Mistra C2B2
Co-Creating
Better Blue

Co-existence with ice

Report from conference in Luleå March 2026

March 2026
www.c2b2.se

Omslagsfoto av Patrik Eld

Content

1. Sammanfattning på svenska

Konferensen Co-existence with Ice hölls i Luleå i mars 2026 inom ramen för forskningsprogrammet Mistra Co-Creating Better Blue (C2B2). Syftet var att samla forskare, myndigheter, kommuner, näringsliv och civilsamhälle för att diskutera hur olika samhällssektorer kan samexistera med is under vinterhalvåret i Bottenviken, ett område som står inför ökande sjöfart, planerade etableringar av havsbaserad vindkraft, växande vinterturism och klimatförändringar som påverkar havsisens utbredning och sammansättning. Deltagarna tog del av en bred kunskapsbas om isförhållanden i Bottenviken, klimatförändringarnas effekter, havsplanering, vinternavigation, isbrytning samt hur vindkraft till havs påverkar is och sjöfart. Vidare presenterades och diskuterades vinterturism, urban vintermiljö och kultur kopplat till förändrade vintrar. Det står klart att isförhållandena fortsatt innebär betydande utmaningar för sjöfart, energiutbyggnad och turism – både idag och i framtiden. Vinterturismen är nu den viktigaste säsongen i norr och stöd till lokalt friluftsliv stärker både invånare och turism.

Ett centralt budskap är att Sverige saknar en tydlig nationell energistrategi, vilket skapar osäkerhet för planering och beslutsfattande. Flera viktiga kunskapsluckor återstår, bland annat kring hur is och vindkraftverk påverkar varandra, hur deformerad is påverkar fartygsbehov och isbrytning, samt hur säkerhetsavstånd vid vinternavigation ska definieras. Data från verkliga mätningar efterfrågas för att förbättra modeller och beslutsunderlag. Klimatförändringarnas snabba utveckling gör att planering och policybeslut behöver gå snabbare. Det finns idag ett väl etablerat samarbete mellan Sverige och Finland vad gäller isbrytning och vinternavigation, men samarbete kring frågor gällande havsplanering och planering av havsbaserad vindkraftsutbyggnad behöver utvecklas och stärkas.

Resultaten av konferensen kommer användas i arbete med att ta fram en Blå agenda inom Mistra C2B2 och i det vidare arbetet inom Living Lab north.

2. Background for the conference

The research project Mistra Co-Creating Better Blue (C2B2) aims for a more sustainable and participatory governance of our seas. In the research project Living Labs, which are innovation experiments in real life settings with stakeholders from different marine actors, are key in order to develop a more participatory governance. Within Mistra C2B2 there are three Living Labs where Living Lab north focus on the governance of the Bothnian Bay. The stakeholders constituting Living lab north represent a wide range of sectors within regional governance, municipalities, private sector and NGOs. In the Bothnian Bay shipping is expected to increase because of the green transition on land, offshore wind power is developing, tourism is increasing, especially wintertime, and the climate is changing. From workshop discussions held within Living Lab north an idea of a conference focusing on co-existence with ice during the winter season was born. The conference aims to identify knowledge gaps and needs for actions related to co-existence with ice to better meet the coming years. It has been co-organized with the Living Lab north team at Umeå University and stakeholders representing the

Swedish Maritime Administration, Skyborn renewables, Luleå University of Technology, Naturskyddsföreningen and the Bothnian Bay Coastal Inter-Municipal cooperation. The Living Lab north team wish to give a big thank you to everyone who has taken part in the organization of this conference.

3. Participants

Deltagare

Alvina Johansson	Umeå Universitet
Anders Palm	Swedish Maritime Administration
Andreas Josbrant	Kustbevakningen
Arttu Polojärvi	Aalto University
Camilla Sandström	Umeå Universitet
Cayetana Ruiz de Almiron	Ramboll
Christer Wallin	Kalix Hamn
David Doms	Studio Doms AB
Elias Callin	Projekt Malmporten
Emma Olofsson	Luleå Tekniska Universitet
Emmy Frohm Gerdin	Länsstyrelsen Västerbotten
Frida Åberg	Swedish Agency for Marine and Water Management
Göran Björk	Göteborgs Universitet
Henning Malmgren	Luleå Tekniska Universitet
Inga Zaitseva-Pärnaste	Tallinn University of Technology Smart Sea Centre of Excellence
Jan-Erik Granvik	Haparanda kommun
Joakim Boström	Icebreaker Officer
Jonas Ringsberg	Chalmers University of Technology, Division of Marine Technology
Karolina Selstam	Länsstyrelsen Västerbotten
Lars Mandahl	Luleå kommun
Lisa Lundstedt	Bottenvikens skärgård kommunsamverkan
Maria Bännstrand	RISE - Research Institutes of Sweden
Matilda Marshall	Umeå universitet
Matti Utriainen	Ramboll Finland Oy
Nick Kamenos	Umeå University
Niklas Hammarkvist	Sjöfartsverket
Nina Lintzén	Luleå tekniska universitet
Patrick Zetterkvist	Luleå kommun
Robert Ekholm	Haparanda kommun
Sema Cil	Univeristy of Vaasa
Seppo Mäkinen	EU SBSR Policy Area Maritime Safety
Siv Huseby	Umeå universitet

Stefan Marklund	Naturskyddsföreningen sektion Luleå kommun
Thomas Drakenfors	Göteborgs universitet
Tomasz Krzynski	Sjöfartsverket
Tommy Nilsson	Skyborn Renewables Sweden
Torsten Linders	University of Gotheburg
Ulf Siwe	EUSBSR PA Safe / Swedish Maritime Administration
Vasiola Zhaka	Uppsala university

4. Program

Table 1: Program

Aktivitet	Tid
09:00-10:00	**Visit to the Ice track in Luleå**, guided by Patrik Zetterkvist, Luleå Municipality
10:00–10:30	**Registration and Networking**
Introduction, Ice and Spatial planning	
10:30–10:40	**Introduction to Mistra C2B2 and background for the conference**. Camilla Sandström, Umeå University
10:40–11:05	**Ice thickness, drift and ridges in the Bothnian Bay.** Göran Björk, University of Gothenburg
11:05-11:25	**Future sea ice in the Bothnian Bay.** Per Pemberton, SMHI (digital presentation)
11:25–11:45	**Facilitating co-existence: Spatial planning in the Gulf of Bothnia.** Frida Åberg, Swedish Agency for Marine and Water Management
11:45–12:45	**Lunch**
Technology, Winter Navigation and Energy	

12:45–13:00	**Results from WINMOS 3 on ice modelling related to windfarms and shipping**. Arttu Polojärvi, Aalto University
13:00–13:15	**Ice growth in ship channels**. Vasiola Zahka, Luleå University of Technology & Uppsala University
13:15–13:30	**The impact of windfarms on winter navigation.** Jonas Ringsberg, Chalmers
13:30–13:45	**Coexistence between shipping and offshore wind power in areas with sea ice**. Maria Bännstrand, RISE
13:45–13:50	**Summing up**
13:50–14:50	— **Coffee Break, workshops and networking**, 2 parallel workshops:
- Studies on ice and windfarms and the effects on winter navigation	
- Challenges with unpredictability for winter tourism and regional development	
Regional Development, Winter tourism and Cultural perspectives	
14:50–15:05	**The ice track in Luleå and ice in urban life**. Patrik Zetterkvist, Luleå Municipality
15:05–15:20	**Winter tourism in Norrbotten and implications of a changing climate**. Lars Mandahl, Luleå Municipality
15:20–15:40	**Winter City Living Reimagined: An Interreg Aurora project on collaboration for more vibrant winter cities**. David Doms, Studio Doms
15:40–16:00	**"Ovinter" – Cultural perspectives on a changing season**. Matilda Marshall, Umeå University
Summing up and closing the conference	
16:05–16:35	**Group discussion summmaries: future needs.** We aim to produce a shared list of key points from the conference on what the conference sees as future needs for sustainable ocean usage with reduced potential conflicts.
16:35–16:45	**Summary and Closing Remarks**

5. Abstract from presentations

Ice thickness, drift and ridges in the Bothnian Bay

Göran Björk[1],Göran Broström[1], Lars Arneborg[2], Anis Elyouncha[1], Daniel Bergman-Sjöstrand[2], Per Pemberton[2]
[1]University of Gothenburg, Dept. of Marine Sciences
[2]Swedish Meteorological and Hydrological Institute, SMHI

Although useful the daily ice charts from SMHI and also satellite images mostly give information on distribution of ice and not so much about its thickness and how the underside of the ice sheet is. This presentation showed results from a study on ice investigated using ADCP measurements A signficant amount of thick ice was observed. 5 % of the track had a draft larger than 5 m in March-April. The mean draft was around 2 m in March-April which is much larger than the pure thermodynamic growth (40-50 cm). Maximum thickness measured was 12m and about ~70 ridges with keel draft > 10 m were identified. Early freezup due to unsually cold temperatures in Nov-Dec indicate that ice cover 2023/2024 was more deformed and with thicker ridges than average.

Future sea ice in the Bothnian Bay
or (Future sea ice conditions for maritime traffic in the northern Baltic Sea)

Per Pemberton, L. Lind, A. Jönsson, L. Arneborg, L. Axell and M. Hieronymus
Swedish Meteorological and Hydrological Institute, Gothenburg and Norrköping, Sweden

We have assessed near-recent and future changes in northern Baltic Sea ice conditions, analyzed from a maritime traffic perspective. The study showed a regime shift in ice coverage after 1990. Similar to what has been found in previous assessments, future winters are shown to gradually have a smaller maximum ice extent, thinner undeformed ice and a shorter ice season, with the largest differences in the southern areas. The fraction and thickness of deformed ice will decrease and only be present in the northern parts of Bothnian Bay.

Facilitating co-existence: Spatial planning in the Gulf of Bothnia.

Frida Åberg, Swedish Agency for Marine and Water Management

Marine spatial planning in Sweden consists of three plans: the Gulf of Bothnia, the Baltic Sea, and Skagerrak/Kattegat. The overall objective is to contribute to sustainable development, with a strong focus on energy production. The plans are guiding for municipality comprehensive planning and in licensing. Plan for Bothnian Bay is based on summer routes for shipping as there is a lack of comprehensive knowledge on how offshore wind energy affects ice formation, conditions for icebreaking and winter navigation. Several research projects have therefore been initiated. A spatial planning conference will be held in September. Today planning coordination with Finland is ongoing but not always

WINDRIFT: influence of offshore wind farms to sea ice dynamics and winter navigation: Results from WINMOS 3 on ice modelling related to windfarms and shipping

Arttu Polojärvi, Aalto University

The WINDRIFT project investigated the influence of offshore wind farms on sea ice formation and winter navigation using fine scale model simulations. A hybrid modeling was used combining three-dimensional discrete element method (DEM) at the wind farm scale and continuum modeling at the basin scale. During simulations, ice loads can be measured and resistance to determine actual resistance forces. They can also examine whether wind turbines influence each other when ice moves, which is another reason for running the simulations for extended periods to capture these interactions. The model will now be scaled up to include the whole of the Baltic Sea to see effects on a larger geographical scale.

Brash Ice and Level Ice Growth, Effects of Snow

Vasiola Zhaka, Uppsala University

Results from studies on brash ice in shipping channels were presented. Brash ice growth models were validated with actual measurements of ice in ship channels. In the full-scale level ice study, 70% of the flooded snow transformed into snow ice and 30% melted or compressed. The snow insulation effect was found to be more significant than the growth acceleration caused by the snow-slush-snow ice transformation. In the main channel, the growth acceleration due to the snow-slush-snow ice transformation was more prominent than the snow insulation. In the test channels, snow remained on the test channel for a longer period, while in the main channel, where there was more traffic, it remained briefly and mostly transformed into slush and then snow ice.

The impact of windfarms on winter navigation

Jonas W. Ringsberg, Victor Ceder, Nils Helgesson, Basil P. Thomas, Zhiyuan Li, Wengang Mao and Hua-Dong Yao, Chalmers University of Technology

The impact of wind farms on winter navigation is a project funded by the Swedish Agency for Marine and Water Management. The study represents new methodology as UNESCOs integrated attributes are included where the overriding attribute should be increased sustainability. A direct consideration in marine spatial planning was that offshore wind farms should be placed in areas without affecting heavy ship lanes (summer and winter). Some areas will require re-routing of the current statistical ship traffic. The new routes will be longer and pass over shallower waters, which can increase the risk during winter conditions. Icebreaking tactics must be dynamic to offer safe shipping conditions during winter.

Coexistence between shipping and offshore wind in areas with sea ice

Maria Bännstrand, RISE

In terms of winter navigation today, there are sufficient icebreaking resources to manage current traffic levels, but the fleet is ageing. Coordination systems are well established, with close cooperation between Sweden and Finland, and the goal is to provide assistance within four hours.

For future projects the main challenge for shipping in the Bothnian Bay is the increase in traffic. Effects of climate change and offshore wind farms add to this. Future needs identified are more knowledge on ice deformation due to offshore wind farms, the functioning of the overall planning process to enable handling of cumulative effects, recommendations on corridor widths in ice conditions and more resources and government support.

The ice track in Luleå – from idea to well-used winter arena

Patrick Zetterkvist, Luleå municipality

The ice track in Luleå started winter 2003/04, as a political proposal to promote outdoor life and movement. It started as a year-to-year project but has the past 15 years been part of the municipality's ordinary business. The length of the track is about 11 km with several areas for different activities along the track. Well established routines are in place for handling the track, the work starts when the ice is 10cm thick. Total budget is 4 million SEK. It is unknown how much income the municipality gets back from the track but is thought to be substantial.

Winter tourism in Norrbotten and implications of a changing climate

Lars Mandahl, Luleå municipality

In addition to the ice track, the municipality also has approximately 30 km of ice roads, swerving 5 inhabited islands. The ice roads also open up for recreational activities in the outer parts of the archipelago. In these outer areas there are also cabins for rent and saunas as well as trails for snow mobiles and skiers. Winter is the new high season for tourism in the region and there is an increase in direct flights to Luleå from abroad. The consequences of climate change with shorter winter seasons and more challenging planning for tour operators might have a potential damage to Luleå's image as a winter destination.

Winter City Living Reimagined: An Interreg Aurora project on collaboration for more vibrant winter cities.

David Doms, Studio Doms

A proposal for an Interreg Aurora project presented using a multidisciplinary approach for creating public spaces on and adjacent to frozen waterways under varying [climatic] conditions. Snow and ice can be used as circular building materials. The goal is to establish winter as a planning priority and to support urban culture and recreational activities. The project aims not only to get people outside, but also to encourage them to stay and spend time in these environments.

"Ovinter" – Cultural perspectives on a changing season.

Matilda Marshall, Umeå University

People have different perceptions of what a "normal winter" is, shaped by cultural understandings and by place, time, and personal experience. The term "ovinter" is used to highlight how climate change is altering winter weather. Although the word existed 100 years ago, it re-emerged after 2008, an unusually warm winter often described in media as "the winter that never arrived."

There are different definitions of winter. Metrologically, if it is not cold enough for the season to be called winter, it is still autumn. Perhaps we shouldn't talk about "non-winters" but rather "new winters". As the presence of non-winter or "new winter" increases, questions emerge about what changing seasons mean for identity—both nationally and individually.

6. Summary of discussions during workshops

6.1. Workshop: Studies on ice and wind farms and the effects on winter navigation

During the workshop on ice and windfarms and the effects on winter navigation discussions were held in 4 groups each consisting of 4-5 people from different sectors.

All groups discussed the following questions:

- Considering the ongoing research projects, what level of knowledge will we have once they are completed?
- What questions still need to be addressed in order to obtain a solid analysis of the impact of offshore wind power on winter navigation?
- What questions still need to be addressed concerning effects on security, resilience, environment, governance, policies, prioritization and financing of possibly increasing costs.
- What international cooperation is needed due to future developments?

A summary of the discussions includes the following:

On current knowledge

- Ongoing research (today's presentations) provides us with theory and numerical models for how wind farms interact with sea ice.
- More research is needed on how to construct a wind turbine/foundation to withstand extreme loads in a 100-year perspective.
- Within a year we will have the (dynamics of ice simulation-) tools to start assessing parametrical effects. Such as vicinity to other offshore wind parks, land or details like ice characteristic or wind farm resistance etc.
- It is especially pertinent to gather all the knowledge we already have, compiling it and using the complied knowledge for decision making.

On what knowledge is still needed

- We need measurement data that verifies theory and models, including how several structures/wind turbines together affect the ice.
- Among other things, we need detailed data for the ice wall barriers. Do the waxes go down to the bottom? Can the embankments affect cables on the bottom?
- The Quark is an area of particular interest.
- We need to define safety distances to wind turbines for winter navigation. These distances are strongly linked to operating speed and assistance response time.
- Winter navigation research needs to be lifted in Sweden. Today, it has a low priority when it comes to financing new projects.
- Is it possible to find money within Campus Total Defence for winter maritime research
- There is a knowledge gap in how deformed ice effects the merchant fleet and its needs for icebreaker services including assistance by towing.
- More research is needed on ice deformation around wind farms.
- More observations to see how the ice cover looks like are needed, including a better understanding of year-to-year variability.
- Info on the amount of time detours will take as time is money for the ship operators.
- Ice formation before and after wind farm development will be crucial in the context of climate change

On questions that still need to be addressed concerning security, resilience, environment, governance, policies, prioritization and financing

- There is no Swedish strategy for the energy system at the political level. This makes it difficult for academia and government agencies to prioritize which research areas and issues need to be focused on. This ambiguity leads to a risk of focusing/investing in the wrong areas.
- The interests of the Armed Forces are not transparent, which makes it difficult to work.
- Safety linked to energy production e.g. if the Suorva dam is blown up.
- One way to work with winter navigation is to review the Swedish-Finnish ice class rules. Investigate whether stricter rules can facilitate icebreaking if offshore wind power is built.
- The timelines aligning between commissioning and building of ice breakers and the impacts of climate change may not be aligned. For example, we might build new ice breakers but due to time line then not need them due to climate change melting the ice. More rapid decisions may be needed when conditions are changing rapidly.
- We identify a need for joint planning of policies
- We see a need for funding of shipping, ports and ice breakers
- Comparisons of the societal benefits of building offshore windfarms vs winter navigation issues are needed. E.g. jobs for building wind farms, environmental benefits, clean energy may outweigh the issues caused for winter navigation

- Would it be beneficial to also explore other types of energy production; offshore wind vs hydropower in Sweden.

On further collaboration needed, or where knowledge from other countries or projects can be found:

- Sweden and Finland need to cooperate in the planning of offshore wind power. (There has been close operational cooperation in icebreaking for a long time.)
- Sweden can learn from Estonia and Poland when it comes to military-civilian cooperation in offshore wind power.
- It is possible to investigate what has been done within the North Sea Consortium.
- In maritime spatial planning and environmental impact assessment work, cooperate with other countries around the Baltic Sea (Southern Baltic Sea to the Gulf of Bothnia) in order to have a more holistic view, as everyone is dependent on the entire sea, not just the part that belongs to each country.
- The rule-based concept with minimum safe passing distances that was discussed during the seminar (wind speed – ice sheet movement, military, etc) was discussed that it should be assessed more in detail whereas today numbers ranging from 0.5 NM to 6 NM are at the table. A performance-based approach would be beneficial.
- While Swedish Finnish collaboration is in place for Winter Navigation (icebreaking operations) and Finnish-Swedish Ice Class Rules; Marine Spatial Planning is reported by the Swedish Agency for Marine and Water Management to be substandard. Participants at this conference will bring this to the table in the current Swedish Finnish government assignment of a joint working group on icebreaking.
- More defined ice may be worse conditions. We need a better handle on the impact of climate on ice. Ice variability itself may be more variable in the future.
- Sweden should learn from the system of auction-based permits for the windfarms used in Finland.
- Security more of an issue in the Baltic Sea proper. Unusual decision by Sweden to stop wind farms in the Baltic Proper as other countries use their windfarm installations to deploy sensors for military purposes.
- International cooperations is quite specific to the regions, for the Bothnian Bay there could be lessons to be learned from Canada also. Continued cooperation between Finland, Sweden and Estonia including regulatory is necessary. Also Russia has a lot of experience in sea ice navigation, including a lot of capacity that they are deploying to support "trade", they are large and nuclear.

5.2 Workshop: Challenges with unpredictability for winter tourism and regional development

Winter and winter activities are important culturally in northern Sweden. In addition, winter tourism in the area is increasing. At the same time, the changing climate means that winters are getting shorter and the weather more unpredictable than before.

With this as a background, we discussed in one group the following questions:

- How can winter tourism and activities develop when winters become more uncertain due to climate change? Discuss how activities on ice and snow can be adapted, developed or supplemented to continue to attract visitors and at the same time be sustainable.

- How can places that use ice (frozen seas, lakes or rivers) for winter activities be developed in a way that strengthens both tourism and culture? Discuss how such environments can be used for new activities and experiences while retaining their local identity and importance for the inhabitants (such as the ice rink in Luleå).

- Are there any obstacles today to strengthening sustainable outdoor life and tourism in the winter in the Gulf of Bothnia? Discuss whether there are challenges to coexistence with other sectors, or if there are regulations or other things that prevent development in the area

Summary from the discussions

- There was a unanimous agreement in the group of participants in the discussion that the tourism industry has previously focused on a short summer season, but now it is mainly referring to the winter season and that tourism in northern Sweden now has shifted towards winter tourism
- Tourism in the Bothnian Bay coastal region and the northern Sweden in general is all about outdoor activities and nature experiences. If you are going to invest in tourism, you should invest in outdoor life.
- We see that conditions for recreation, well-being and tourism are interconnected. The priority, as the participants discussed, should therefore be to support outdoor activities for the local public, which then in turn will have a positive effect on tourism and the hospitality industry. The ice track in Luleå is a good example.
- Further investments are needed in infrastructure, like train transport, for a sustainable growth of tourism in the region.
- More information and marketing are needed. It is found challenging to communicate on outdoor activities to visitors. Information in several languages needed. Training of guides for visitors could be a possibility. Webcams could let people see how the weather and the conditions are before they go out.
- Currently there are no larger issues on safety with visitors according to the Coast Guard but it is something to keep an eye on if tourism is increasing.

- How far does the municipality's responsibility stretch was discussed, and where other actors should step in. Information on personal security under conditions that can change fast is given at the Municipality's website. Some hotels with a lot of tourists also contributing to information to visitors, others are not in the same degree.
- More local actors and entrepreneurs are needed. Especially actors that can provide service. Tourist that arrives outside of already organized groups must do a lot on their own to organize their stay – something that could be facilitated. Tourist packages can be expanded; Started as a question of whether it was important or not but has now become a success. Good examples from Haparanda winter tourism show how to organize a range of different winter activities for visitors. Also, examples given during the discussion from West Sweden in their "Meet the locals" activities.
- In the Luleå archipelago there are opportunities to market and package various nature experiences.
- Suggestion to carry out tests, create wind shelters and meeting places and encourage people to stay outside even in less good weather.
- The future prospects are described as dystopian due to climate change impacts on the winter season. The ice will not disappear completely in the near future, but the impact is expected to be greater in southern Sweden. Adaptation to climate change is already necessary.

7. Summary

A big thank you to all participants at the conference! During the day a broad range of information was presented ranging from information on ice and ice in a climate change perspective, marine spatial planning, breaking of ice and effects on ice from offshore wind installations, effects on shipping by offshore wind installations during ice season as well as information on the ice track and ice roads in the Luleå Archipelago and how urban winter could be developed further through research. The last presentation considered what the changed winter season means for the culture and identity.

From the presentations given it is clear that the ice season in the area bears challenges to the shipping, energy and tourism sectors and will continue to do so also in the future.

A lack of strategy for energy planning nationally in Sweden was identified at the conference, and it is unclear what direction policymakers intend to take. Politicians are expected to set the direction, but this is currently missing. County Administration Boards do not always have full perspective and cannot assess cumulative effects.

Questions that still need to be addressed:

- There is no compiled or integrated knowledge base, even though such information would be valuable.

- Climate change raises issues related to future perspectives, policy, planning, decision-making processes, and the delivery of icebreakers.
- Security and governance considerations also need attention.
- Faster planning and policy decisions are required due to accelerating climate change.

Planning and direction:
There is no Swedish-Finnish coordination for planning offshore wind farms, nor from an energy-strategy perspective. Friction exists between civilian and military interests (similar to experiences in Poland and Estonia). More knowledge is needed about the depth of ice ridges and further investigations are required; investment in technologies such as robotics may be useful. Progress has been made in understanding the dynamics between ice and wind farms, but significant knowledge gaps remain. Questions persist about how wind farms interact under winter conditions. Rather than expanding existing spatial planning groups to include shipping, it may be more effective to approach the process from the perspective of shipping first.

- How does deformed ice affect merging fleets?
- How will this influence the need for icebreaking and towing?
- How might the emerging dual-use open up new areas?

Greater collaboration between Sweden and Finland is desired, as well as cooperation with Estonia and others. Experts across these projects are aware of ongoing developments, and the EU sees opportunities in joint work among Sweden, Finland, and Estonia on these issues.

- There is still knowledge that is needed in order to make better decisions concerning offshore wind and co-existence with shipping: Winter navigation research needs to be of higher priority in Sweden. More data on actual measurements are needed for validating models used.
- We need to define safety distances to wind turbines for winter navigation. These distances are strongly linked to operating speed and assistance response time.
- In the work on Marine Spatial Planning, winter situation with ice needs to be incorporated at least for the northern sea basins in Sweden. Marine Spatial Planning also need to be better aligned with the Finnish planning for the Bothnian Bay.
- Collaboration is key to a sustainable usage of our seas and there are lessons to be learned from other countries in the Baltic and elsewhere.
- Winter tourism is now the most important season for the tourism industry in the north.
- Supporting and developing outdoor leisure activities for the public in the region will also help the tourism industry.
- Investments and further development in information to visiting tourists are needed

The conference brought together actors from different sectors and academia facilitating discussions on important societal issues. The feedback from the participants was in general very good, and the concept of combining presentations and workshop discussions well liked.

8. What happens next

The information and the results of the discussions held during the conference will be used as a basis for the Mistra C2B2 Blue Agenda coming later this year. The results from the conference will also be used in the further work within Living Lab north. Hopefully the knowledge learned and shared at the conference may also be used by the different participants at the conference in their work within their institutions and in their collaborations.