

Enabling offshore wind power in the territorial waters of Åland

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Åland

- †† Åland is located between the Finnish mainland and Sweden.
- †† Åland is an autonomous region in Finland.
 - †† 6,757 islands of at least 0.25 hectares.
 - †† Land area 1 554 km², water area 11 742 km².
 - †† Population of 30 344 persons.
 - †† 16 municipalities.
 - †† 100 years of autonomy with own jurisdiction in many key areas.
- †† Development of legislation and work on maritime spatial plan started in 2016, with a public proposal presented in 2019.
- †† The current Åland Maritime Spatial Plan was adopted in 2021.
- †† The MSP identified 1000 km² as potential for offshore windfarms.

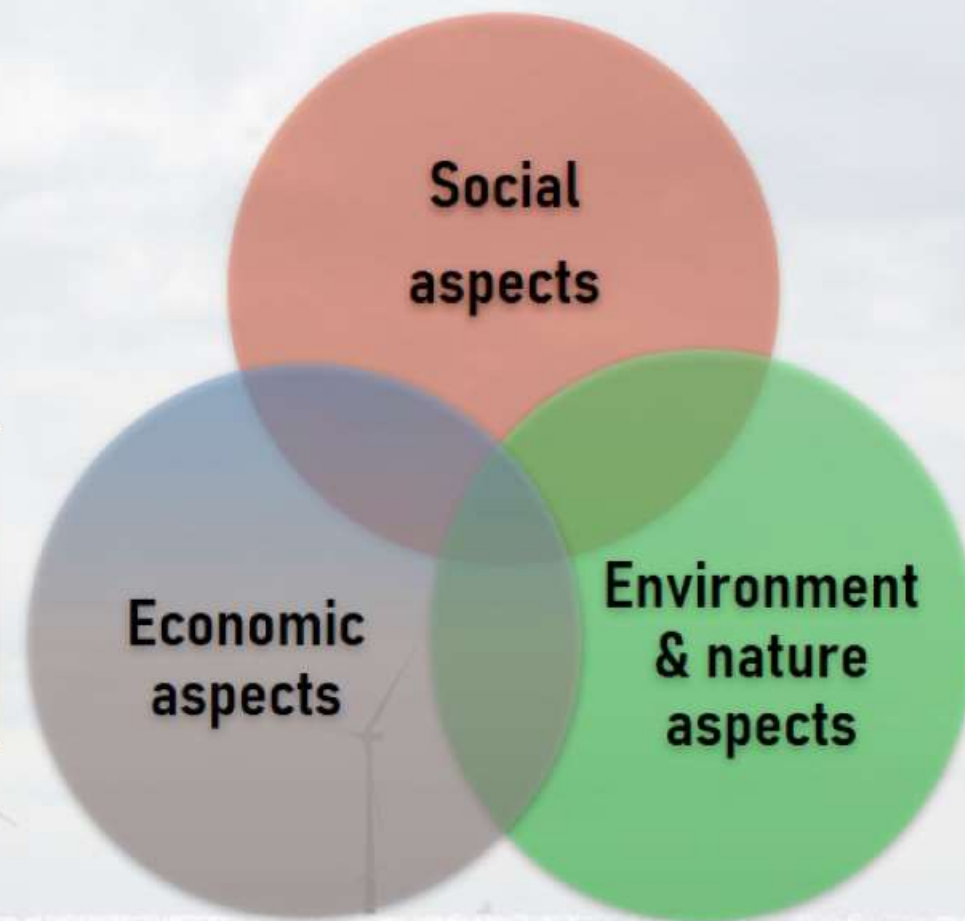
Materialiet innehåller en samling av data. Se specifika lager för vad som gäller | Esri, GEBCO, DeLorme, NaturalVue | Esri, HERE, Garmin, FAO, NOAA, USGS

The maritime spatial plan & energy

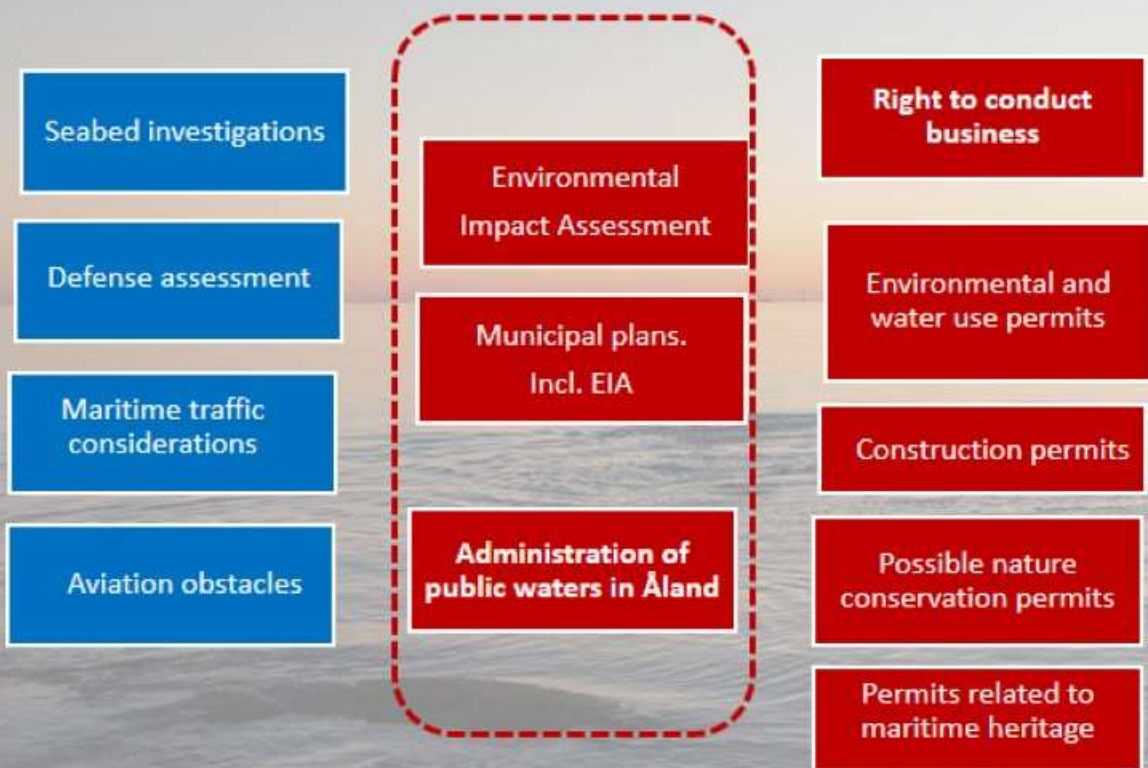
- †† The Åland Maritime Spatial Plan (MSP) areas for windpower production raised interest already during the planning process.
- †† The northern energy areas in the MSP could potentially be increased to over 1000 km² (from the current 670 km²). This could enable a capacity in the range of 4 GW with an annual production of 20 TWh.
- †† Territorial waters are administered by the Government of Åland. Public waters encompass more than 7000 km². The additional 4600 km² of sea areas in Åland are privately controlled.
- †† The Åland government established the Sunnavind project in 2021, with EU RRF funding.
- †† The Sunnavind project task is to enable windpower in the northern areas on market-based principles. The right to develop will be rewarded in a competitive process.



Sunnanvind project approach



Example of permitting competence for offshore wind



⚠ For the permitting of the Åland energy areas, competence is divided.

(scope shown does not constitute complete permitting scope)

⚠ For project implementation outside Åland Finland's processes and legislation is applied

⚠ For connections to grid in Sweden an additional legislative framework is added to project development.

⚠ The Sunnavind projects ambition is to make the permitting process as fluid as possible. Co-operation with various authorities in the surrounding regions is paramount. The intent and scale of development has cross-border possibilities and effects.

■ Åland authorities
■ Finnish authorities

Some strategic alternatives for transmission of energy *

Export to Sweden



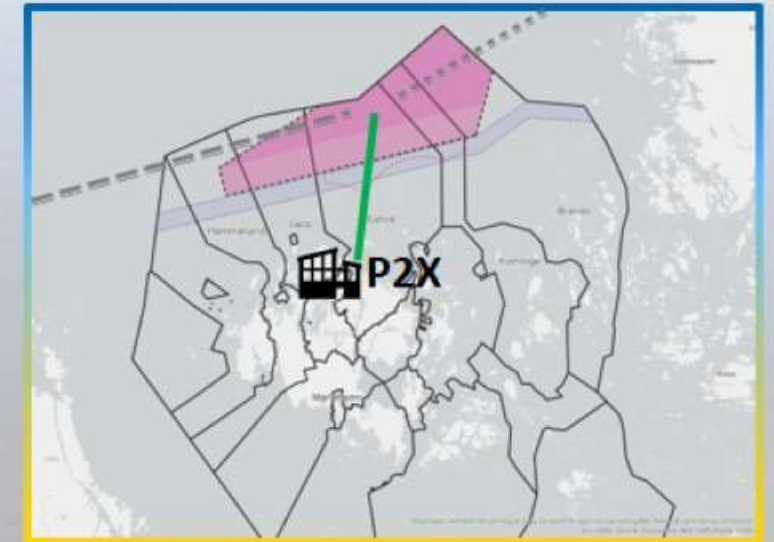
Export to Finland



Export to Finland & Sweden & transit

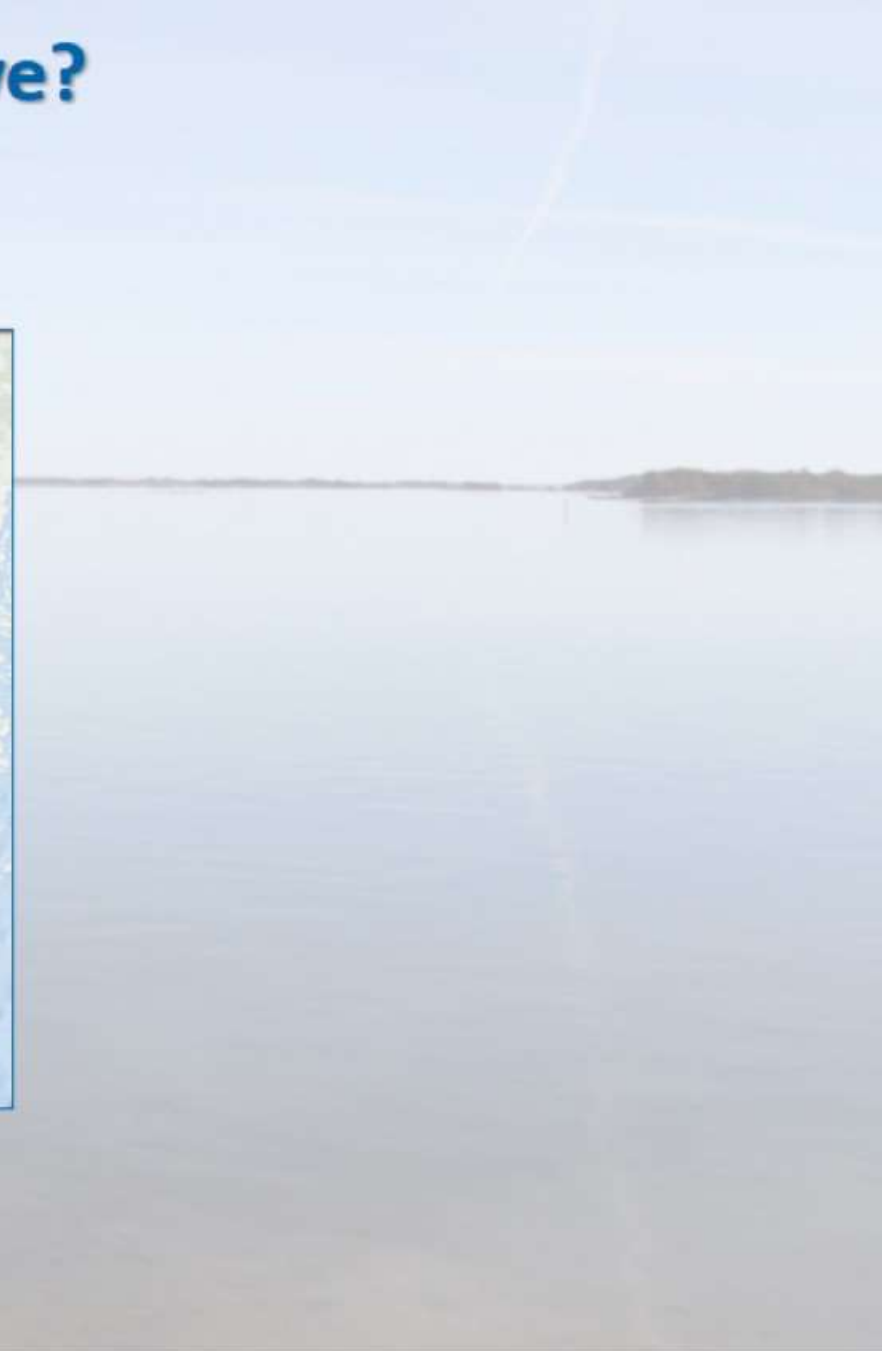
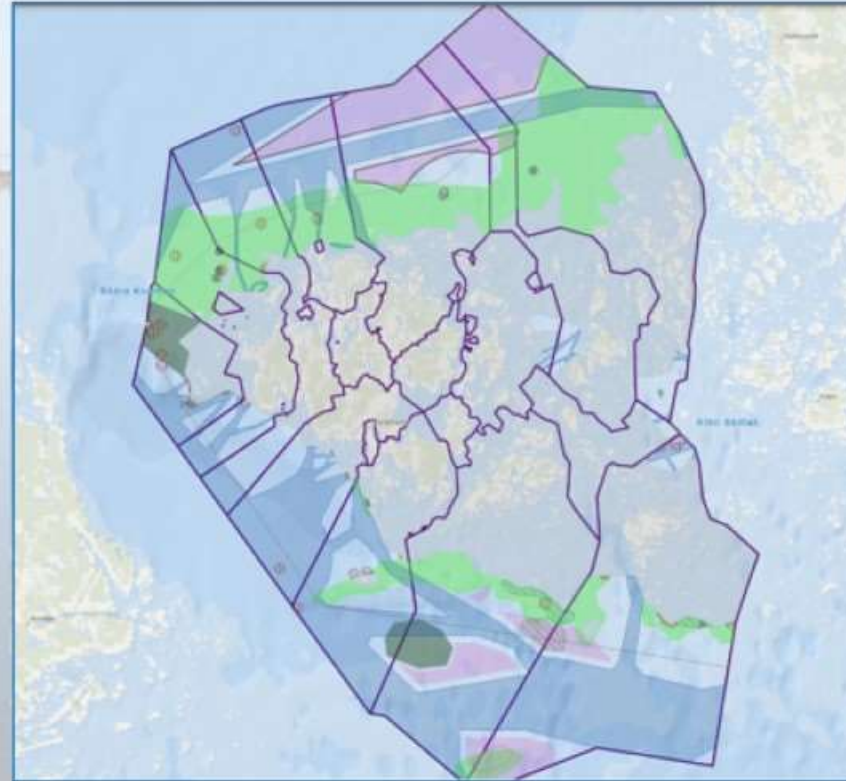
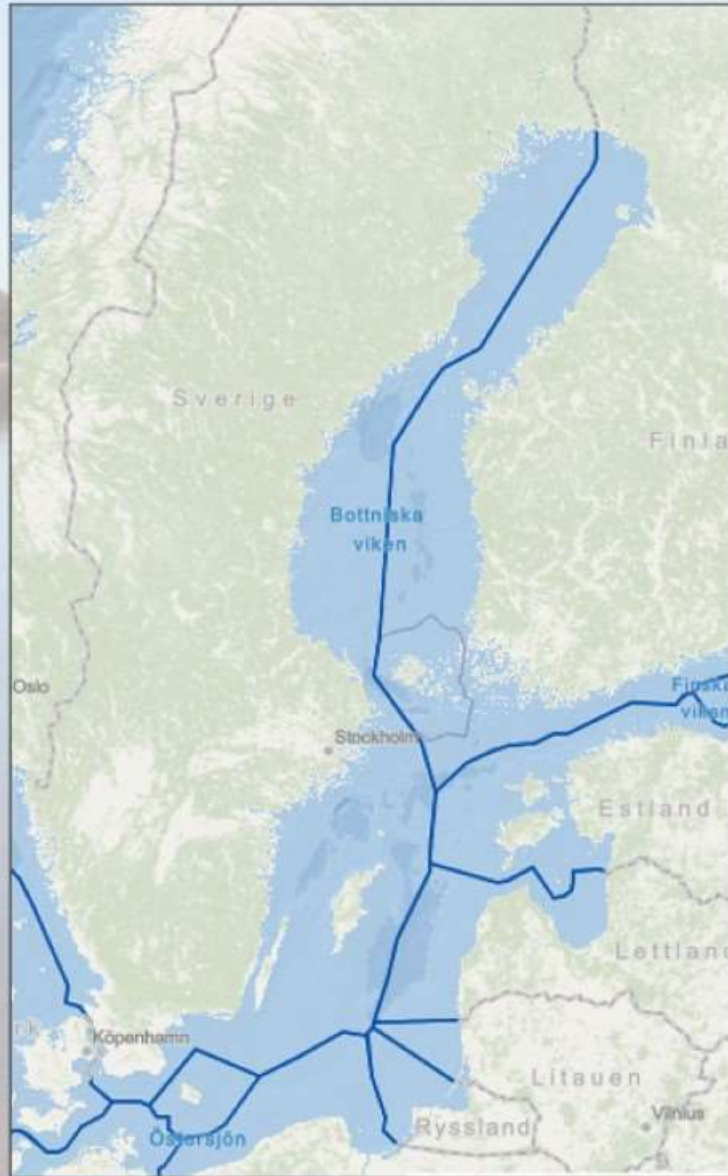


- † Foreseen development is for 280-340 m height windmills with a capacity of 15-20 MW, resulting in total of 4 GW and annual production of 20 TWh.
- † Hydrogen/P2X offers an interesting alternative that can be realized depending on how grid connections east/west become available. Hybrid models are likely in future solutions.
- † The project is evaluating various relevant alternatives that may have a bearing on long-term benefits and the competitive process.

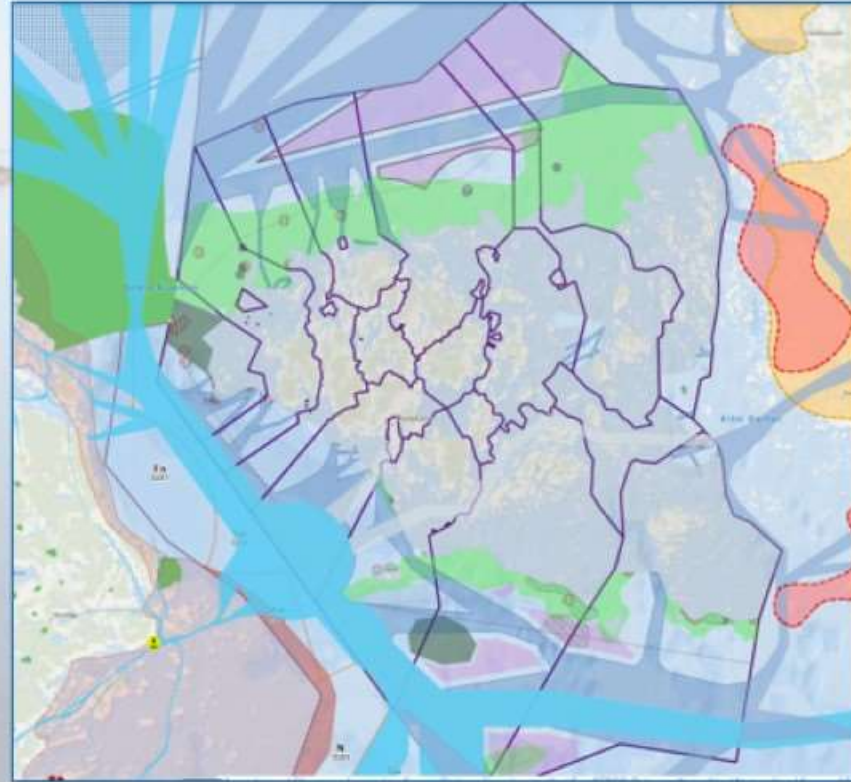


*Lappeenranta-Lahti University of Technology report available on <http://urn.fi/URN:ISBN:978-952-335-752-5>

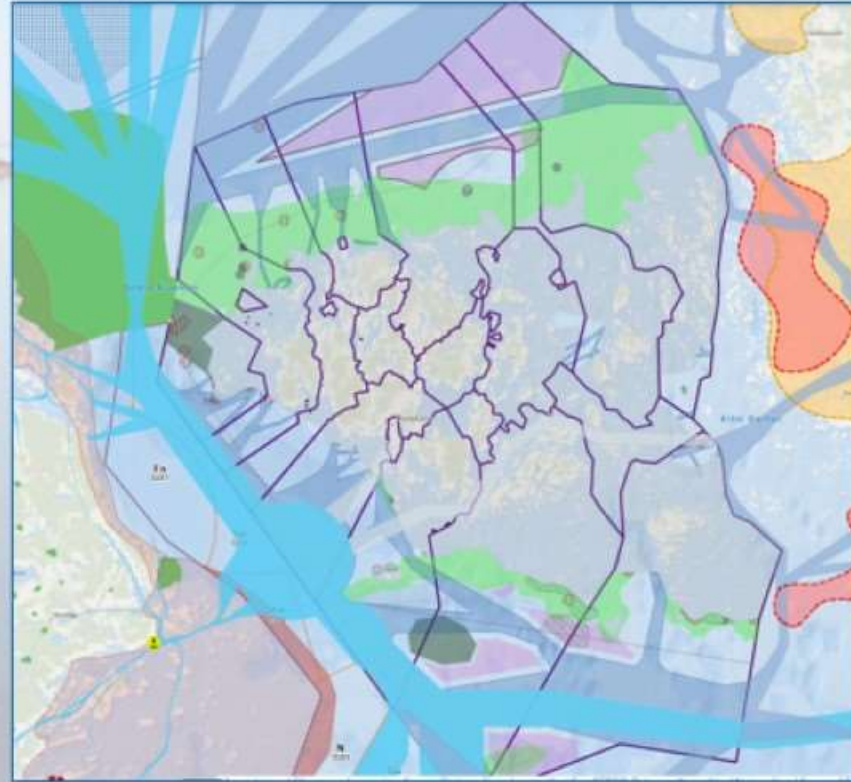
How do things look from an Åland perspective?



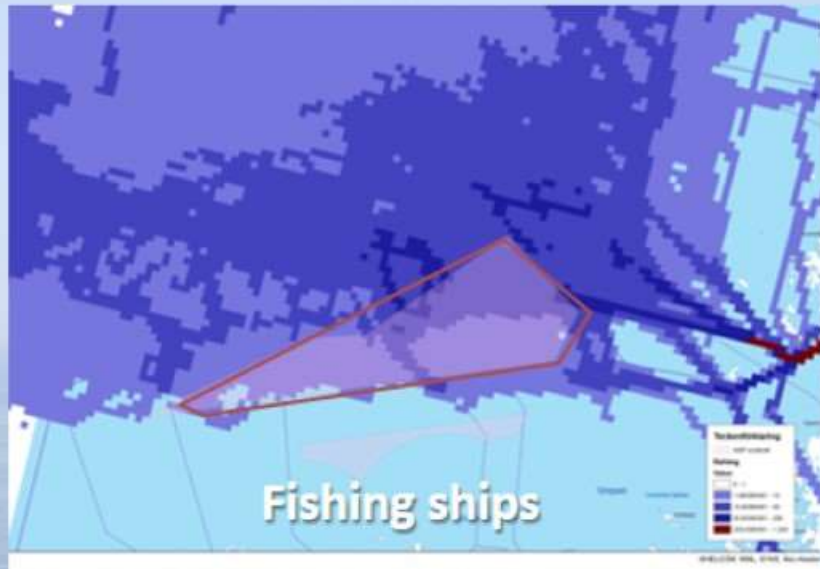
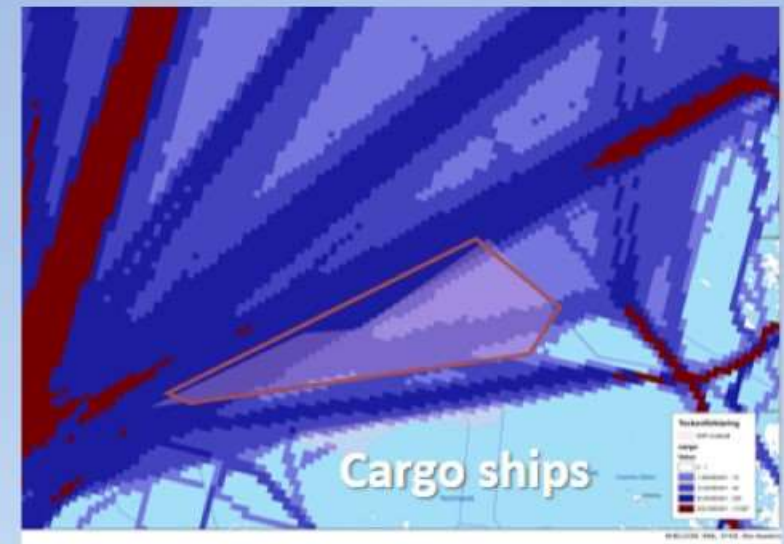
Multiple interests seen from an Åland perspective



Multiple interests and market seen from an Åland perspective



Cumulative marine traffic in Sunnanvind areas during 2006-2020



Some reflections

- **Offshore windpower has escalated - the potential is central in creating the sought for new energy market. We are in a paradigm shift, with many challenges to solve.**
- **Innovative ways of realising the societal value is needed, implying multi-authority approach to finding solutions to avert suboptimal solutions and resource utilisation.**
- **An example is ice-conditions in the Gulf of Bothnia – could a holistic approach be taken, as it is of a greater regional/national interest? Energy + maritime traffic (+ other multi-use) and the subsequent system development and operations in the future.**
- **Grid connectivity is critical. In the Sunnanvind case, a special issue is the opportunity for regional/country connections, with possibility to strengthen Nordic electricity market.**
- **Co-existence & compounded societal value used to weigh development alternatives**
 - **Multi-use of the sea areas: Nature, Traffic, Food, Leisure, Societal benefits & acceptance**
- **The Åland energy areas are part of a string of pearls for the market to make the transition.**



Koksnan lighthouse, distance 5,3 km



View with theoretical clear visibility of fully developed MSP area.
340 windmills of 320 meter total height. Distance to closest mills 15 km.

Koksnan lighthouse, distance 5,3 km



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**View, rendered according to Koksnan natural obscuring haze, of a fully developed MSP area.
340 windmills of 320 meter total height. Distance to closest mills 15 km.**