Accelerating the green transition and uptake of alternative fuels – the case of Northern Europe and Baltic Sea

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Mærsk Mc-Kinney Møller Center
for Zero Carbon Shipping

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In the next 20 minutes ..

01 **Introduction:** The challenge, MMMCZCS and our work

02 **Presentation:** Green Corridors as a mechanism in the green transition

03 **Deep-dive:** Green Corridor projects and their potential in Northern Europe

04 **Q&A**

"Keeping warming to 1.5°C above pre-industrial levels requires deep, rapid and sustained green house gas emissions reductions in all sectors"*

The challenge
[shipping's share]

Commercial vessels globally	Tons of fossil fuel consumed	Tons CO_2 emitted annually	Share of global CO_2 emissions
100.000	300.000.000	900.000.000	3%

The solution

By 2025 emissions must peak
By 2030 CO_2 emissions must be reduced by ~50%
By 2050 CO_2 emissions must be reduced by 100%

*2023/03/20: IPCC press release of sixth assessment report

MMMCZCS is a not-for-profit, independent R&D Center looking to accelerate the transition towards a net-zero future for the maritime industry

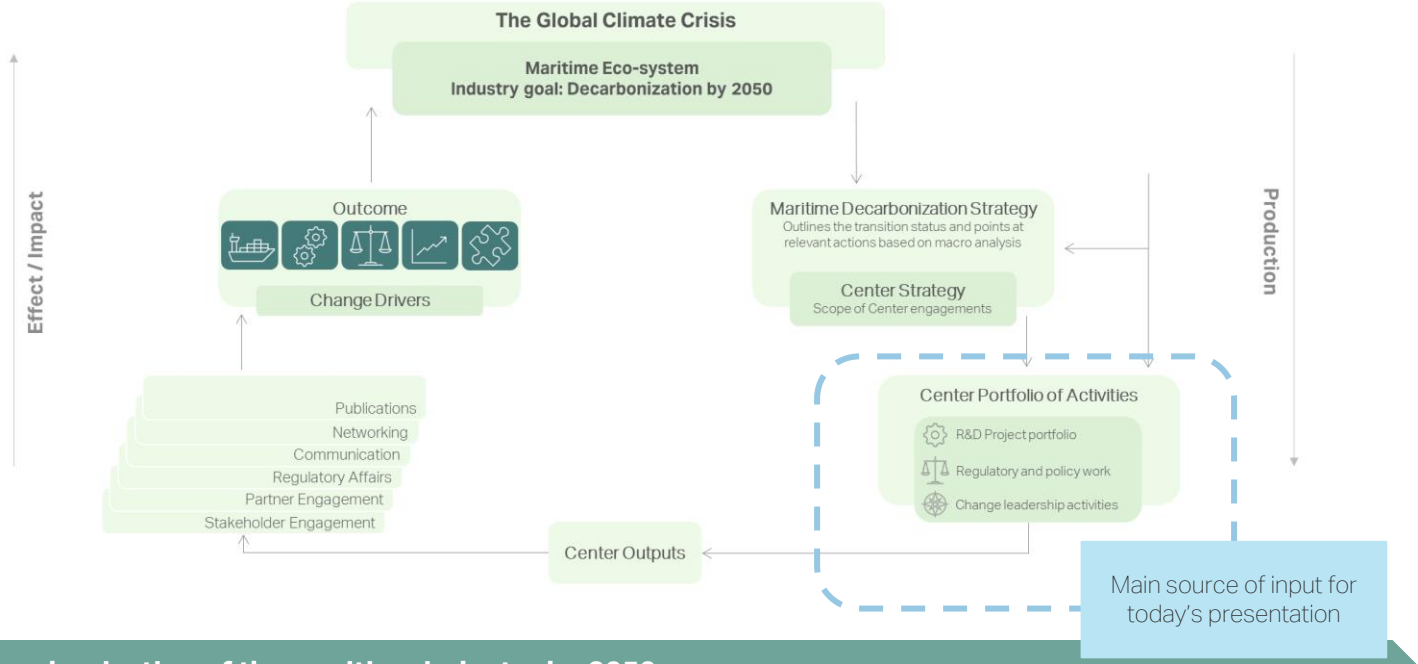
Our three strategic objectives

We set the course for a sustainable sector transition in a global context

We collaborate to create the enabling concepts/standards and initiate the transition

We advocate for reforms and collaborate with decision makers to act at scale

The Center as a Change Leader of the Transition



Sustainable decarbonization of the maritime industry by 2050

Our Partners share the zero-carbon vision and are committed to collaborative climate action

Strategic Partners

Companies in the maritime value chain contributing to setting the strategic direction of the Center and committing with financial and/or in-kind support

ABS, Alfa Laval, bp, CF, Cargill, DP World, equinor, Hapag-Lloyd, John Swire & Sons, Maersk, MAN Energy Solutions, Mitsubishi Heavy Industries, Mitsui & Co., Norden, NYK Line, Royal Caribbean Group, Rio Tinto, Seaspan, Siemens Energy, Stolt Tankers, Sumitomo Corporation, TOPSOE, TotalEnergies, Vestas

Knowledge Partners

Enablers of the maritime ecosystem contributing to the Center with knowledge, experience, and people, committing to in-kind support

Allen & Overy, BCG Boston Consulting Group, DanishShipping, Danish Maritime Authority, ecoinvent, Environmental Defense Fund, Global Maritime Decarbonisation, Global Maritime Forum, Gorrissen Federspiel, HUB Ocean Centre for the Fourth Industrial Revolution, Maritime and Coastguard Agency, McKinsey & Company, The Royal Institution of Naval Architects, SSI Sustainable Shipping Initiative

Mission Ambassadors

Companies from across the maritime shipping ecosystem with capabilities of potential relevance to Projects/WG, taking part of the Center network and information flow, contributing with membership fee and potentially with expert knowledge

A.P. Moller Capital, Eagle Bulk, Minerva Gas, subsea 7, ABB, Bernhard Schulte, Skuld, novozymes, TORM, NavigareCapital, Carnival Corporation & PLC, Ultranav, Tufton, Westwood Shipping Lines, ClassNK, Oshima, MPC Container Ships, IHS Markit, Monjasa, Blue Sky, Bibby Marine Services, Bellona, Daihatsu, X-Press Feeders, Meyer Werft, Port of Gothenburg, E&S Tankers, Bunker Holding Group, Woodside Energy, Wärtsilä, Dorian LPG, Fednav, Navigator Gas, Ørsted, Anglo-Eastern, gard, vtti, Tsuneishi, Norwegian Hydrogen, ZeroNorth, IMCA, Jotun, IMSA, msc

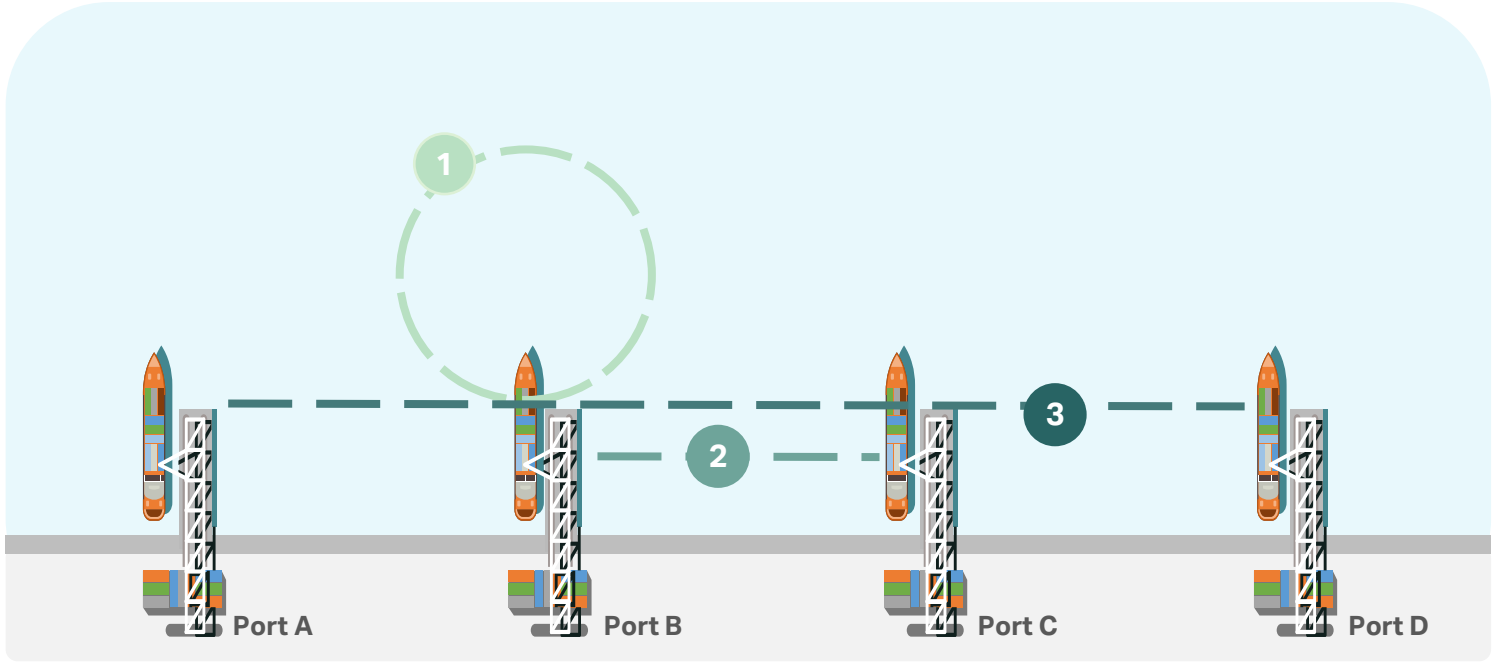
2030 is an important checkpoint for maritime decarbonization - Green Corridors can structure and accelerate the uptake of alternative fuels

What are Green Corridors

Green corridors are shipping routes on which there are commercially operating ships using exclusively alternative fuels

The three types of Green Corridors

1. Single- point corridor
2. Point-to- point corridor
3. Network corridor



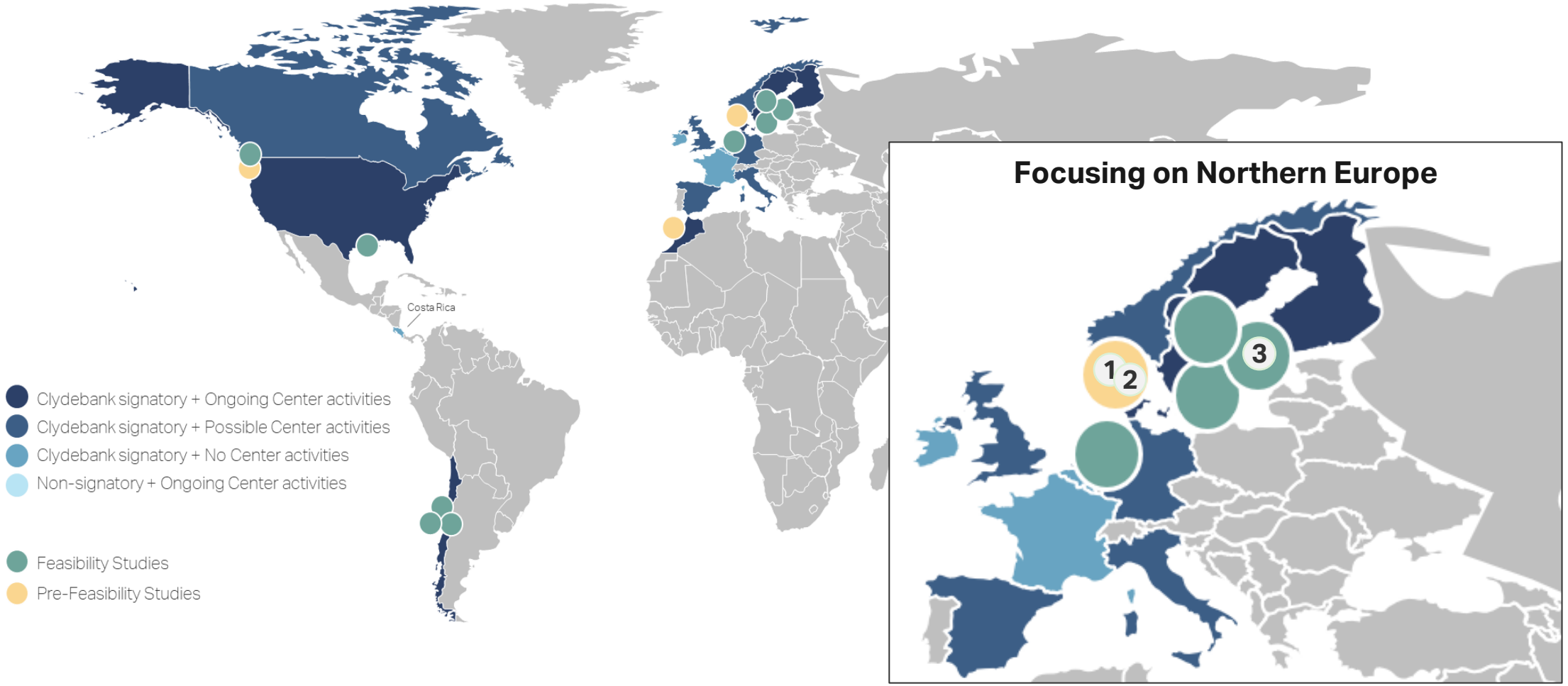
Green Corridors provide an approach and design for focused action across the eco system, initiating end-to-end decarbonization within a supply chain

Project phases	Pre-Feasibility	Feasibility	Select	Define	Construct	Operate
	Project baselining Value chain mapping and initial engagement with relevant regulatory bodies and government Establish screening criteria (selection framework and justification) High-level screening of potential corridors Consortium Incubation Workshop (CIW)	Technical and regulatory feasibility, and cost assessment Risk registry and mitigation plan Outline of decisions and commitments required by stakeholders Roadmap and milestones up to operation	Definition of criteria for selecting final concept Deep dive on key elements from feasibility phase as relevant to ranking criteria Rank of concepts based on criteria and selection of final concept outlined in the feasibility study	FEED[1], detailed engineering design, and detailed commercial design related to (infrastructure, production, vessels, etc.) Contractual commitments between stakeholders, before final investment decisions (FID)	Finalized project details Project com-missioning and execution Preparation for handover	Operation of green corridor

Uncertainty
Investment / Commitment

1. Front-end engineering and design

The Center is involved in numerous Green Corridor assessments – both regionally and globally, with a focus on unlocking early action



September 2022 – The Northern European and Baltic Green Corridor Pre-Feasibility Study

First Movers in the project

Port Gdynia
Port of Roenne – Together we create
Port of Rotterdam
Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping
Port of Hamburg
Port of Tallinn

Outcome of the project

Concrete recommendations for a step-wise deployment of alternative fuels in the region – starting in 2026 and through to 2030

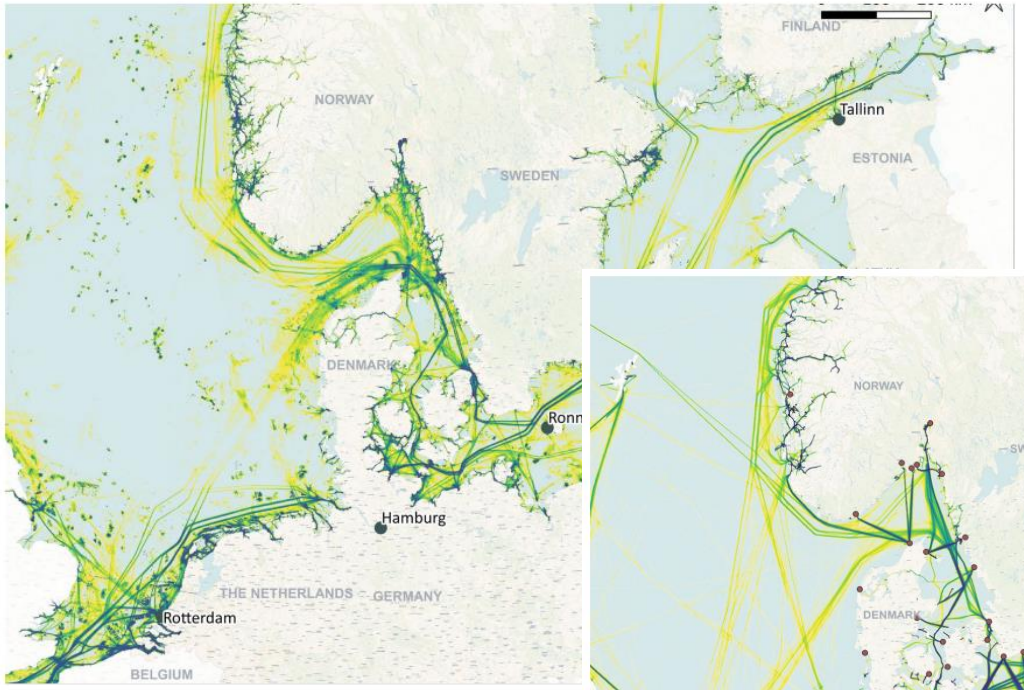


Figure 5 Vessel activity in the

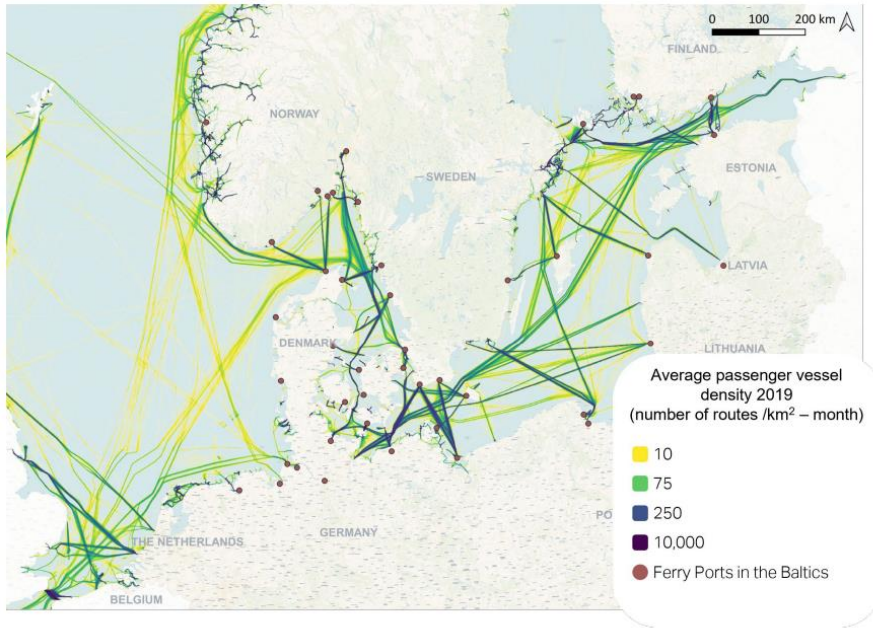


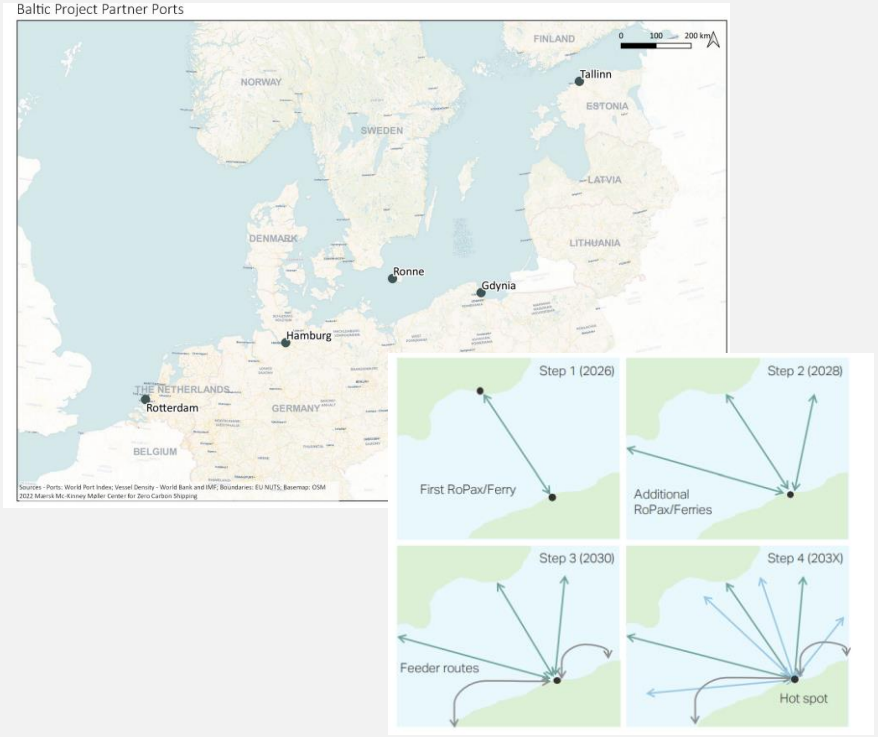
Figure 6 Ferry traffic in the Baltics.

September 2022 – The Northern European and Baltic Green Corridor Pre-Feasibility Study

The project recommendation

Fuels in focus

1. Alternative fuel supply is unique for the region
2. All considered fuels will be produced within the region
3. The region is in the forefront of establishing the needed production facilities



Vessel segments in focus

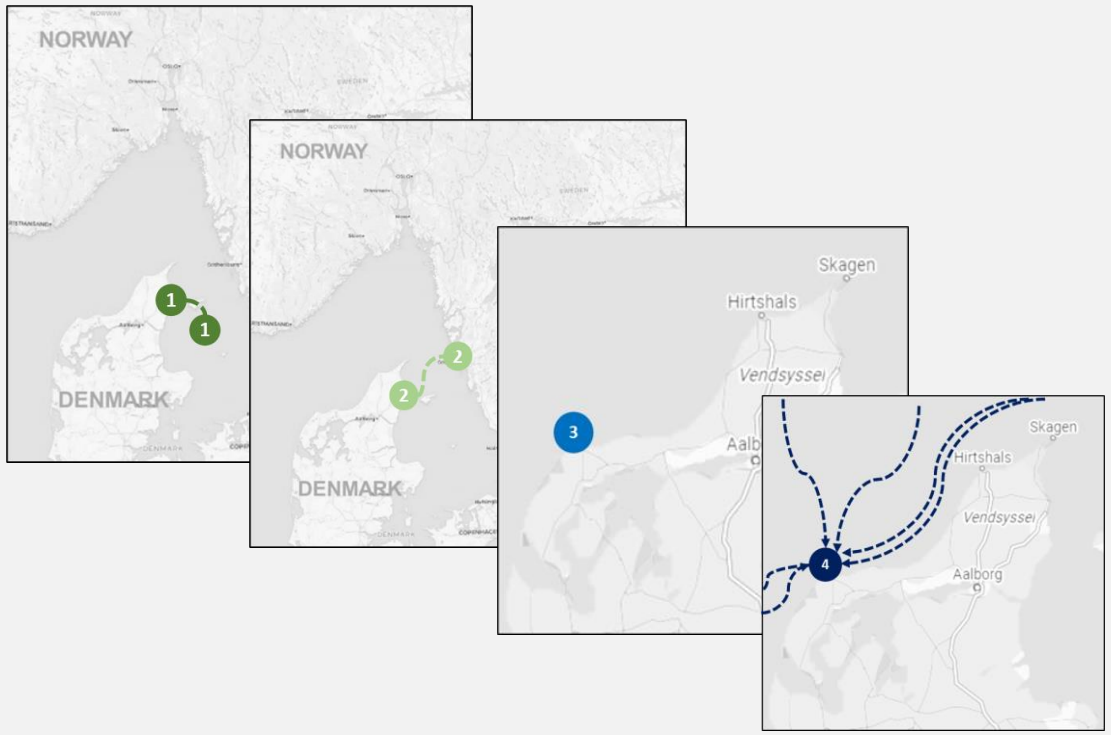
1. Offtake with focus on ferries, passenger & vehicle carriers
2. .. to be followed by feeders deployed in the region at a later point
3. .. to be followed by hotspot / network approach in the region

August 2023 – The MARCO POLO-DK finalizes its recommendation for the decarbonization of four archetype ports in the Nordics

The project scope

MMMCZCS has delivered four Green Corridor Technical Assessments corresponding to key archetype ports in the Nordics

Port archetypes & vessel segments in focus ->



The project deliverables

The project has delivered four concrete Roadmaps for individual asset and route decarbonization in each route, as well as expected future Methanol demand volumes associated with each Route.

The project also delivers insights into the port interplay of the different routes and likelihood for bunkering aggregation

August 2023 – MMMCZCS is involved in the Mega Green Port project in Åland, where OX2 and the Bank of Åland have joined forces

The project scope - based on the Press Release 03.02.2023[1]

"Creating a Mega Green Port will bolster the Åland economy in many different ways. In addition to being an important part of the offshore wind power projects, it will generate jobs and produce e-fuel for the shipping industry – making Åland attractive for the establishment of large business operations and enabling many new innovative projects in oxygenation of waterways and utilisation of excess heat in various manufacturing activities. The port will strengthen Åland's potential to become the leading green hub in the Nordic region," says Anders Wiklund, Country Manager Åland at OX2.

"The purpose of our planned wind power projects is green energy transition and enabling the general public to participate via our mutual fund structure – but perhaps, above all, to create a new growth engine for the Åland business sector. The feasibility study for Långnäs as a Mega Green Port is an important step in understanding how Långnäs can play a key role in the future of the Åland business community, especially with reference to the growth of existing Åland companies and the establishment of new business operations," says Peter Wiklöf, Manager Director and Chief Executive of the Bank of Åland

1. https://www.alandsbanken.com/news/ox2-and-the-bank-of-aland-plan-mega-green-ort-project-in-aland/pdf


Q&A and Thank You!