

OX2

Does offshore wind increase emissions from shipping

OWF project development perspective



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OX2 in brief



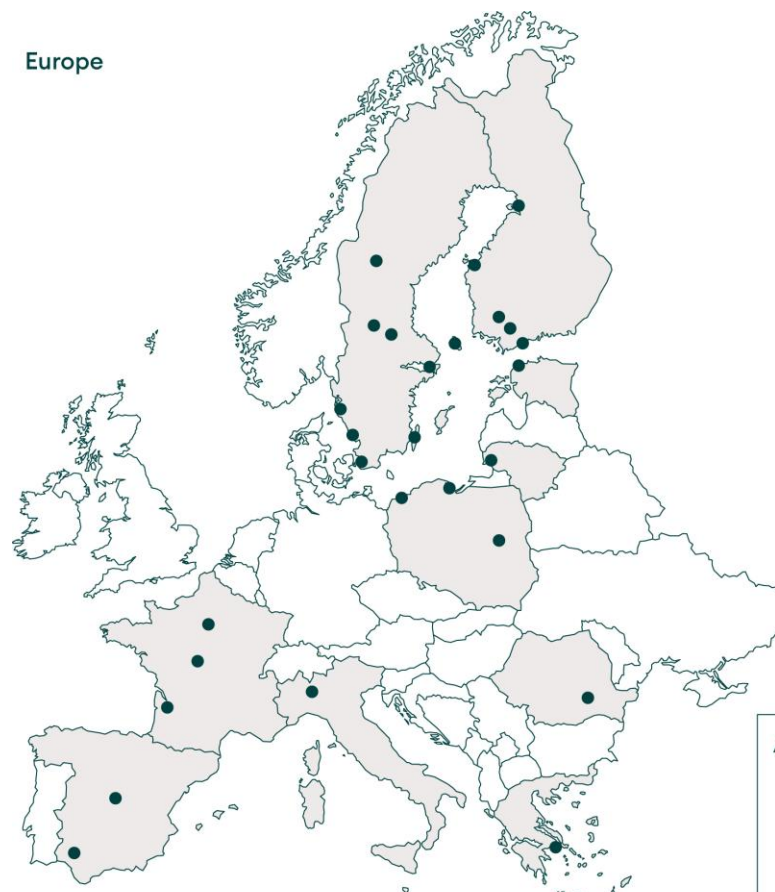
SEK
7.3_{bn}
LTM Net sales Jul-Jun

5.5%
LTM Op margin Jul-Jun

1,505_{MW}
LTM Net sales Jul-Jun

47,375_{MW}
Total portfolio
as per Q2 2024

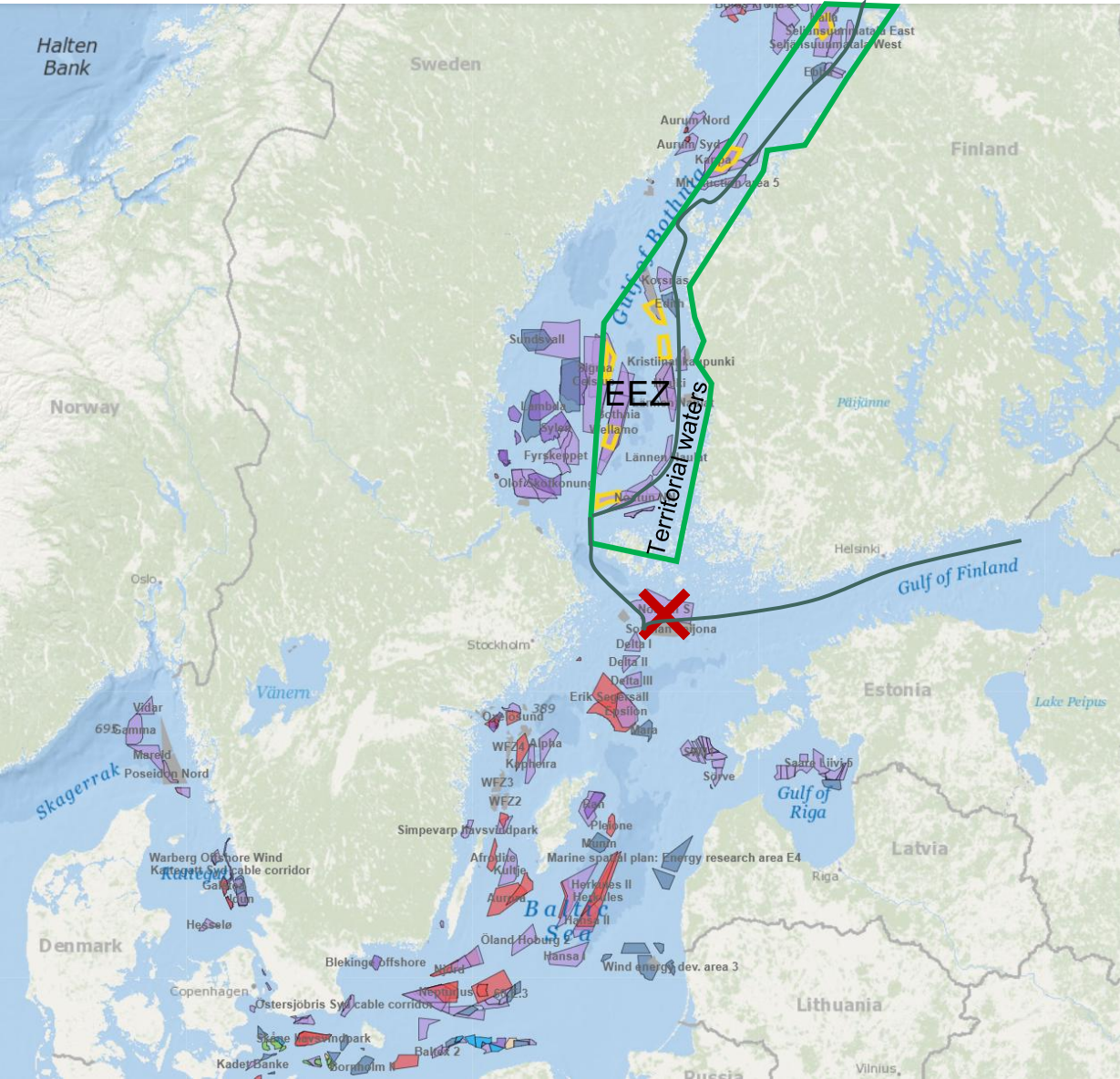
Portfolio (Year-end 2024)	
Development	
Onshore wind 11,505 MW	
Offshore wind 13,768 MW	
Solar power 6,804 MW	
Energy storage 996 MW	
Construction	
Under construction 1,019 MW	
Asset management	
TCM 5,050 MW	



[Björkskär - OX2](#)

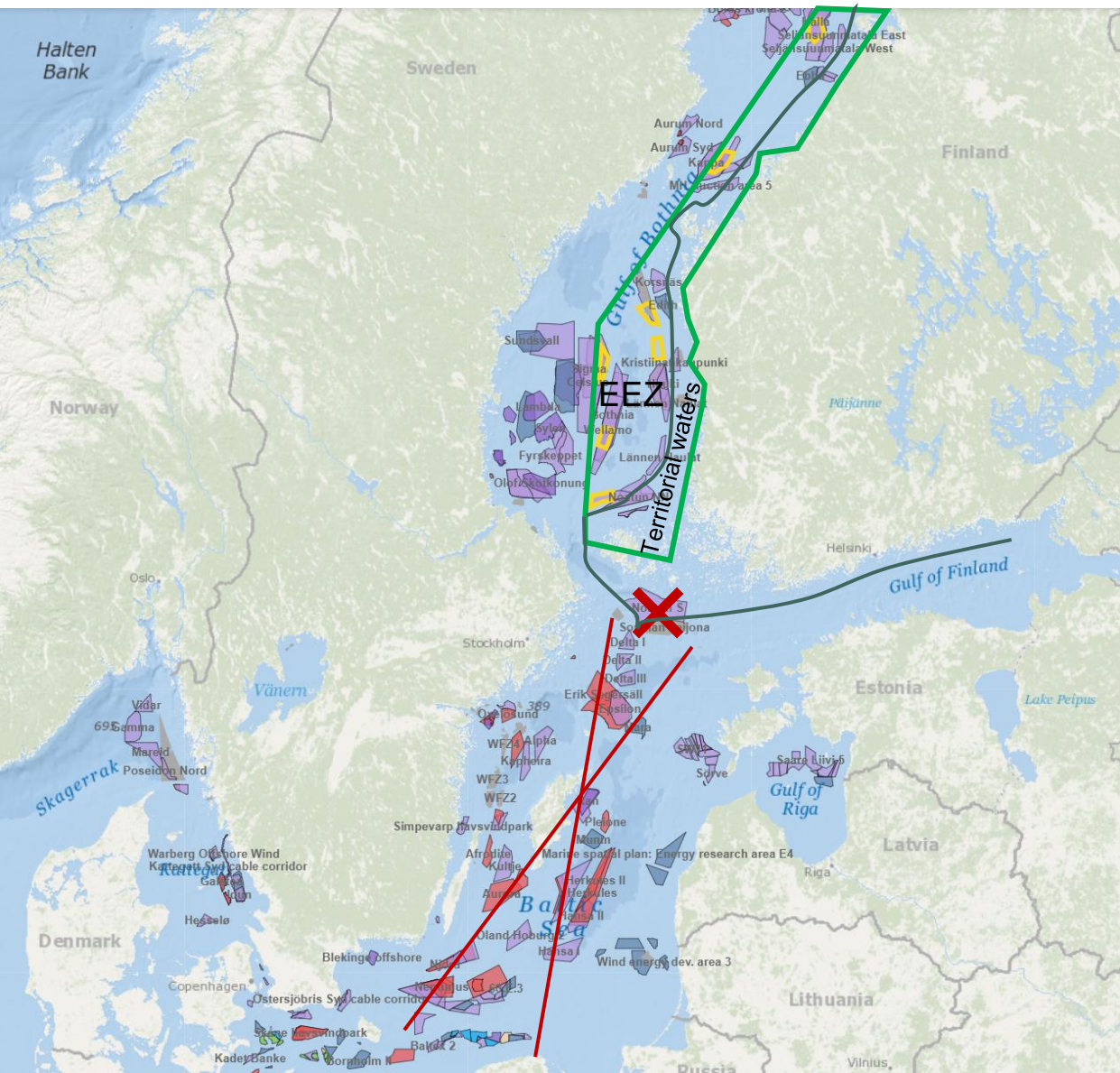
[Långnäs: Mega Grön Hamn - OX2](#)

OWF Projects in the Baltic-region – Status before 4:th of November 2024

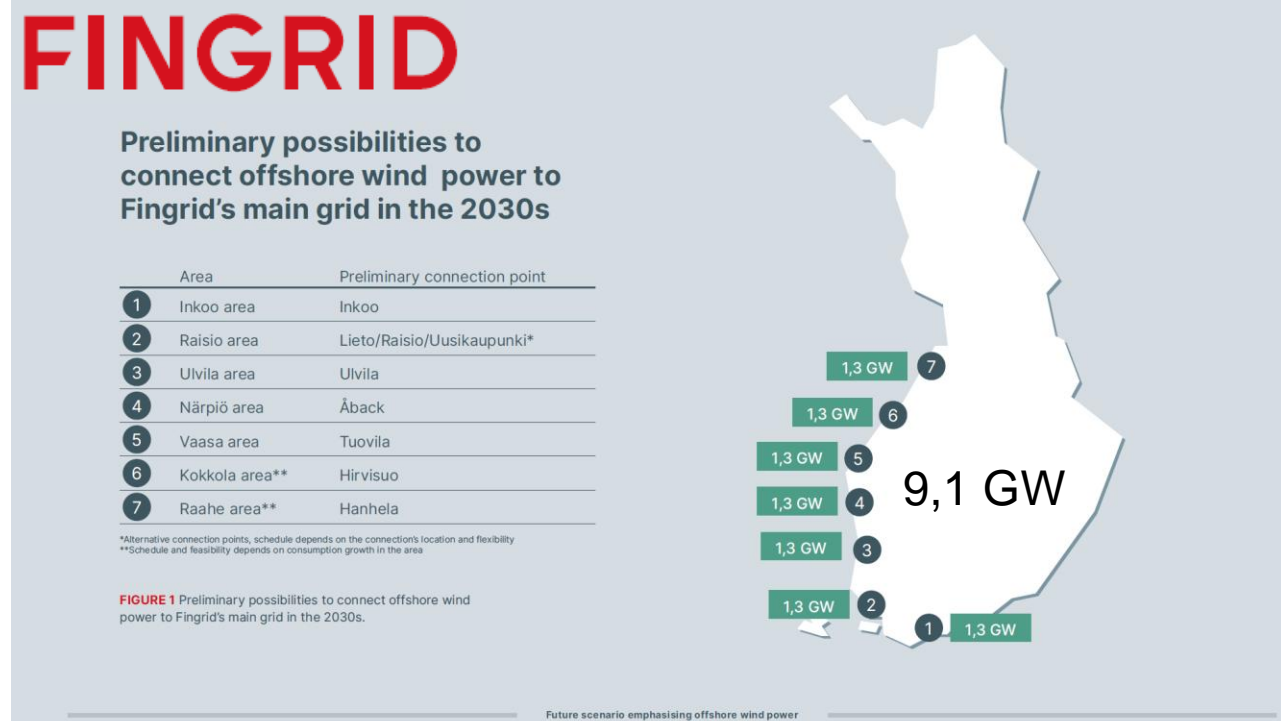


- Most of the projects in the Baltic region was in EEZ
- OWF-projects close Åland are in territorial waters
- Forstyrelsen (Finland) has OWF-projects in territorial waters (auctions & developments)
- New legislation regulating OWF in Finnish EEZ
- Finnish Defense Force are positive to projects north of Åland
- Finnish defense force are negative to project south of Åland and in Gulf of Finland
- Forstyrelsen are proposed to be responsible for handing out exclusivity to OWF-projects Finnish EEZ

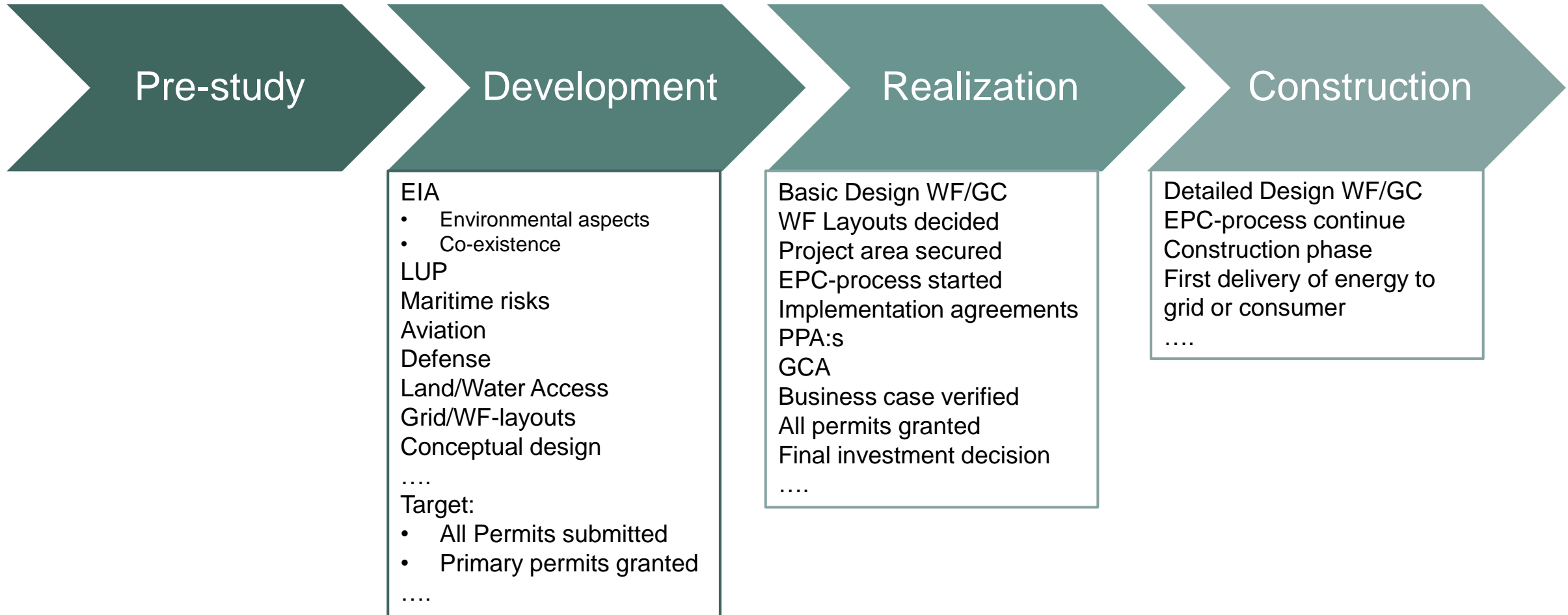
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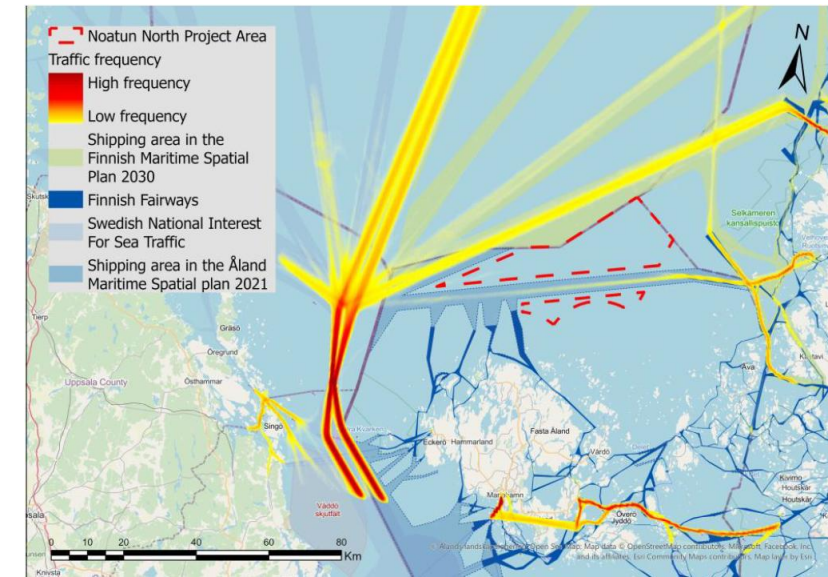
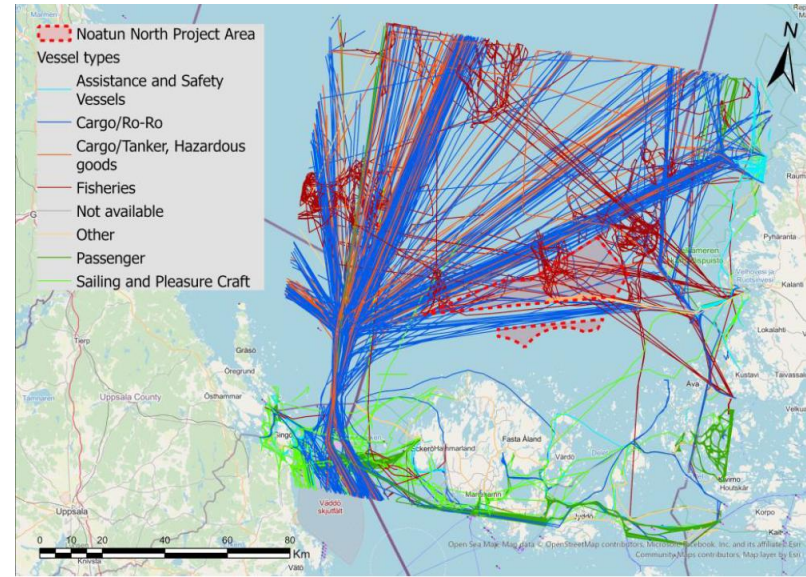
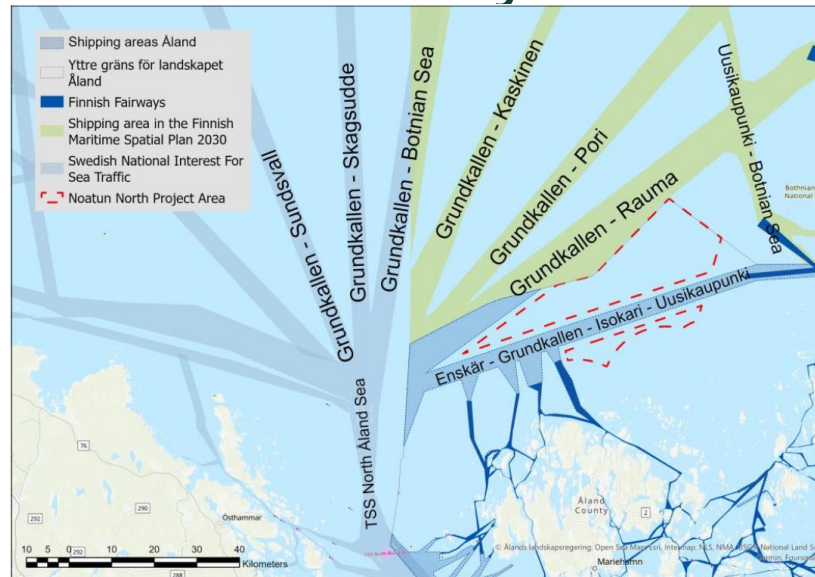
- Swedish government rejected all permit applications projects in EEZ south of Åland and East of Öresundsbron
- Projects in Swedish territorial waters are still ongoing
- Fingrid published their final study of possible connection points for OWF-project on the west coast.



How is maritime industry included in the OWF-development process?

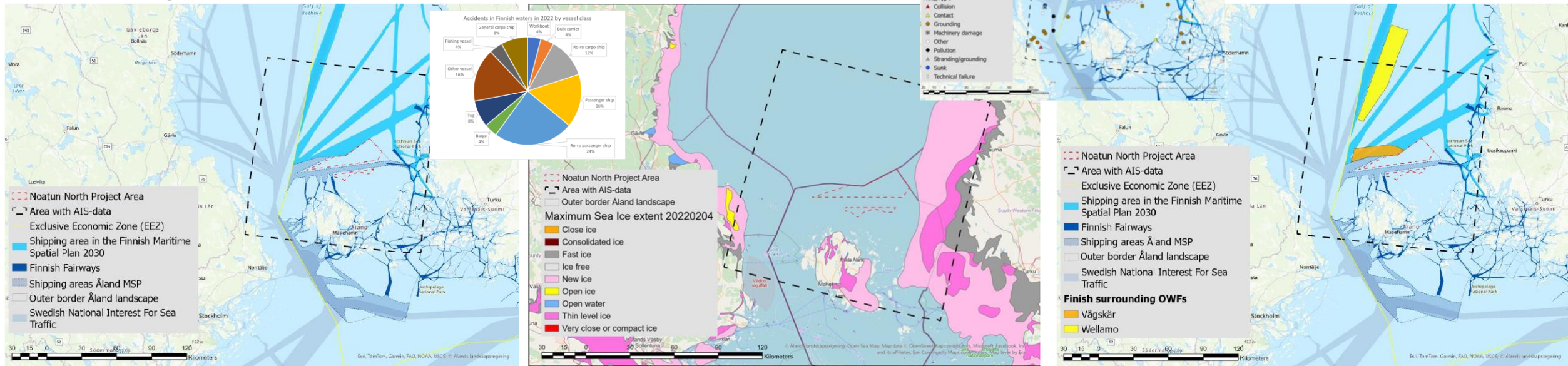


Traffic analysis



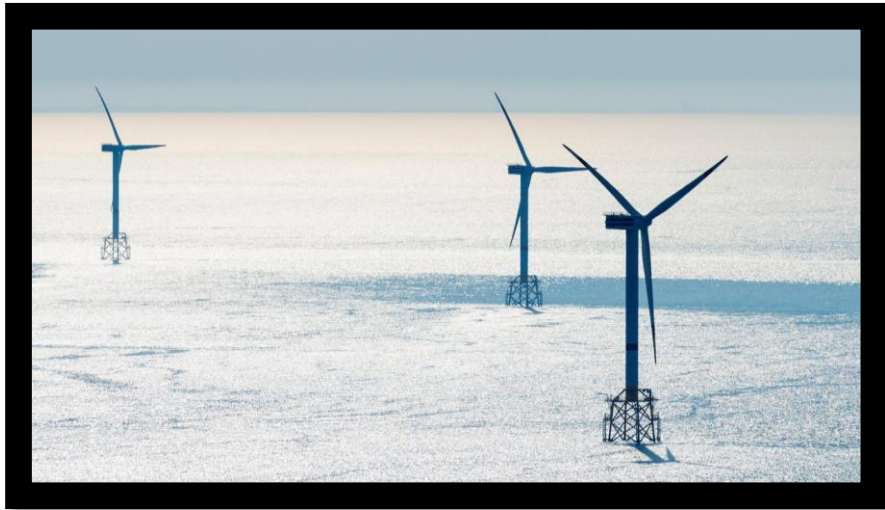
- The basis for finding out how an offshore wind farm and shipping can coexist
- Based on available AIS data from authorities
- Carried out for the first time in the EIA-phase of an OWF project, revisited several times during project development
- Used as base for Navigational risk assessments of the OWF-project and cumulative effect from neighboring OWF:s
- Maritime transports during ice-conditions important topics in Bothnian sea and Bothnian bay
- Part of permit-processes (Env. Authorities, Traficom...)

Navigational risk assessment



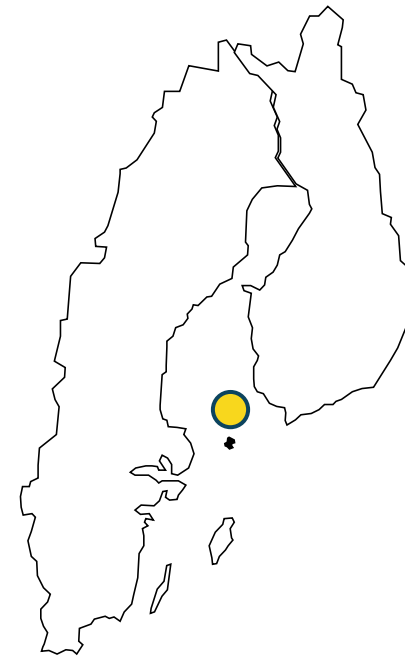
- Risk workshops with relevant stakeholders (FI, SE, AX) including cumulative effects from other OWF:s
 - Participants form Authorities, coast guard, SAR, shipping, developers, municipalities, icebreakers a.o.
 - Carried out for the first time in the EIA-phase of an OWF project, revisited several times during project development
 - NRA will be used as fact base for permit applications → Describes risk level & mitigating measures
- In Finland/Åland;
- Traficom & Väylä – Permitting authorities for OWF:s

Climate effects of an OWF-project



Noatun Nord

Åland

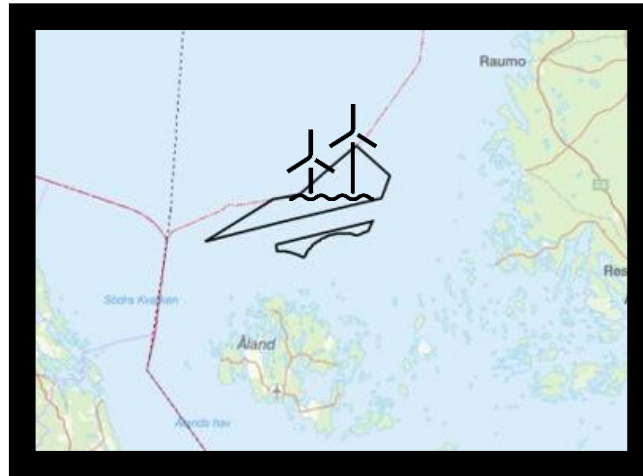


Björkskär - OX2

Långnäs: Mega Grön Hamn - OX2

From OWF lifecycle perspective, including:

- Development
- Construction
- O&M
- Deconstruction



265
15 MW turbines

Development phase

Yearly production:
15,6 TWh
Effect: 4 GW

11.56 million tons less CO₂ emissions per year (>20 % of Finland's yearly emissions)

Conclusions – Is there a risk that OWF:S will increase CO2-emissions from maritime industry



- No, not from a lifecycle perspective → OWF-energy production will compensate the CO2-emissions from the whole development and construction phase.
- Co-existence is a topic in several permit-processes (EIA, Env. Permits, Maritime special plans, Land use plans, Aviation, Maritime...) and will be assessed from a holistic perspective by authorities → Unlikely that maritime aspects not are included in permit.process (at least by Finnish authorities)
- All initiated projects will not be realized!
 - Limited capacity at TSO:s
 - New legislation regulating project-process in Finnish EEZ-zone
 - Financial aspects

Administrative and organizational measures	Technical and physical measures
A. Emergency shutdown procedures for WTs.	K. Emergency shutdown function for WTs.
B. Procedures for environmental accidents.	L. Equipment for spills.
C. Emergency preparedness plan.	M. Visual marking.
D. Dialogue with maritime stakeholders.	N. Radio and radar marking.
E. Marine coordinator.	O. Foghorn.
F. Construction risk analysis.	P. ID tagging.
G. Work vessel procedures.	Q. Measures against radar interference (lost target).
H. Information.	R. Navigation lights.
I. Ice management.	S. Virtual fairway.
J. Enhancing winter traffic collaboration, coordination, and regulation.	

The cumulative effects of the establishment of several OWFs in the area do not entail any additional risks beyond those identified when analysing the OWFs individually.

The overall conclusion is that the risk induced by Noatun North OWF is *acceptable*, presuming that reasonable mitigating measures are taken. Risks related to winter navigation and ice are not assumed to have severe consequences for human health and safety or for the environment but are classified as *ALARP* to assure that the uncertainties do not lead to underestimation of risks.

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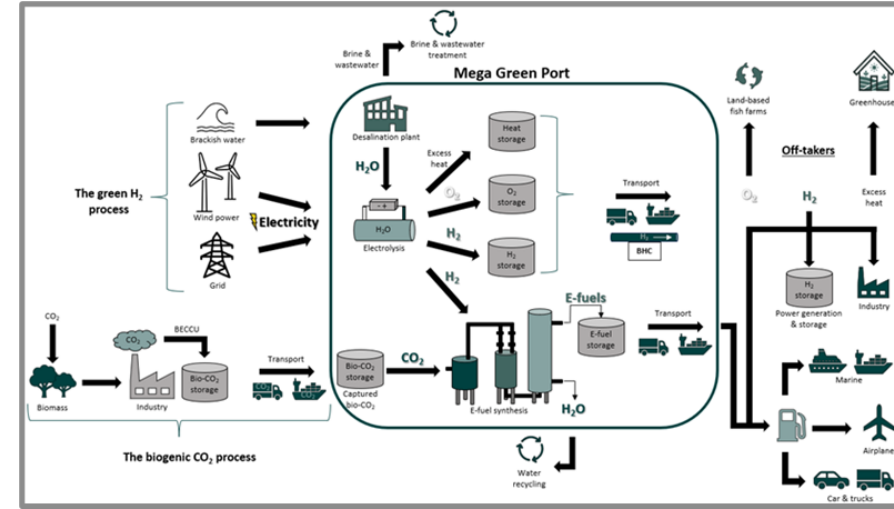
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- OWF-projects can help reduce CO2-emissions from maritime industry -

How can OWF-projects reduce CO2 emissions in Maritime industry?



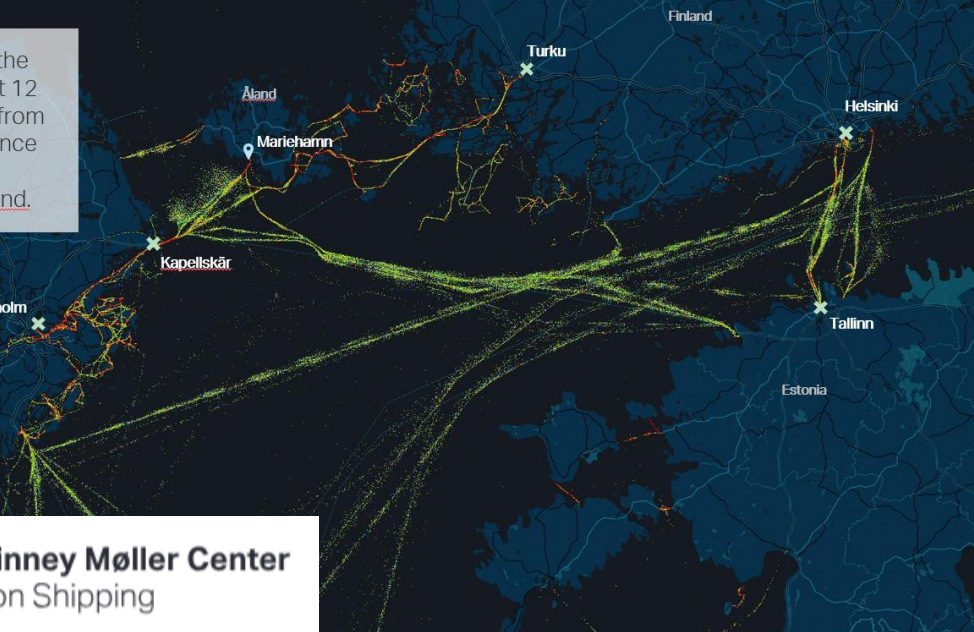
Sustainable e-fuels produced from biogenic CO2 and green H2 produced with fossil free energy from OWF:s close to areas where Green corridors will be established



Emissions & Maritime Activity: Vessel density maps

Density maps of passenger vessels support that both domestic and international RoPAX routes may be a major contributor to Åland and Finland's CO₂ emissions connected to maritime activity

The density map shows all the vessel activity over the past 12 months based on AIS data from Sea, illustrating the importance of both domestic and international shipping in Åland.

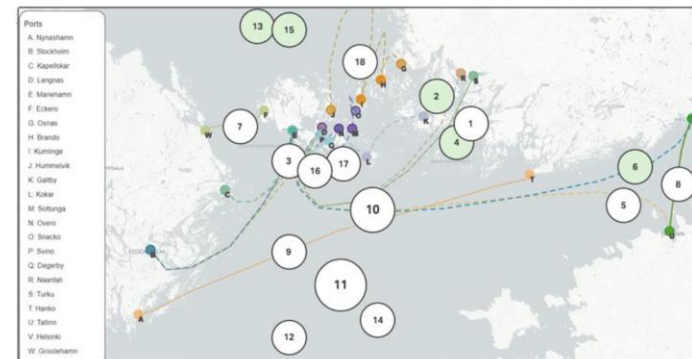


The Pre-Feasibility Assessment unlocked nine Green Corridors, with an additional nine options introduced at the Consortium Incubation Workshop

Results from the Prioritization Exercise at the Consortium Incubation Workshop

Unique Route ID	Route Configuration
1	Kapellskär - Åland (M) - Turku
2	Kapellskär - Åland (L) - Naantali
3	Stockholm - Åland (M)
4	Stockholm - Åland (ML) - Turku
5	Stockholm - Åland (M) - Tallinn
6	Stockholm - Åland (M) - Helsinki
7	Grisslehamn - Eckero
8	Tallinn - Helsinki
9	Nynäshamn - Hangö
10	Combined Green Connector - Northern Baltic Sea coverage
11	Combined Green Connector - Complete Baltic Sea coverage
12	Methanol as cargo transportation to Port of Rotterdam
13	Northern Bothnia Industry / Cargo movement
14	RoRo / Freight traffic to Germany and/ or Poland
15	Steel and Mining
16	Service Operations Vessels (SOVs)
17	Tugboats
18	Archipelago / Commuter traffic

The five Corridors receiving highest scores, and therefore the ones prioritized for Feasibility, are highlighted in green on the Route Map below



A scenic view of a wind farm at sea. The sky is a deep blue with a bright sun in the upper right corner, creating a lens flare. A white contrail from an aircraft streaks across the sky from the top left towards the center. The sea is dark blue with a shimmering reflection of the sun. In the distance, several wind turbines are silhouetted against the horizon.

Thank You!

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