Maritime at RISE

Maritime department at RISE (former SSPA) and the business area: Environment, Risk and Operation:

About 40 NRA related to offshore wind farms

2025: ”Estimation of costs and resource requirements regarding the impact of offshore wind power on winter navigation in the Gulf of Bothnia” (the so called WinWin project. RISE on behalf of SMA)

Simulation services

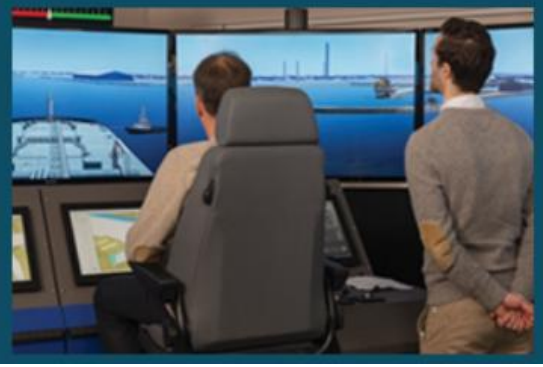
Nautical risk analyses

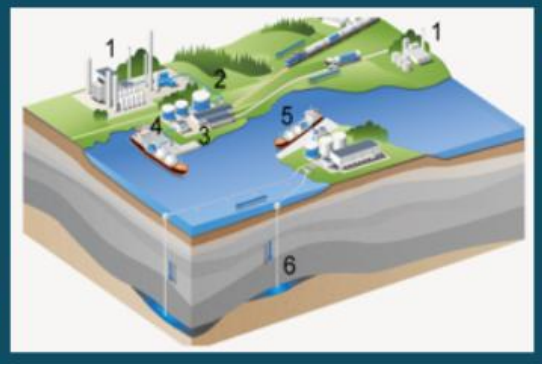
Advisory services

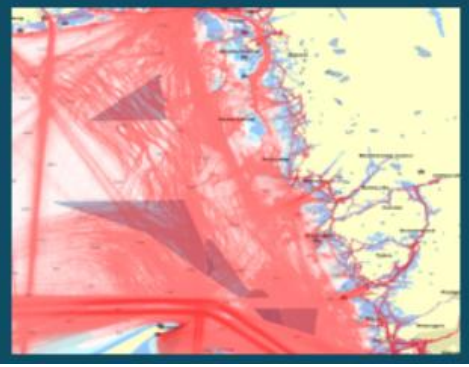
Casualty investigations

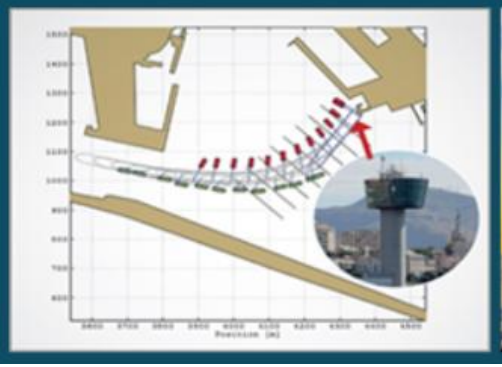
Pre-studies

Spatial planning









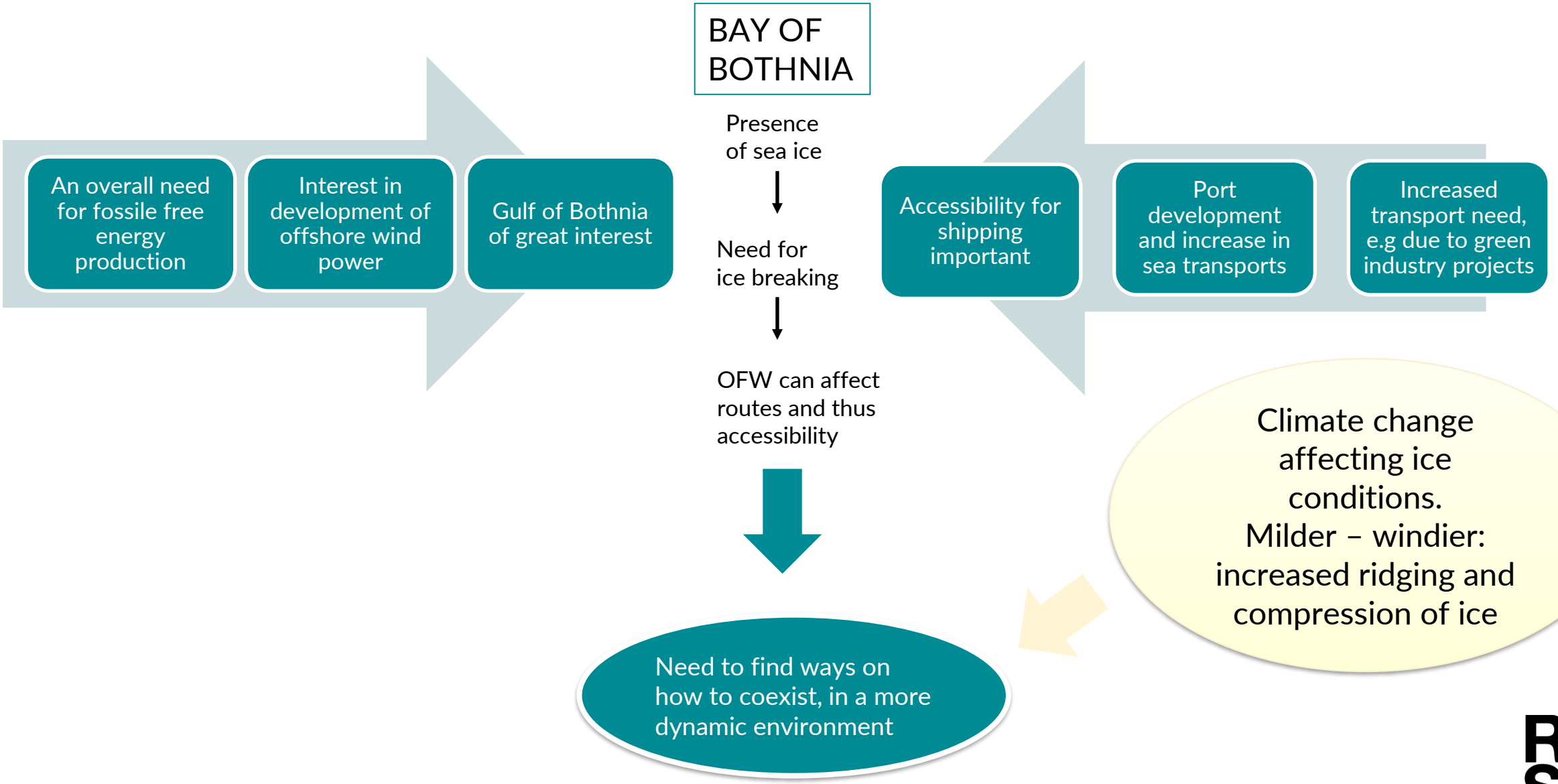
Maria Bännstrand, Senior specialist nautical and maritime risks

Coexistence between shipping and offshore wind in areas with sea ice

17 March 2026

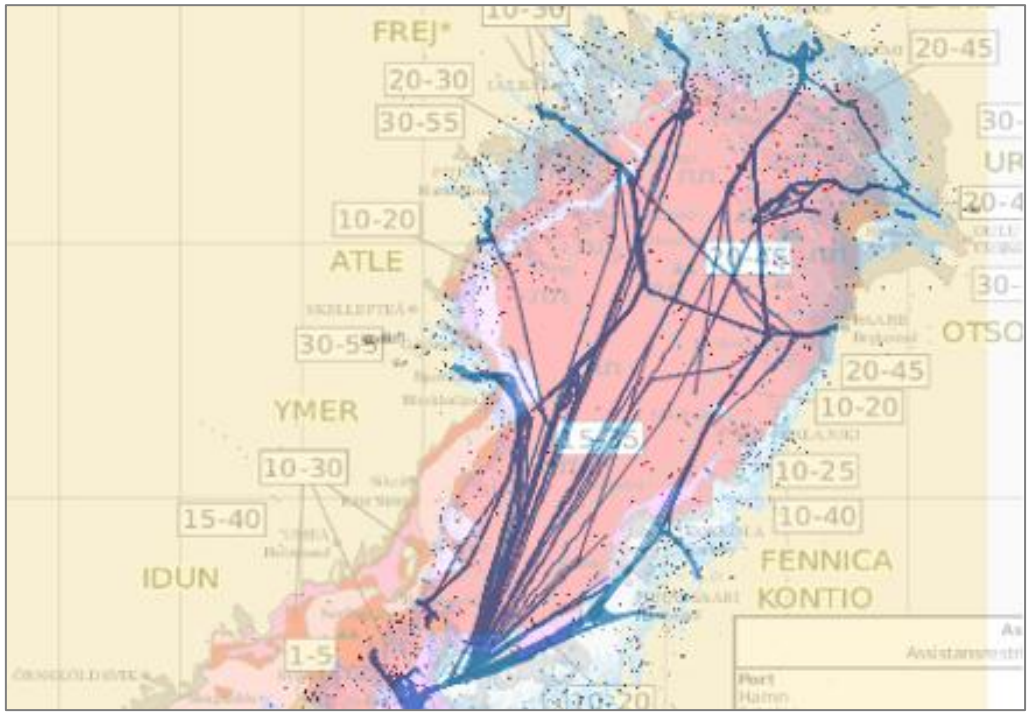
Foto: Sjöfartsverket

Background

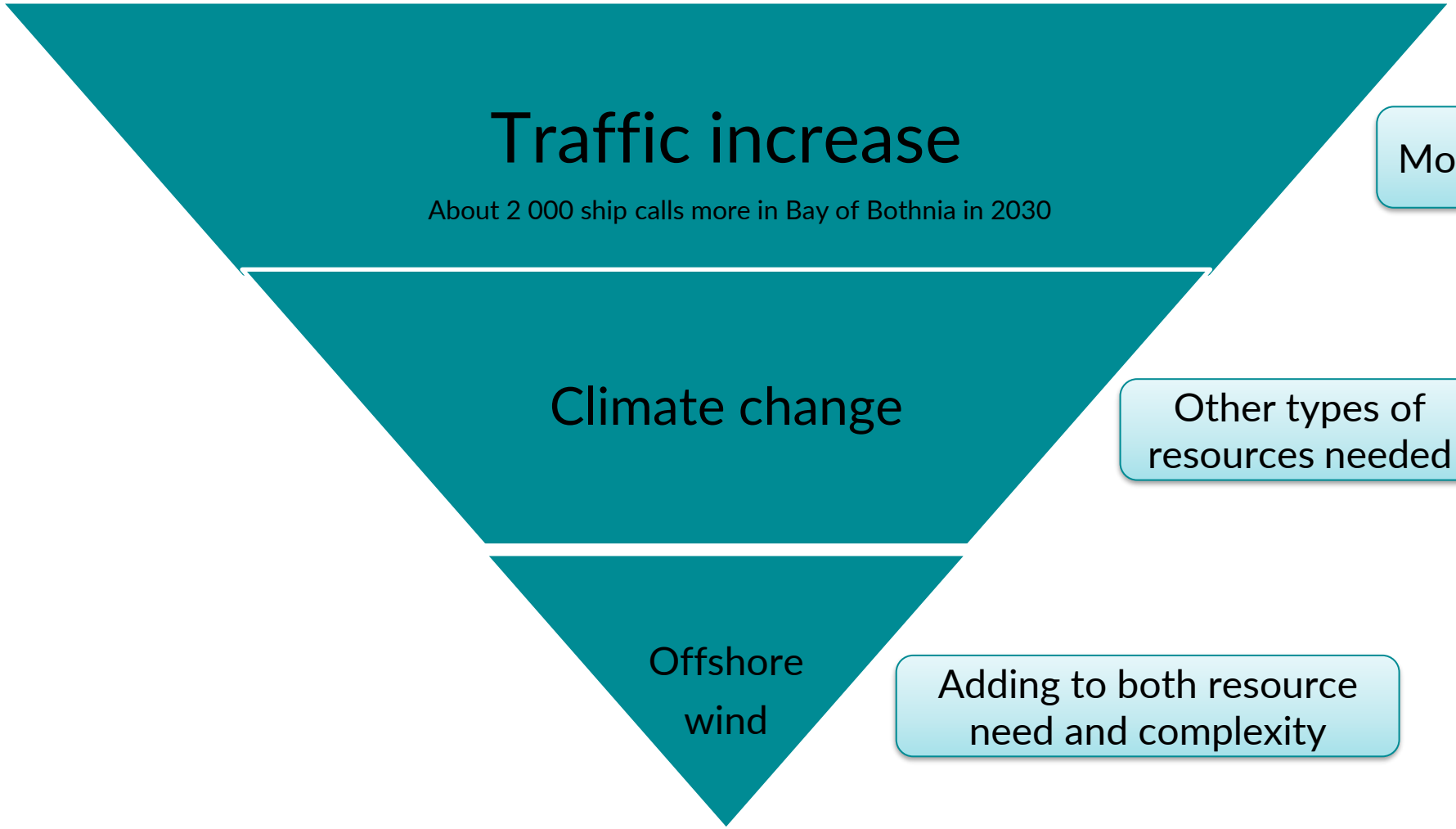

BAY OF BOTHNIA
An overall need for fossile free energy production
Interest in development of offshore wind power
Gulf of Bothnia of great interest
Presence of sea ice
Need for ice breaking
OFW can affect routes and thus accessibility
Accessibility for shipping important
Port development and increase in sea transports
Increased transport need, e.g due to green industry projects
Climate change affecting ice conditions.
Milder – windier: increased ridging and compression of ice
Need to find ways on how to coexist, in a more dynamic environment

Winter navigation today

- Enough ice breaking resources to handle todays traffic
  - but ageing IB fleet
  - challenging operations (climate, EEDI, crews lacking ice experience)
- Coordination in place, joint work and
- Aiming to provide assistance within 4 hrs.
- Ice breaking assistance one by one, in convoys, by towing
- Use of designated routes, along which vessels can proceed independently to a point where they are met by icebreakers.
- Alternative routes available – no infrastructure, routes depend on wheather and ice conditions.



Future challenges for winter navigation



More resources needed

Other types of resources needed

Adding to both resource need and complexity

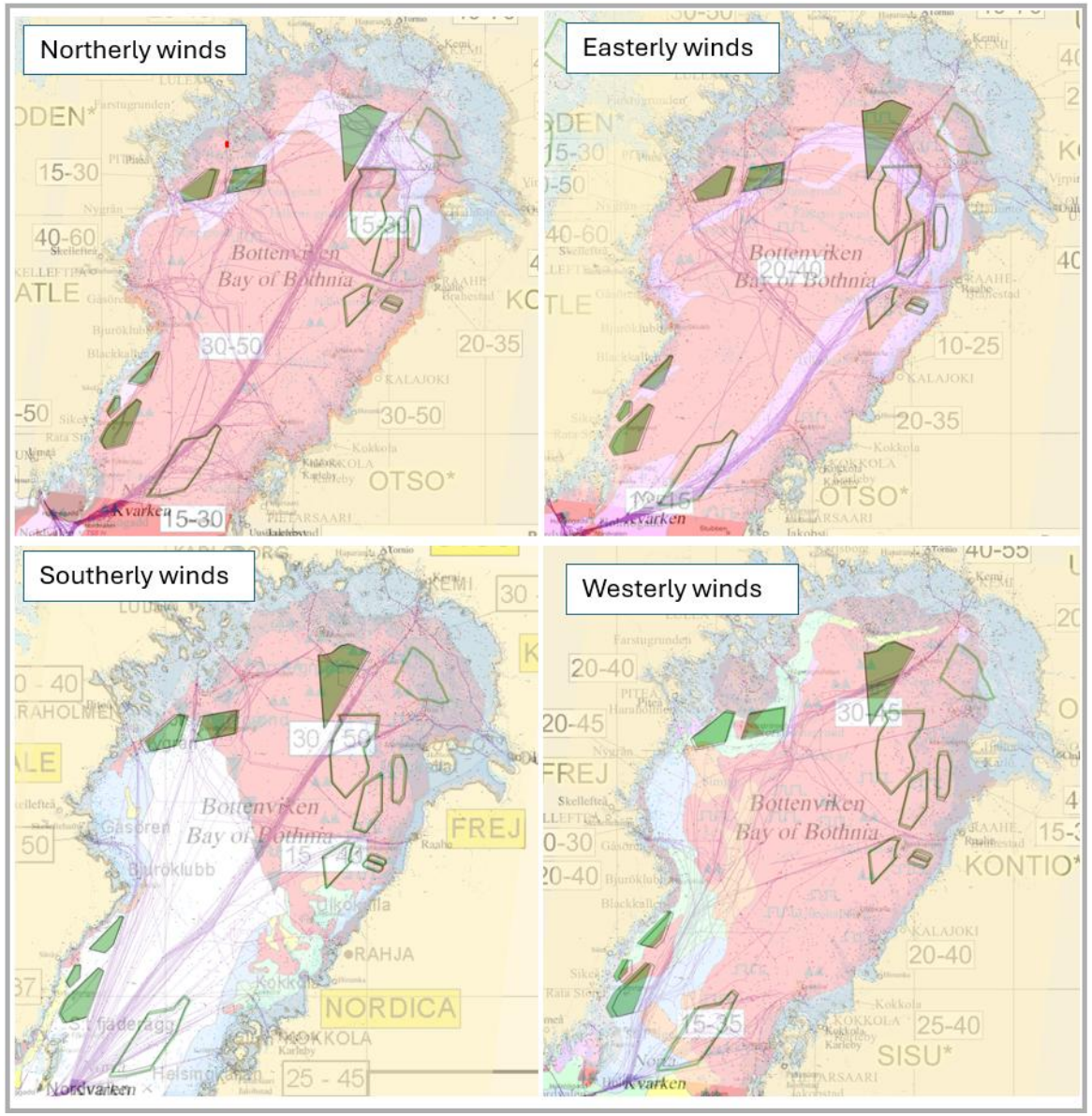
A future with offshore wind farms in areas with sea ice

Effects on shipping and ice breaking

- Energy production areas overlap frequently used routes – shipping must choose other routes

- Longer routes
- Routes in harsher conditions
- Designated routes might not be feasible
- Added waiting time for assistance, longer transit (waiting areas further out from port)
- More ice breaking resources needed

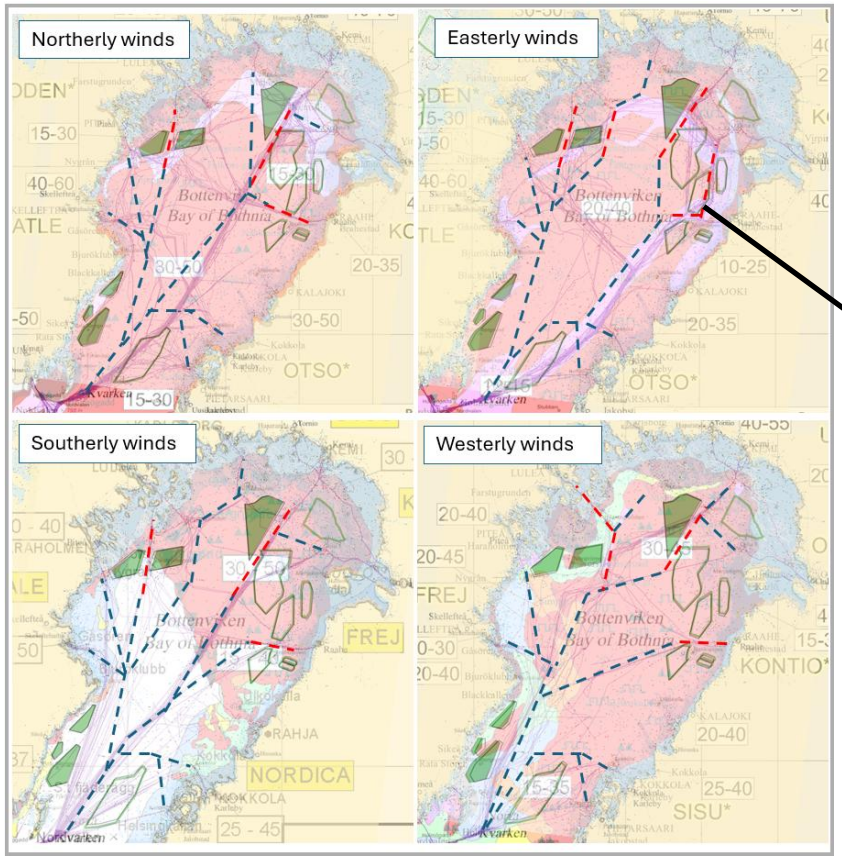
The indicated energy production areas are based on indata to the WINWIN project.

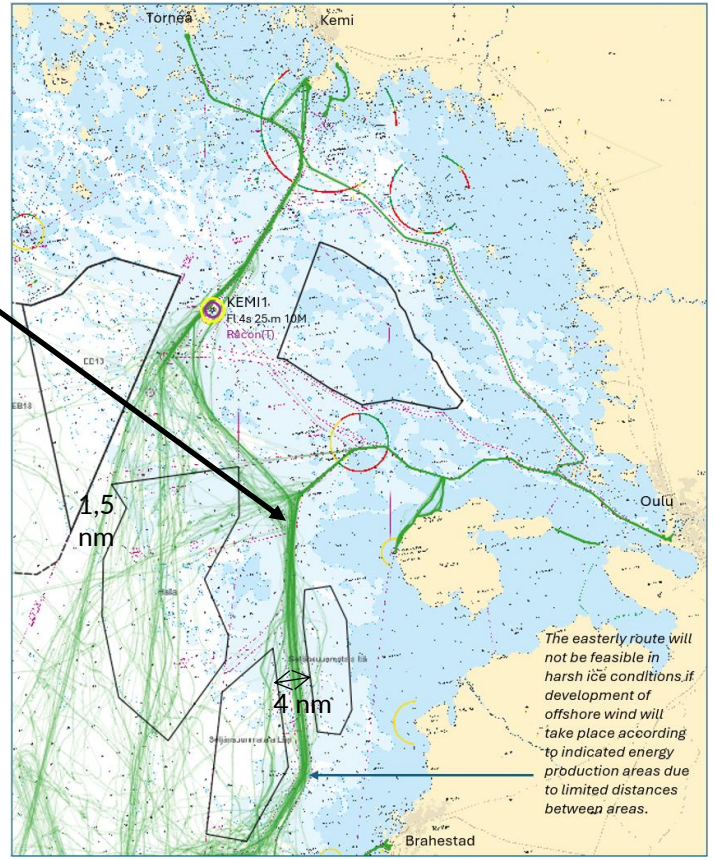


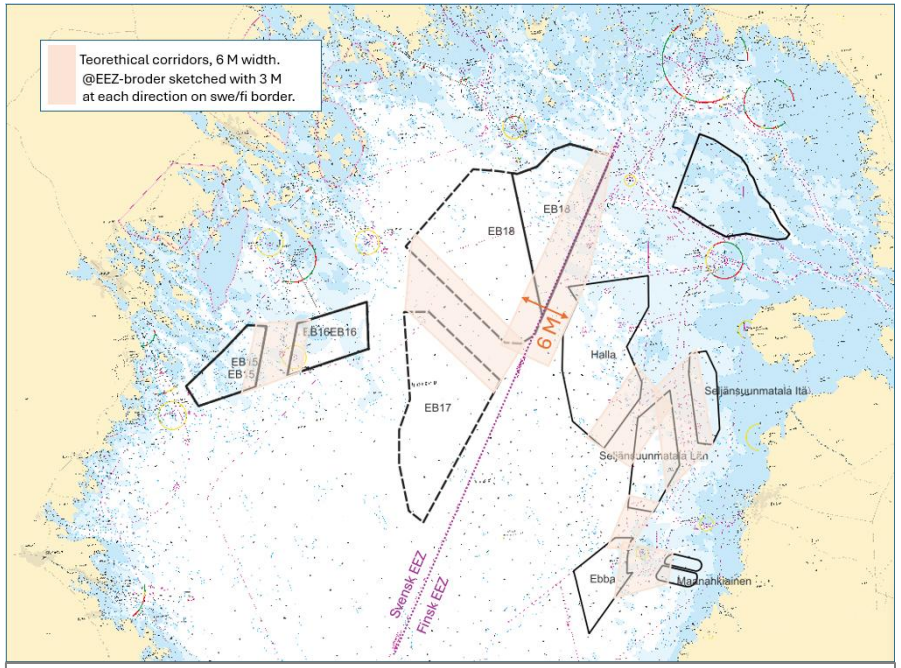
A future with offshore wind farms in areas with sea ice

Effects on port accessibility

- Accessibility to certain ports could be limited due to too narrow passage in between /areas completely blocking routes







- Recommendations on corridor widths between OWF:s, and safety distance between shipping and OWF not applicable in sea ice
- Corridor widths must allow for a scenario with ice drift (typical 2-3 % of surface wind speed, i.e. 10m/s wind speed equals 2,4 nm during 4 hrs
- Corridor width of at least 6 nm?

Need for recommendations on distance and corridor widths.

A future with offshore wind farms in areas with sea ice

Cumulative effects on winter navigation and accessibility

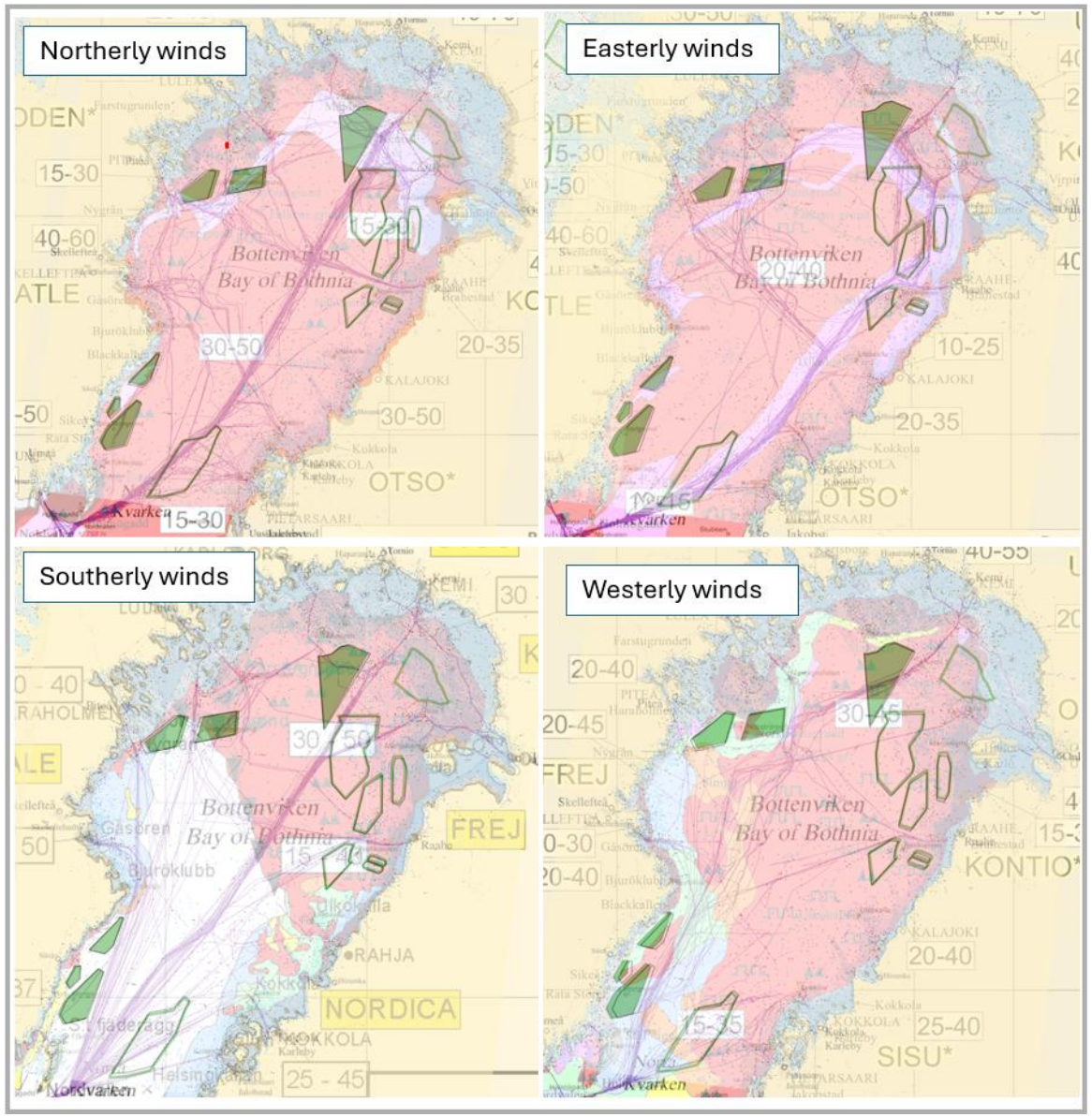
Permit application process in Sweden: one project @ a time.

Great uncertainties - Cumulative risks and impact are difficult to fully foresee at the time of the risk analysis.

Several adjacent OWF:s will affect sea ice in a larger extent than one single OWF:

- More deformed ice leading to harsher conditions
- in turn leading to higher operational costs
- increased likelyhood of added waiting time for assistance, delays to port, higher risks for ships…

Need for joint planning process for all interests in a certain area, and also an updated application process, to be able to take cumulative effects into account.



Future needs to enable coexistance between shipping and OFW

Possible to mitigate effects from OWF in waters with sea ice and benefit from fossile free energy production

Thank you!

Nautical risks related to port/fairway infra, offshore wind, ice, ship operations etc?

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P.S. ! RISE together with IFE (Institutt For Energiteknik), Taltech and others is now starting up the FROST PROJECT (2026-2028):
The purpose of FROST is to link ice studies with studies of the effect from wind farms on ice/ice deformation and in turn how that affect shipping.