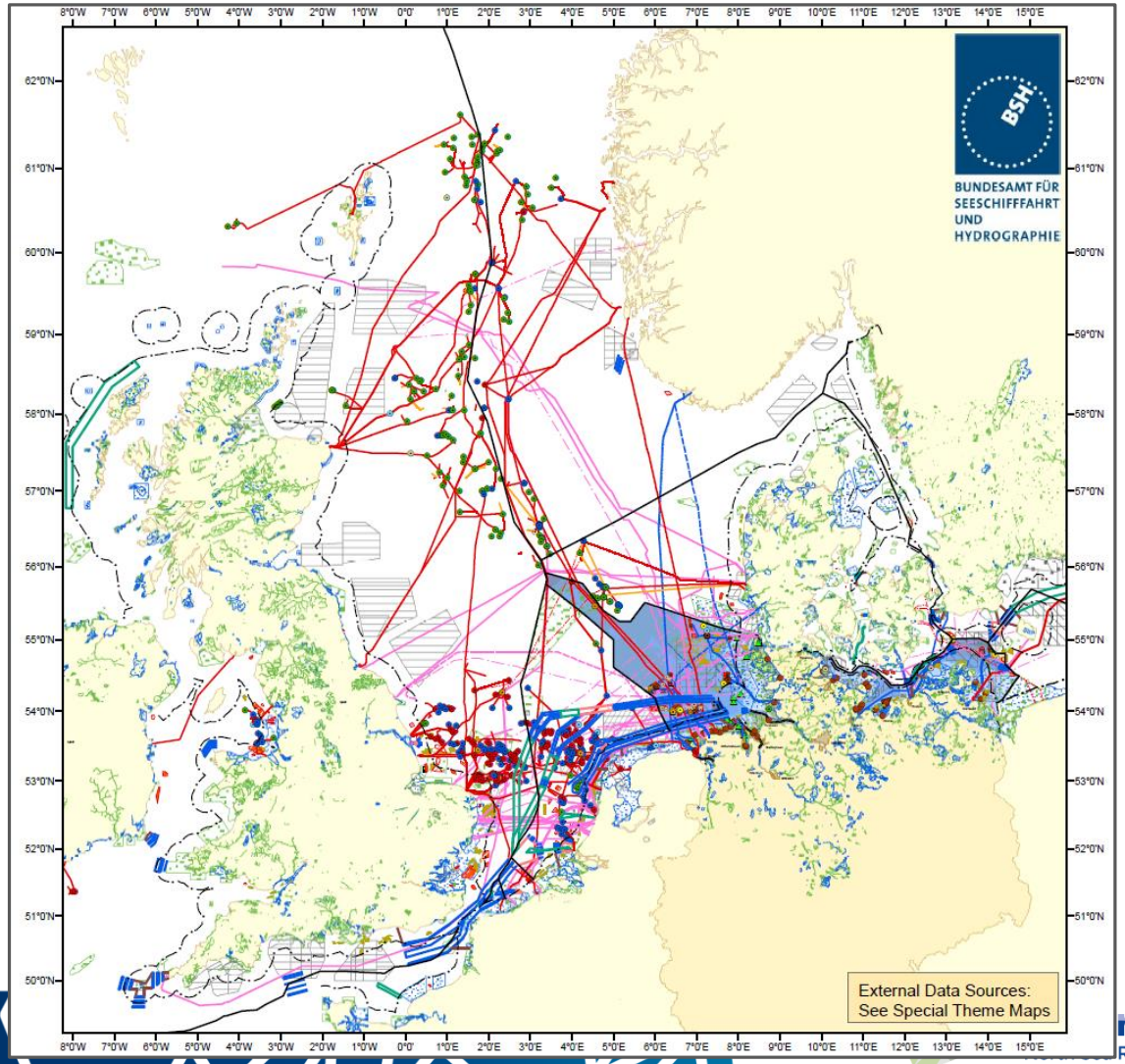
In the 2040-perspective TYNDP 2018 found a need to reinforce the transmission capacity:

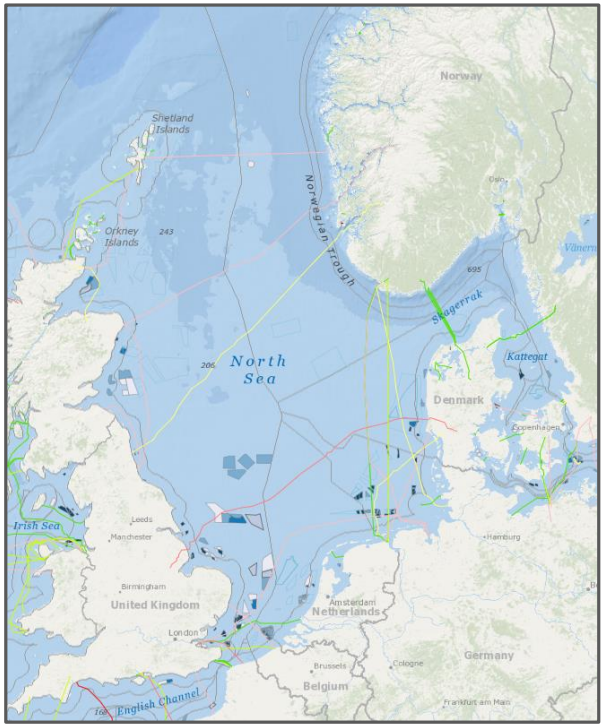
- Germany-Poland, in order to increase market-integration and in order to facilitate thermal decommissioning in Poland,
- Sweden-Finland in order to increase market-integration,
- Sweden/Denmark and Germany, due to price-differences and due to better optimization of the renewable generation,
- The Baltics, mainly due to Security of Supply.

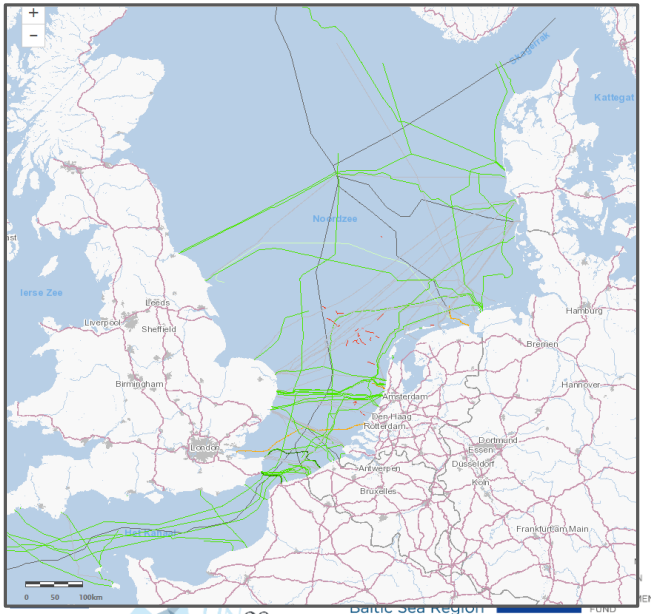


TYNPD - projects

North Sea Linear Energy Infrastructure

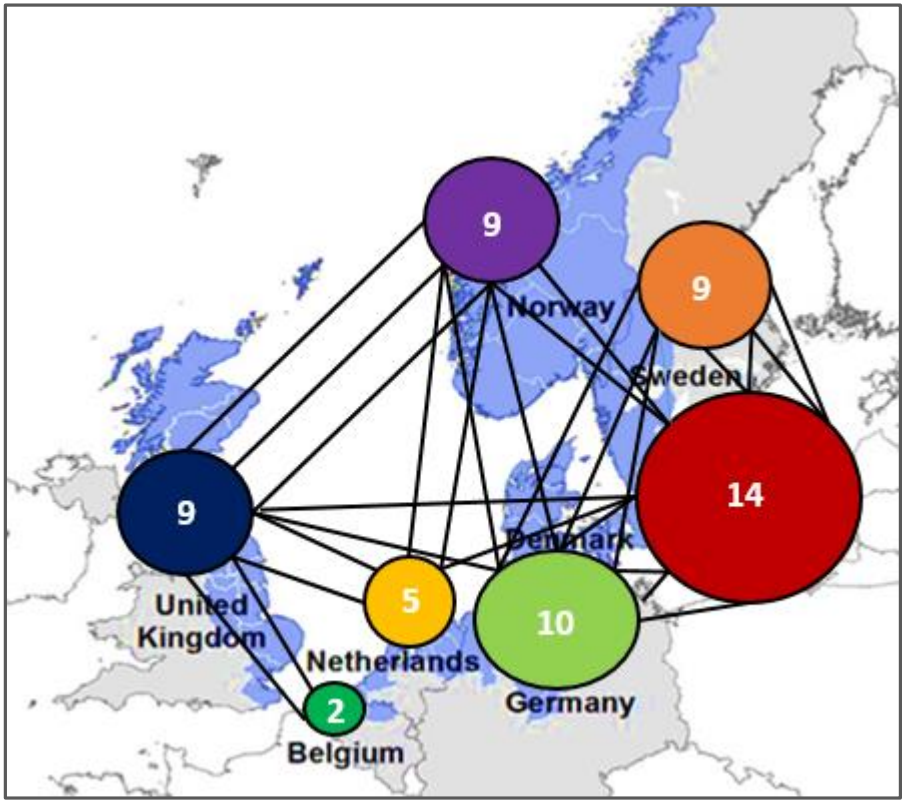






North Sea Interconnection

- Growth of offshore energy production = more interconnectors to share energy across borders and become more energy secure
- EU 15% interconnection target by 2030 – Denmark currently the most interconnected country
- UK not on track to meet 10% interconnection target by 2020



Transnational interconnectors: Includes existing, under construction, consented & future planned interconnectors

Grid & Cable Planning in NSR

Country	Plan	Spatial areas designated for cables	Spatial & technical planning criteria
BE	Belgium's MSP	Yes, designated cable corridors	• 250 m min of free space on either side of cable
DK	None, no MSP existing	?	
DE	Offshore Grid Development Plan 2030 Offshore Area Development Plan Spatial Offshore Grid Plan	Yes, cable corridors and gates	• Bundling of cables by parallel routing • Routing via gates • Crossing of priority & reservation areas for shipping by shortest route & right-angled • Routing as far outside Natura2000 areas as possible • Consideration of marine heritage & cultural assets
NL	Integrated Maritime Spatial Policy map and North Sea Policy Document 2016-2021	Yes, priority areas for cables	• Ensure efficient use of space and obstruct other users as little as possible • Cables not to impede shipping or fishing • New cables forbidden in anchoring locations • Maintenance zone of 500 m • Bundle cables & routes run in parallel • Cable crossings in shortest & straightest way • Avoid sand extraction zones
NO	None	No	• Consider environmental, visual impact, biodiversity, land use and socioeconomic benefits
SE	None, no MSP existing	No	None
SCOT	Scotland's National Marine Plan	Yes for offshore renewables, indicative export cable route, but not for interconnectors	• New cables to minimise impacts on environment, seabed and other users • Cable routes checked spatially • Consider flooding & coastal protection policies • Separation distance of 750 m between wind turbines and existing submarine cables • 1 NM cable maintenance vessel safety zone

Thank you

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Dr. Andronikos Kafas
Renewable Energy & Environmental Advice Group Leader & International Liaison

Marine Scotland, Scottish Government
e: Andronikos.Kafas@gov.scot
Twitter: a_kafas

Riku Varjopuro
Head of Unit, Sustainable Use of the Sea Areas

Finnish Environment Institute, Marine Research Centre
e: riku.varjopuro@ymparisto.fi
Twitter: rvarjopuro

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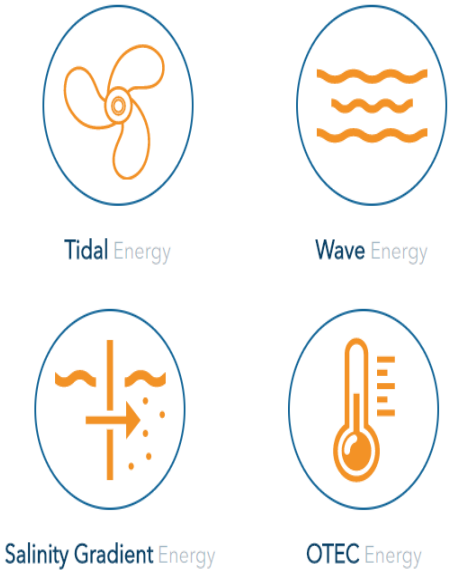
Introduction OESA project

Simon Stark

DMEC Strategy

Our vision is a 100% renewable energy supply globally, where energy generation from water significantly contributes to the renewable energy mix



Build international collaborations between organisations in the marine energy sector and beyond

Deliver a suite of technical- and commercial services from R&D to commercialisation

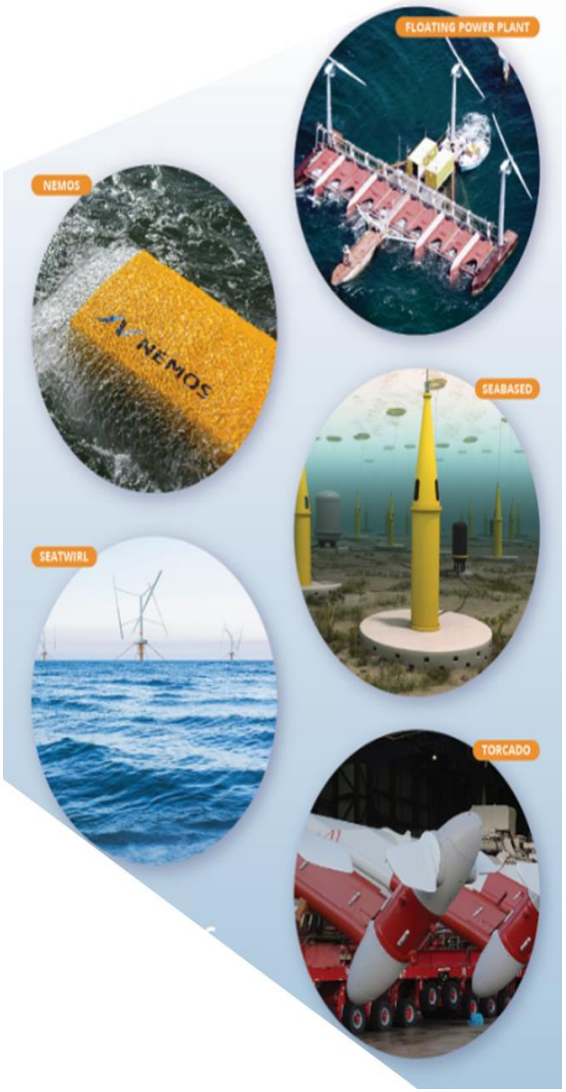
Align finance and policy to shape the right conditions for commercial project realisation

Ocean Energy Scale-up Alliance (OESA)

Aim: Implement a transnational service-package to accelerate the scaling-up of ocean energy pilots

Impact by 2021:

- 5 realised pilots (2 wave energy, 1 tidal energy, 1 floating wind energy and 1 wind-wave energy hybrid) aiming to generate **20 MW**
- Joint service offer and long term collaboration between OESA service providers
- Alignment of Policy, Offshore and Investors to facilitate commercialisation of ocean energy



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Collaborate with OESA

DMEC Dutch Marine Energy Centre

AALBORG UNIVERSITY DENMARK

UPPSALA UNIVERSITET

CATAPULT Offshore Renewable Energy

Hanstholm DanWEC Danish Wave Energy Center

EMEC ORKNEY THE EUROPEAN MARINE ENERGY CENTRE LTD

DMEC Dutch Marine Energy Centre

akp

SSPA

NEMOS

SEABASED

TOCARDO TIDAL TURBINES

SEATWIRL®

FLOATING POWER PLANT

Join our stakeholder platform:

- Policy summits
- Investors Dragons Den
- Offshore & Energy broker session

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Relevance of OESA

North Sea Region

- Up to 77 TWh/year wave potential [1]
- High amount of offshore experience
- Economical development
  - Global potential of tidal energy: 0.5 TW

Marine Spatial Planning

- Combined infrastructure
  - Reduced investments
  - More constant load
- Submergible tidal turbines

For additional information contact me:
simon@dutchmarineenergy.com
Or visit:
https://www.dutchmarineenergy.com/our-projects/ocean-energy-scale-up-alliance-oesa

[1] H.C. Sørensen, J. Fernández Chozas, 2018, *The Potential for Wave Energy in the North Sea,* 3rd International Conference on Ocean Energy, Bilbao, Spain

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Comparison Table

Kirsty Wright (NorthSEE) Riku Varjopuro (Baltic LINes)

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Comparison of MSP Baltic Sea

Riku Varjopuro (BalticLINes)

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MSP status of Baltic Sea countries

	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Sweden
Number of planning areas	1 National MSP	1 (+2) 2 earlier regional plans incorporated into national MSP	3 +1 3 Regional MSPs 1 Åland	1+3 1 EEZ 3 Territorial Waters	1 National MSP	1 National MSP	1 Coordinated between 3 Maritime offices	3 Regional MSPs (from 1nm zone)
Number of levels of spatial planning at sea	1	1	3 MSP (sub-national), regional (sub-national), municipal	1 Federal and state level planning are separate (not hierarchical)	2 National, municipal up to 2km from the coast	1	1 + several more specific plans	2 MSP (national level), municipal
Expected progress in MSP (national plans)	1st edition 1st draft: ~ 04/2019, MSP: ~12/2020	1st edition 1st draft: ~07/2018, MSP: ~09/2019	1st edition 1st draft: ~04/2020; MSP: ~03/2021	2nd edition 1st draft:01/2019 MSP: ~01/2020	1st edition 1st draft: ~12/2016 MSP: ~12/2018	2nd edition 1st draft: ~06/2019 MSP: ~06/2020	1st edition 1st draft: ~04/2018 MSP: ~07/2019	1st edition 1st draft: ~04/2017 MSP: ~12/2019
Scale of MSP	Not decided yet	1:200.000	Not decided yet	1:400.000	1:200.000	1:200.000	1:200.000	1:700.000 – 1:1.000.000
Planning horizon	~2050	~2030	Not decided yet	Not decided yet	~2030	~2050	~2030	~2050
Binding/non-binding MSP	Binding	Binding for all structures, incl. OWE installations	Very strategic, non-binding	Binding	Non-binding	Binding	Binding	Non-binding

Key observations

- Most of the countries are doing their first MSP
  - Russia has not yet started the process
- Differences
  - Different ways of organising in terms of planning areas and levels of planning
  - Scales ranging from 1:200 000 to 1:1 000 000
  - Time horizons 2030 to 2050
  - Binding/non-binding
- A lot of exchange between the Baltic Sea countries
  - HELCOM-VASAB MSP working group
  - A series of MSP related projects

Offshore wind in MSP

	Denmark	Estonia	Finland	Germany	Latvia	Lithuania	Poland	Sweden
Role of MSP and sectoral planning in OWE development	Until now sectoral decision-making and planning by the Danish Energy Agency. MSP's role is to coordinate use of the sea areas for different uses.	Identification of "acceptable areas" → after MSP is in force, OWE can only be build areas pointed out in MSP(s)	not known yet	Binding "Site development plan" for EEZ and TS soon to be published (by BSH) also for state level	MSP has identified suitable areas for OWE, but OWE can be located outside of these.	MSP screens potential areas, sector ministry responsible for more detailed management and strategy	Indicates suitable areas for locating OWE *(mainly based on previous private initiatives)*. Not possible in other areas.	National interest areas from energy authority taken into MSP plan, but MSP suggests also new areas.
OWE distance from the shore	Smaller OWF located between 4 and 20 km Large OWF are located > 15 km distance	In the two existing plans distances are 10 and 12 km	not known yet	Not defined, but visibility has been a reason why far from the coastline (state level MSP)	In national MSP process a distance of 8 km was used	20 metres or deeper sea areas. The depth curve is from a few km to approx. 12 km	Wind energy allowed only in EEZ.	Not defined (case by case)
Tendering process: open door or government call for tender?*	**Government call for tender**	**Open door** (developers initiating) at least before; possibly in the future as well	**Open door** (developer initiating) process will be changed	Open door; changing now into **government call for tender**	**Mix:** **1st step Open door** **2nd step Government tender**	**Government call for tender** (process under development, not yet decided)	Procedure under development; so far **open door**	**Open door policy**; MSP and Energy Agency's "national interest areas" are guiding, and projects are initiated by developers
Existing OWF	13 offshore wind parks (516 turbines) 3 under preparations	0 8 projects in the pipeline or expressed interest	1 (11 turbines) 10 projects in different phases	3 (in the Baltic Sea) • 2 in EEZ (150 turbines) • 1 in Mecklenburg-Vorpommern (21 turbines) • 1 in construction (60 turbines) • 1 approved	0 Several expressions of interest from operators	0 Three finished EIAs for OWE projects	0 1 project has received a permit 1 project has finalized EIA	5 77 turbines, 7 OWF approved + several projects in preparation

Key observations on OWE in MSP

- Role of MSP
  - Different bindingness of area designations
  - Close collaboration between sector authority and MSP
- The picture is changing
  - Previously initiatives by the operators have been driving the process, now national coordination is becoming stronger
    - often within MSP processes
  - Most of the countries are doing their first MPS – obviously the picture is changing
- Regional sea level collaboration on OWE is not organised

MSP status of North Sea countries

MSP	Belgium	Denmark	Germany	Netherlands	Norway	Scotland	Sweden
Progress in MSP	2nd plan revision, 3rd cycle	Very early stage of the 1st MSP plan	1st plan revision, 2nd cycle	3rd plan revision, 4th cycle	5th plan revision, 6th cycle	1st plan revision, 2nd cycle	Final stages of the 1st MSP plan
How many planning areas?	1	1 National MSP	5 EEZ (federal for North Sea and Baltic Sea), three coastal states	1	3 Regions: The Barents Sea, the Norwegian Sea and the North Sea	1 National MSP 11 Regional Marine Planning Areas (sub-national level)	3
Levels of spatial planning at sea	2 National and Sectoral	1 Sectoral plans so far	1 Federal and state level planning system are separated (not hierarchical)	1	2 National plans in the oceans, Regional plans in coastal areas	2 Scotland's National Marine Plan, and Regional Marine Plans. Including additional tier of sectoral marine planning	2 MSP (national level), municipality. MSP guides municipal level.
Binding/non-binding MSP	Binding	Binding	Binding	Binding	Binding in coastal zone. In ocean areas: politically decided by parliament, but no law for this	Binding	Non-binding

Key observations
MSP in North Sea countries

- Difference in MSP progress between North Sea countries – Denmark & Sweden don't currently have an MSP in place
- Differences in levels of spatial planning – National, Regional & Sectoral or between Federal & State level (Germany)
- All countries have binding MSP except from Sweden

Energy	Belgium	Denmark	Germany	Netherlands	Norway	Scotland	Sweden
MSP's role in locating OWE	MSP is used to designate spatial areas for renewable energy and for offshore wind, the wind turbine area	Until now sectoral decision-making and planning by the Danish Energy Agency. MSP's role is to coordinate use of the sea areas for different uses.	Designation of priority areas is indicative. OWF can be built outside the designated areas.	MSP is used to designate wind energy areas and all the conditions required to build wind farms (location, permit and grid connection etc.)	No zones have been opened for OWE yet but 15 possible or suitable areas have been identified by SEA	MSP particularly focuses on the development of the marine renewable energy sector MSP is used to identify spatial 'Plan Options' for offshore wind, tidal and wave energy.	National interest areas from energy authority taken into MSP plan, but MSP suggest also new areas. OWE can be built outside the designated areas.
OWE distance from the shore	12 NM	Smaller OWF located between 4 and 20 km Large OWF are located > 15 km distance	Not defined, but visibility and the National Park has been a reason why far from the coastline. Hub height limited to 125m if visible from coast	Current OWF 6-34 NM off the coast. All new designated OWF areas are at least 10 NM out of the coast.	Not defined, there are is currently no OWE	No minimum distance set, plan options can be within and out with 12NM (cut-off point for devolved powers)	Not defined (case by case)
MSP linked to permit procedure	MSP shows wind turbine area		Shows suitable areas in EEZ. Indicative designation of suitable areas in EEZ. Permissions outside designated areas possible	Wind farm site decisions are based on MSP designated areas. Wind farms are not permitted to be built outside these designated areas.	No zones opened yet therefore there is no existing practice on licensing for commercial OWE projects	MSP identifies spatial Plan Options. Seabed lease and marine licensing applications are expected to be located within the Plan Options. Applications within Plan Options are not guaranteed to obtain a licence. Scotland's National Marine Plan provides the framework for the licensing and consents process	MSP has a guiding influence, municipalities have a veto right.
Initiative from the operators or from the authorities/planning process?	The authorities define the area, the operators develop the windfarm layout		Until now initiatives from the operators. New scheme for OWF installations from 2021: designation of OWF areas by authorities. Preliminary assessment included	The State is responsible for designating offshore wind farm areas.		Initiatives from the planning authorities (sectoral planning)	Initiatives come from the operators
Use of planning criteria	Set of criteria has been developed by the authorities and stakeholders together	Set of criteria has been used by the energy authority	Technical and spatial planning criteria defined for the indication of OWF areas and development	Set of criteria being used – design and technical criteria	Set of criteria used to identify zones	Spatial and technical planning criteria used by the planning authority to show 'Plan Options' for offshore marine renewable energy	Has an indicative list, but always case by case
Existing OWF	6 offshore wind farms (182 turbines)	13 offshore wind parks (516 turbines) 3 under preparations	18 (North Sea): EEZ (942 turbines – 4495 MW) 6 OWF in construction 9 under preparation (11/2018)	5 OWF (957 MW) + 10 areas designated for OWF See offshore wind energy roadmap 2030. www.noordzeeloket.nl/en	1 turbine	12 bottom-fixed foundation OWFs and 3 floating OWFs have been granted consent	5 77 turbines, 7 OWF approved + several projects in preparation

Key observations
Offshore Wind & MSP in North Sea countries

Similarities

- MSP process has at least started and energy is being considered in marine plans
- Most countries have designated OWF areas and already have OWF operating
- No minimum distances of OWF from shore has been applied so far
- Strong influence of MSP on OWF licensing

Differences

- No one size fits all – different legislation, planning and maturity level
- Different levels of exclusivity, including fishing, MPAs and shipping (e.g. Sweden & Germany)
- Different spatial and technical planning criteria between countries
- Planning criteria of different origins, nature & weighting
- Licensing duration and process differ
- OWF initiative differs: top-down, bottom-up and unknowns

Grid & interconnectors	Belgium	Denmark	Germany	Netherlands	Norway	Scotland	Sweden
MSP's role in locating grid connections, platforms and interconnector routes	Cable corridors are identified in the MSP and space has been designated for cables		Definition of subsea cable routes or corridors, platforms and transboundary gates for the grid connection of offshore windfarms and interconnectors within the EEZ in the Site Development Plan and not in the MSP	Priority and preferred routes for cables around sand extraction reserve areas which are determined in the Integrated Maritime Spatial Policy map and North Sea Policy Document 2016-2021	No MSP exists so planning for grid connections and cable routes is yet to be considered	The planning of cables is considered within Scotland's National Marine Plan (NMP) and planning advice and guidance is captured within the plan's policies and objectives. There are indicative export cable routes for offshore wind, wave and tidal energy developments identified in Scotland's NMP	No MSP exists so planning for grid connections and cable routes is yet to be considered
Integration into the onshore power grid; Localisation of grid connection points			Onshore grid connection points are defined within the Network Development Plan by the TSOs and Federal states are responsible for the cable routing within the territorial waters				
MSP linked to permit procedure	Cables and interconnector corridors are defined in MSP and developers propose cable routes within the corridors		Cables and interconnector routes are defined in MSP, but there is no cable priority area. Only the corridors (meaning gates) to territorial waters or the neighbouring countries are determined. Specifications in sector planning. Interconnectors and cables have to follow the MSP plan.	Developers can apply for cable routes within the cable priority areas which are subject to licensing procedures	MSP not linked to licensing due to no MSP existing.	Cable routes are largely proposed by developers for Marine Scotland's review and the NMP is considered during the licensing process.	MSP not linked to licensing due to no MSP existing.
Initiative from the operators or from the authorities/planning process?	Designation of cable corridors and interconnector corridors by authorities (sector planning)		Designation of cable corridors and interconnector corridors by authorities (sector planning)	Designation of cable priority areas by authorities (sector planning)	Initiative from operators	Initiative largely from operators	Initiative from operators
Use of planning criteria for cables and platforms	Few planning criteria exist including the use of cable corridors		Well established planning criteria. Set of criteria has been used (see Spatial Offshore Grid Plan or draft of new Site Development Plan)	Established planning criteria such as bundling and routing measures	No set planning criteria but environmental issues, biodiversity, visual impact etc. considered during planning	Less established planning criteria than for example, Germany. Some Government-led and some Industry-led criteria. Some are more guidelines rather than strict rules that are at the developers discretion	No established planning criteria
Existing interconnectors	In operation: - Nemo Link 1 GW to England Concept/early planning: - Nautilus/Nemo 2 1400 MW to England	Pre-Construction: - Viking Link 1400 MW to England Under construction: - COBRA cable 700 MW to Netherlands	Interconnectors through EEZ in operation: - NorNed (Norway-Netherlands) Under construction: - NordLink (Norway-Germany) - COBRAcable (Netherlands-Denmark) Approval procedure: - Viking Link (Denmark –UK) Concept/early planning: - NeuConnect 1400 MW to England - NorGer 1400 MW to Norway	In operation: - BritNed 1 GW to England - NorNed 700 MW to Norway Dormant - NorNed 2 700 MW to Norway Under construction: - COBRA cable 700 MW to Denmark	In operation: - NorNed 700 MW to Netherlands - Skagerrak 1-4 440 MW to Sweden Under construction: - NordLink 1400 MW to Germany - North Sea Link 1400 MW to England Concept/early planning: - NorthConnect 1400 MW to Scotland - NorGer 1400 MW to Germany	In operation: - BritNed 1 GW England to the Netherlands - Nemo Link 1 GW England to Belgium Under construction: - North Sea Link 1400 MW England to Norway Pre-Construction: - Viking Link 1400 MW England to Denmark Concept/early planning: - NeuConnect 1400 MW England to Germany - NorthConnect 1400 MW Scotland to Norway - Nautilus/Nemo 2 1400 MW England to Belgium	In operation: - Skagerrak 1-4 440 MW to Norway
Existing landing points			Spatial Offshore Grid plan: 4 gates to territorial sea 13 gates for transboundary connections Spatial Development Plan (draft): 5 gates to the territorial waters 14 gates for transboundary connections 6 cable routes for interconnectors			2 (Peterhead and Cockenzie)	

Key observations
Offshore grid/Interconnectors and MSP in North Sea countries

Similarities

- No well established grid planning/always ad-hoc (except Germany)

Differences

- Only some countries plan cable corridors
- Initiative differs from operator or planning authorities between countries
- Some countries more interconnected than others (i.e. Denmark most interconnected)

Northern North Sea has enough space, Southern North Sea is more congested and therefore planning for grid is more important

Cross sea basin comparisons
North Sea & Baltic Sea

Similarities

- MSP split between National and Regional marine planning across most North and Baltic Sea countries
- Most MSP is binding (Sweden, Finland & Latvia non-binding)
- Nearly all countries have used MSP to designate or identify possible spatial areas for OWF – strong role of MSP in locating offshore wind energy
- Set planning criteria used by North & Baltic Sea countries (but different criteria!)

Differences

- More progress in MSP in North Sea countries – Baltic Sea countries are still at early stages of MSP
- OWF distance to shore differs across sea basins (some not defined, some set distances and some case-by-case)
- Differences in licensing influence in locating OWF and whether or not licences are permitted out with designated areas
- Initiative for OWF mostly comes from operators in the Baltic Sea and from the authorities in the North Sea
- More OWFs in the North Sea compared to the Baltic Sea but projects are in the pipeline for the future

Thank you

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Riku Varjopuro
Head of Unit, Sustainable Use of the Sea Areas

Finnish Environment Institute, Marine Research Centre
e: riku.varjopuro@ymparisto.fi
Twitter: rvarjopuro

Kirsty.Wright
NorthSEE Project Officer

Marine Scotland, Scottish Government
e: Kirsty.Wright@gov.scot

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Energy Session

Step-by-step guidance on energy in MSP

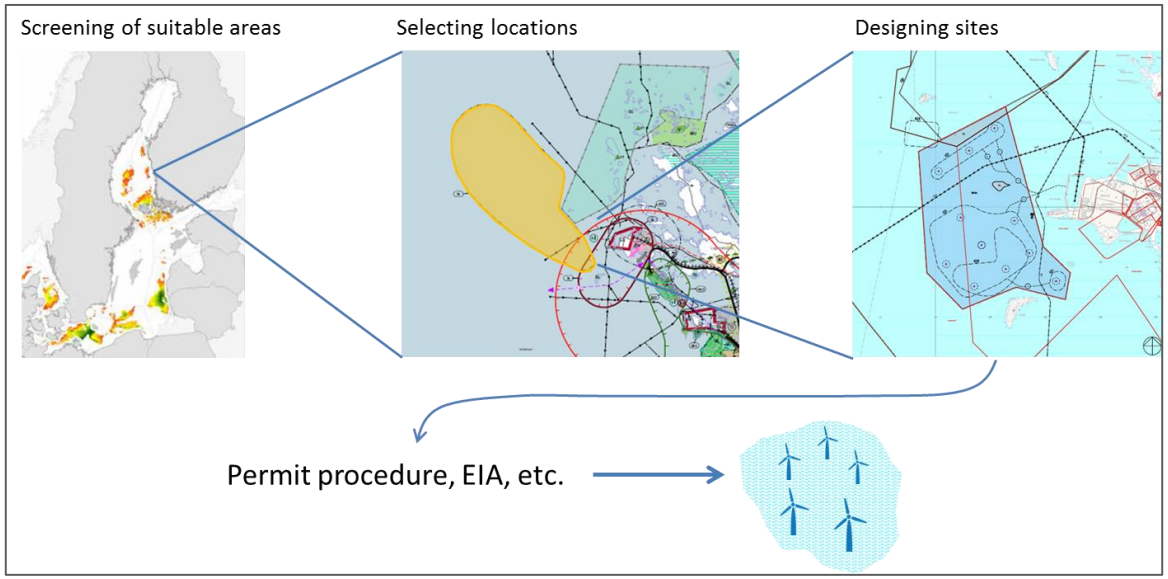
Riku Varjopuro (BalticLINes)

North SEE

Interreg North Sea Region European Regional Development Fund EUROPEAN UNION

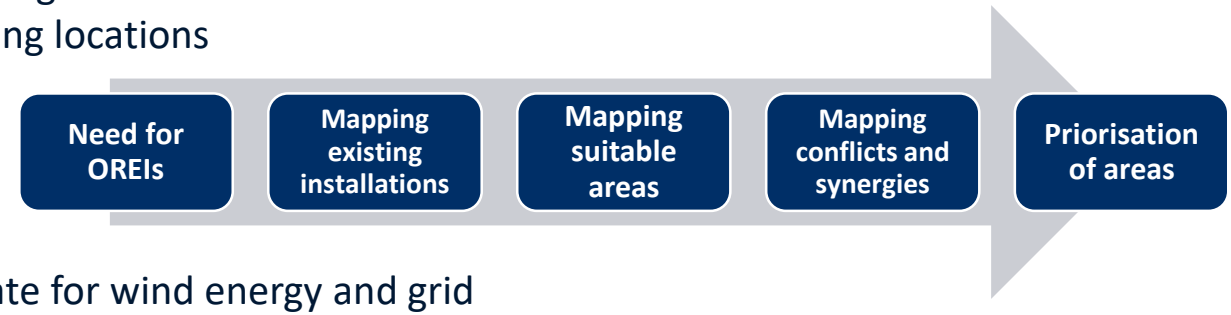
Baltic LINes

Interreg Baltic Sea Region EUROPEAN UNION EUROPEAN REGIONAL DEVELOPMENT FUND



Steps of the guidance document

- Screening suitable areas
- Selecting locations



- Separate for wind energy and grid

Step 1: define the need for development (wind)

- *Analyse political goals*
- *Identify priorities of development*
- *Check priorities of neighbouring countries*
- *Analyse future trends*

MW*	2017	2030 Low	2030 Central	2030 High	2050 Low	2050 Central	2050 High
Denmark	880	1 620	1 769	2 169	1 769	3 926	8 786
Germany	689	2 124	2 084	2 368	8 542	17 737	49 732
Sweden	206	386	757	1 157	4 496	11 030	26 055
Finland	87	235	448	539	2 694	10 722	34 511
Poland	-	1 464	1 727	3 411	4 981	20 109	61 193
Estonia	-	225	425	900	2 042	2 807	4 722
Lithuania	-	-	50	100	1 672	3 343	8 232
Latvia	-	-	-	133	824	2 093	5 762
Baltic EU	1 861	6 055	7 260	10 777	27 020	71 768	198 992

Step 2: Mapping the existing designations and installations (wind)

- *Take existing energy sector plans as a starting point*
  - *Swedish example*
    1. *Take the existing national energy plan*
    2. *Analyse applicability of old areas and identify new ones (with the sectors)*
    3. *Include them into your MSP*
- *Other uses (hard constraints)*

Step 3: Mapping suitable areas (general planning criteria) (wind)

- *Physical conditions*
- *Demand for energy in the area*
- *Grid connections*

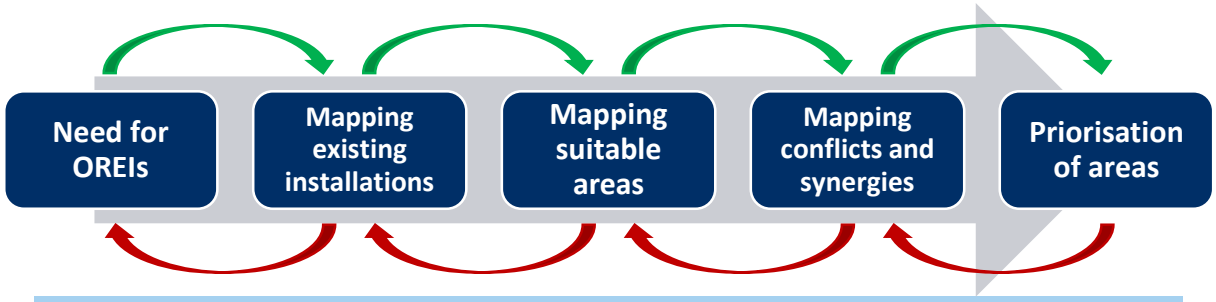
Step 4: Mapping conflicts and synergies with other uses (wind) - Organise cross-sectoral discussions

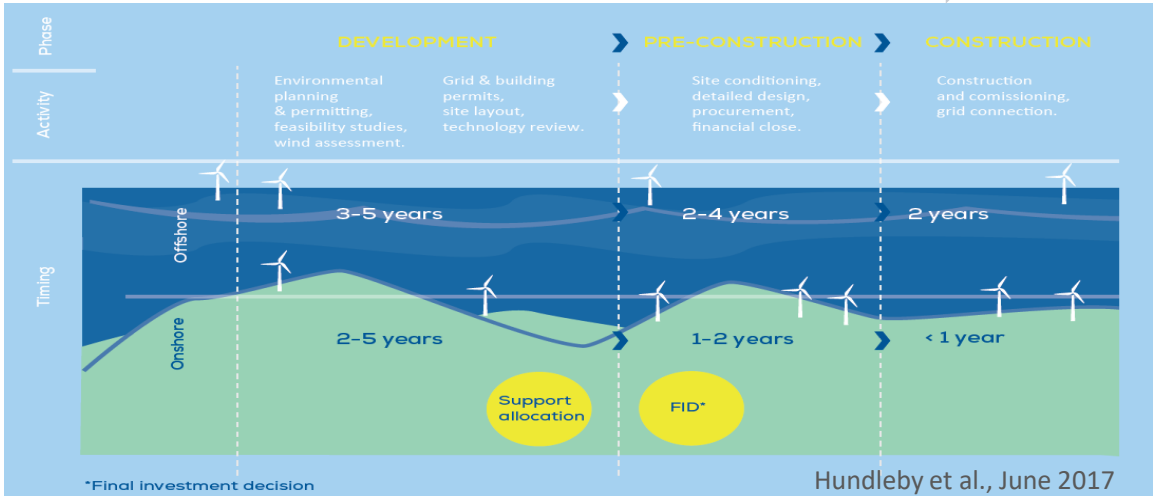
No-go areas with buffer zones:

- Recreational housing, distance 2000m
- Shipping lane (depth 5m or over), distance 350m
- Shipping lane (depth less than 5m) , distance 50m
- Light house, distance 1000m
- Ship wreck, distance 1000m
- Recreational areas, distance 3000m
- Valuable areas for cultural history , distance 3000m
- Natura 2000 areas , distance 3000m
- Other protected areas / natural protection, distance 3000m
- Bird protection areas, distance 500m

Step 5: Define priority areas for offshore wind energy (wind)

→ the plan





Hundleby et al., June 2017

Step 1 (cables)

- ***Analyse political framework/targets***
- ***Take into account future demand***

Infobox – TYNDP

The future demand for transnational cables from the energy market perspective is identified by all European transmission system operators in the Ten-Year Network Development Plan (TYNDP, published every two years) based on the ENTSO-E System Needs Report. The TYNDP includes trans-regional and international grid development measures, which are of international importance for the European cross-border electricity transmission.

https://tyndp.entsoe.eu/tyndp2018/

Step 2 (cables)
- Suitability of areas: geology

Step 3 (cables)
- Conflicts and synergies with other uses

Uses particularly to consider:

- Shipping (consideration of safety and insurance reasons)
- Natura2000 areas and sensitive biotopes/ habitats (Routing outside these areas is desirable.)
- Pipelines
- Military exercise areas, esp. exercise areas for submarines
- Cultural heritage sites, for example wrecks
- Sand and gravel extraction
- Offshore Wind Farms
- Fishing grounds (The interests of fisheries should also be taken into account at an early stage.)
- Dumping grounds
- Munition

Step 4 (cables)
- Consider land-sea interaction: connection to grid on land

Step 5 (cables)
- ***Define cable corridors***

Interactive Discussion (table-based)

Which topics related to the energy sector have not been covered in the presentations so far but could be of major importance for the North Sea and Baltic Sea?

Which developments of the energy sector could be the main drivers in future MSP processes?

How could future collaboration within the energy sector look like (transnational and between sea basins)?

Discuss the spatial impacts of renewable energy (map): where are possible areas for the energy sector in the future? Possible conflicts? Solutions?

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Wrap up and main messages

Andronikos Kafas