BalticSeaH2

Updates on Europe’s first large-scale interregional hydrogen valley

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The project is supported by the Clean Hydrogen Partnership and its members.

Clean Hydrogen Partnership

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BalticSeaH2 – A pioneering initiative for a fully sector-coupled, interregional hydrogen economy

- Main Valley connecting Southern Finland and Estonia
- 7 Connected Valleys: Norway, Sweden, Denmark, Latvia, Lithuania, Poland and Northern Germany
- 40 partners from nine Baltic Sea area countries
- Total budget 33 M€, EU funding 25 M€
- Timeline: 2023-2028
- Co-coordinated by CLIC Innovation and Gasgrid Finland

BalticSeaH2 develops a Baltic Sea –wide Hydrogen Economy across country borders, industries, and energy sectors

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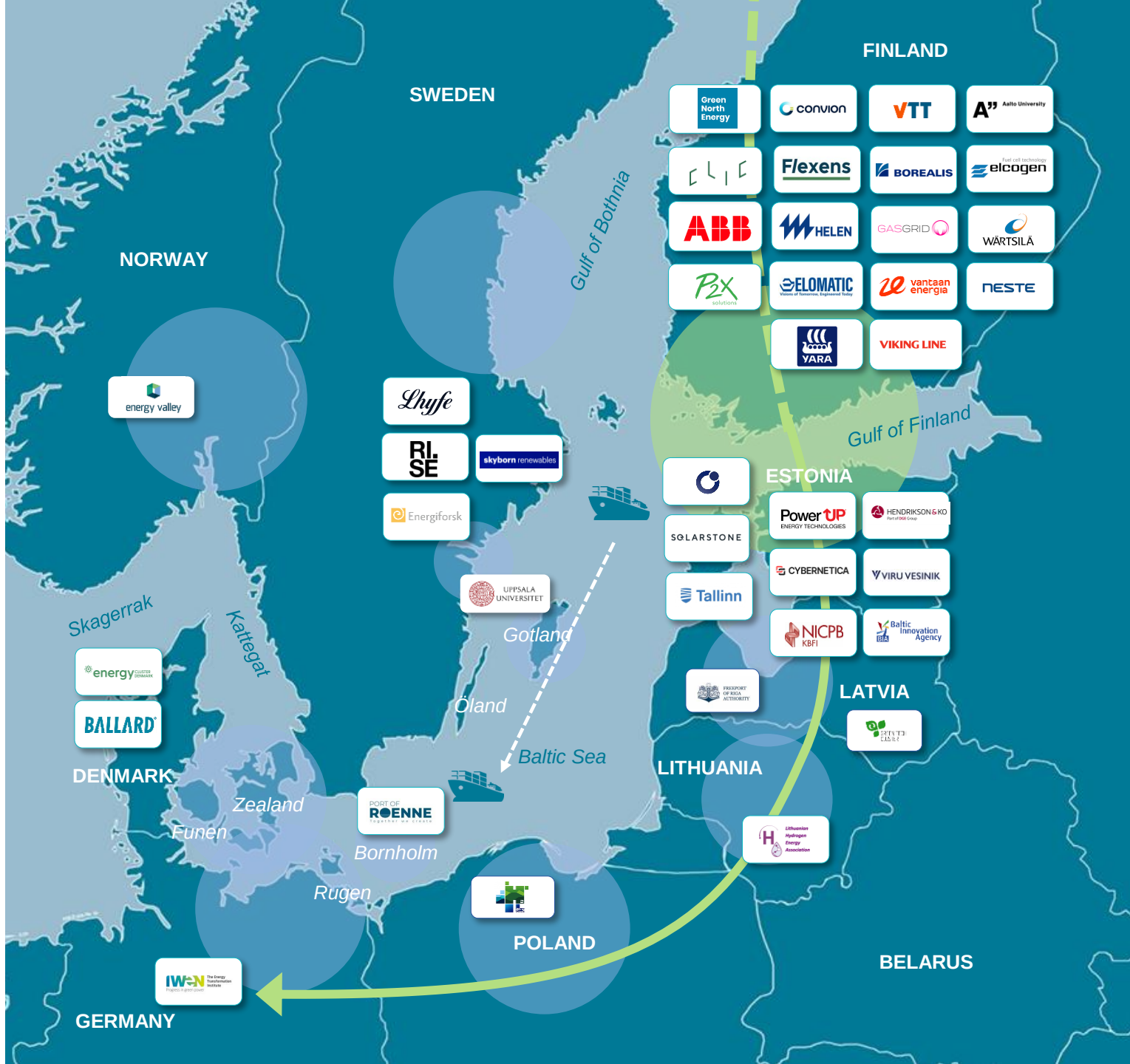

Existing infrastructure, markets and industries create a good base for the Main Valley

- Cross-border main Valley Estonia - Southern Finland with hydrogen pipeline connection
  - Existing infrastructure includes methane pipeline, electricity transmission lines, and active marine traffic – interconnected markets

- Included end-use sectors in the main Valley:
  - Traffic (direct use of hydrogen and e-fuels)
  - Chemical industry
  - Energy industry (P2X with X=different products)
  - Maritime (use and transport of hydrogen)

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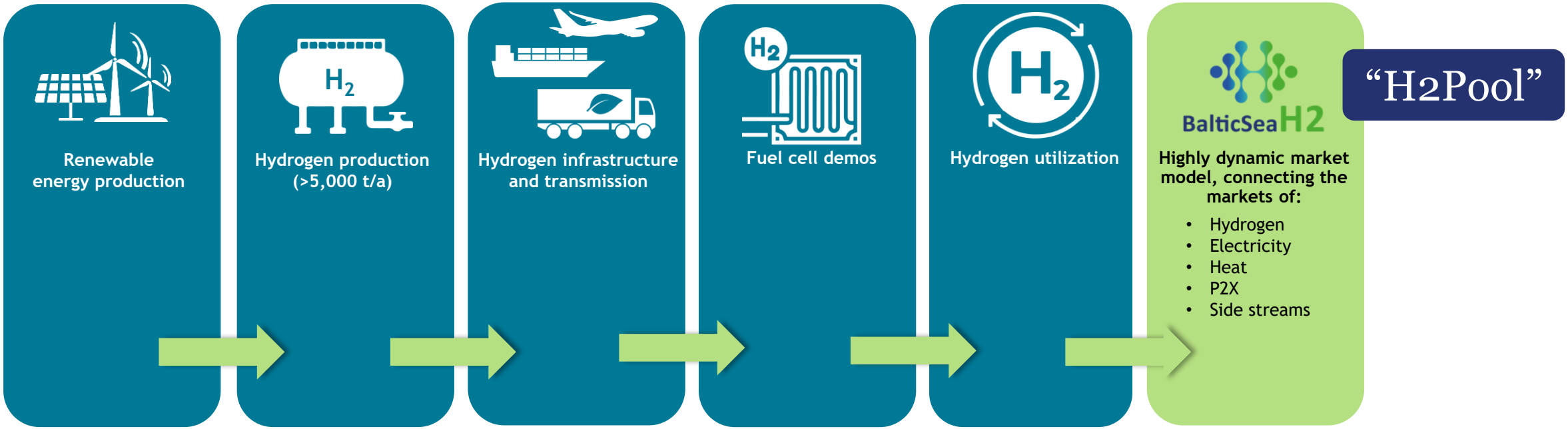
Our overall Hydrogen Valley concept

Coverage of the whole value network: renewable electricity providers - hydrogen producers / heat utilizers - H2 logistics providers - biobased CO2 sources – e-product producers & users



Sector integration leads to more efficient use of primary energy, minimizes carbon emissions in various industries, and improves energy security and self-sufficiency.

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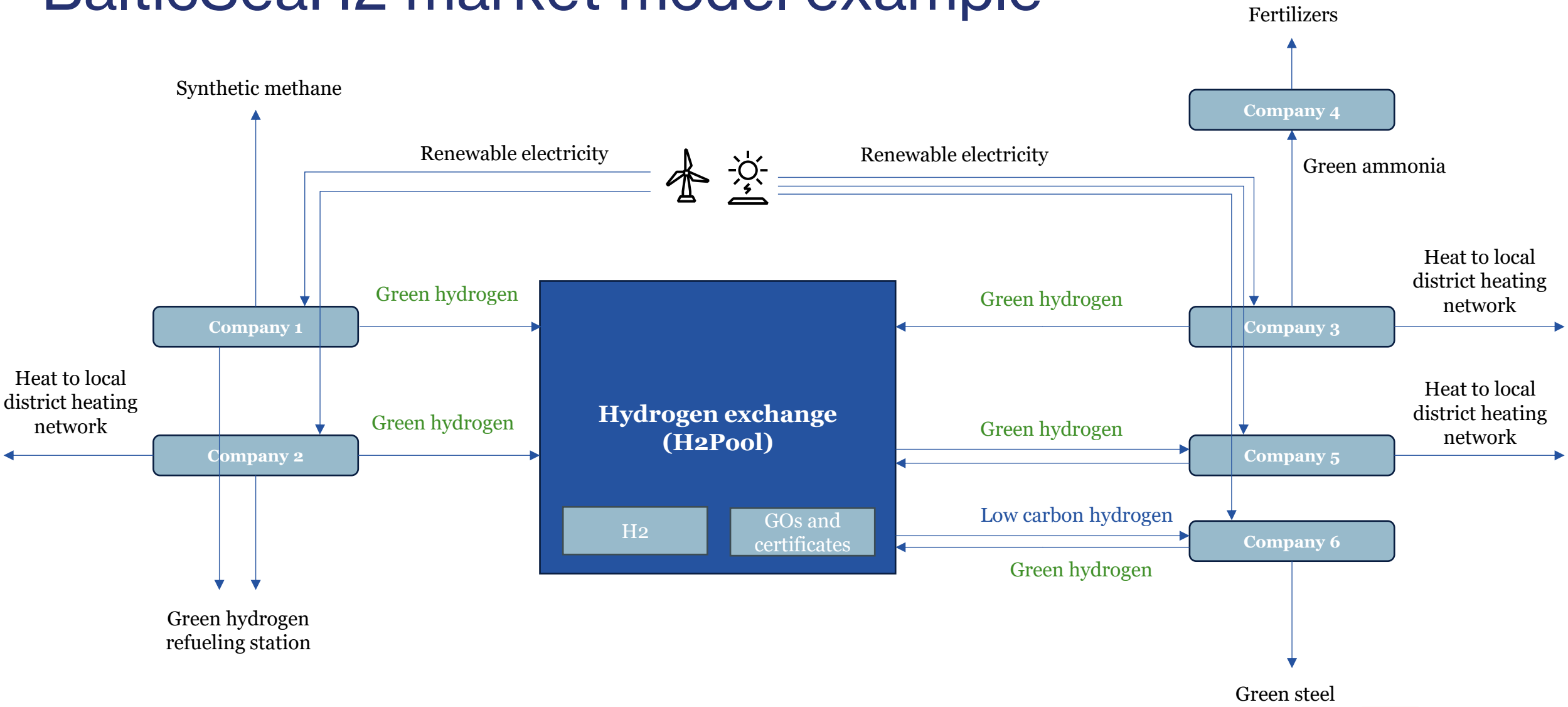
BalticSeaH2 market model example



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Working on two parallel tracks

1. Valley implementation

2. Co-creation for shaping of the hydrogen economy

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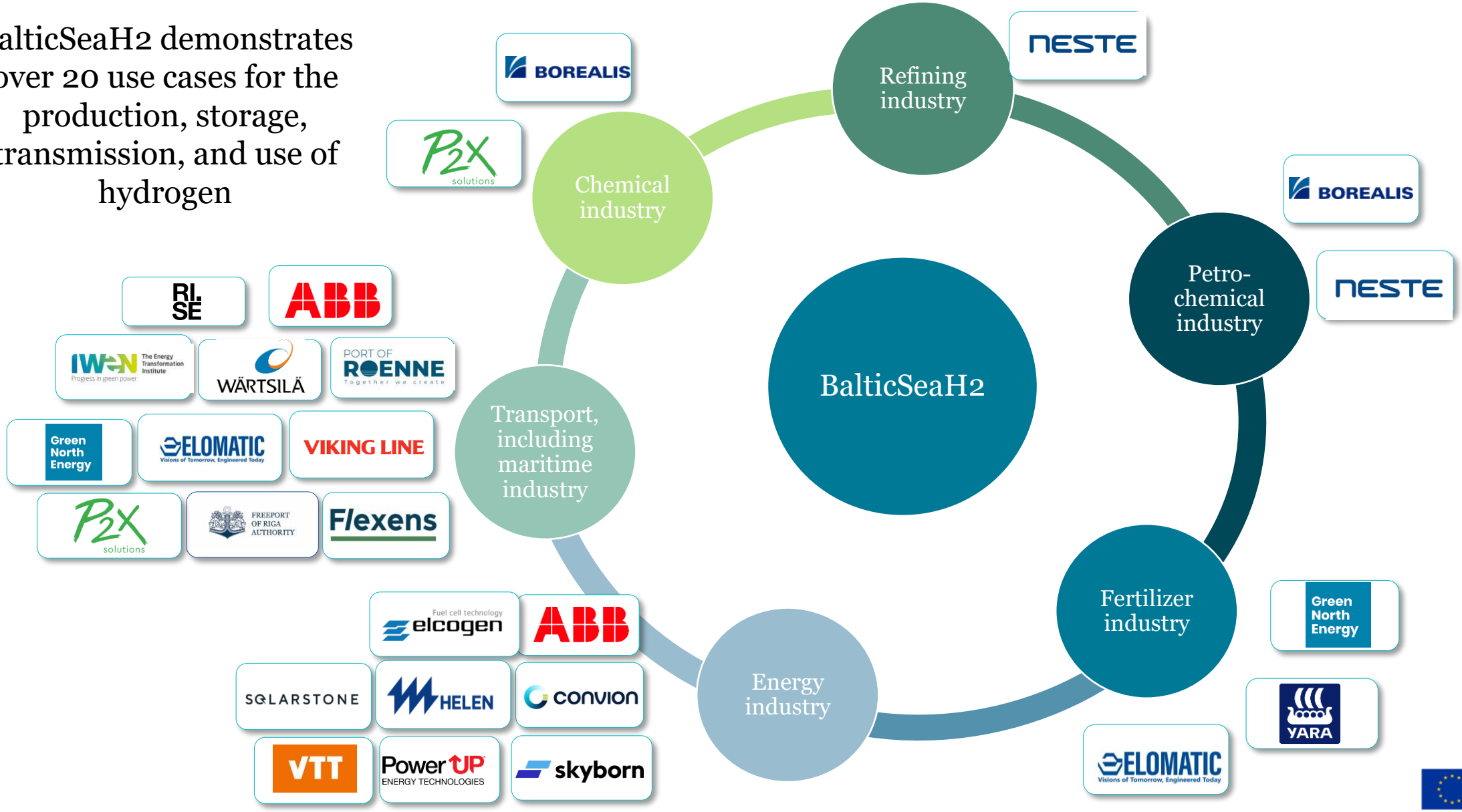
1. Valley implementation 1/2

BalticSeaH2 demonstrates over 20 use cases for the production, storage, transmission, and use of hydrogen



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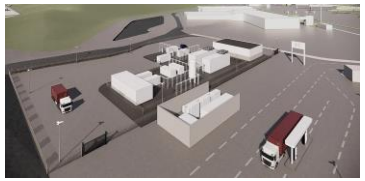
1. Valley implementation 2/2

Renewable hydrogen production targets - plan by 2030

In commissioning
Harjavalta 20 MW



FID made in 2024
3H2 pilot plant 3 MW

FID made in 2024
Joensuu 30-40 MW

FEED
Naantali 280 MW

Total ~60,000 ton/a

70000
60000
50000
40000
30000
20000
10000
0

2024	2025	2026	2027	2028	2029	2030
3,000 ton/a	500 ton/a	5,500 ton/a	36,000 ton/a			15,000 ton/a
H2 E-methane	H2 for refuelling	H2 E-methanol	Green ammonia			
Target sectors: Transport Industry	**Target sectors:** Transport Energy Storage	**Target sectors:** Transport Industry	**Target sectors:** Transport Industry	**Target sectors:** Transport		**Target sectors:** Storage Other

Note: The plants that are already under construction have received investment financing from the Innovation Fund, or IPCEI, RRF or other funding from the Finnish ministry or the Finnish Climate Fund.

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BalticSeaH2 case: P2X Solutions

- P2X Solutions' 20 MW Harjavalta plant, operational in 2024, is the first industrial-scale renewable hydrogen and synthetic methane production plant in Finland
- Harjavalta plant kickstarts Finnish hydrogen economy by showing example, creating supply, and demonstrating the production part of hydrogen value chains
- …but there is more to come: Joensuu and Oulu production sites are in planning!

Harjavalta 20 MW production plant

- Finland's first industrial-scale renewable hydrogen and synthetic methane production plant
- Operational Sept 2024

Joensuu 30-40 MW production plant (planning)

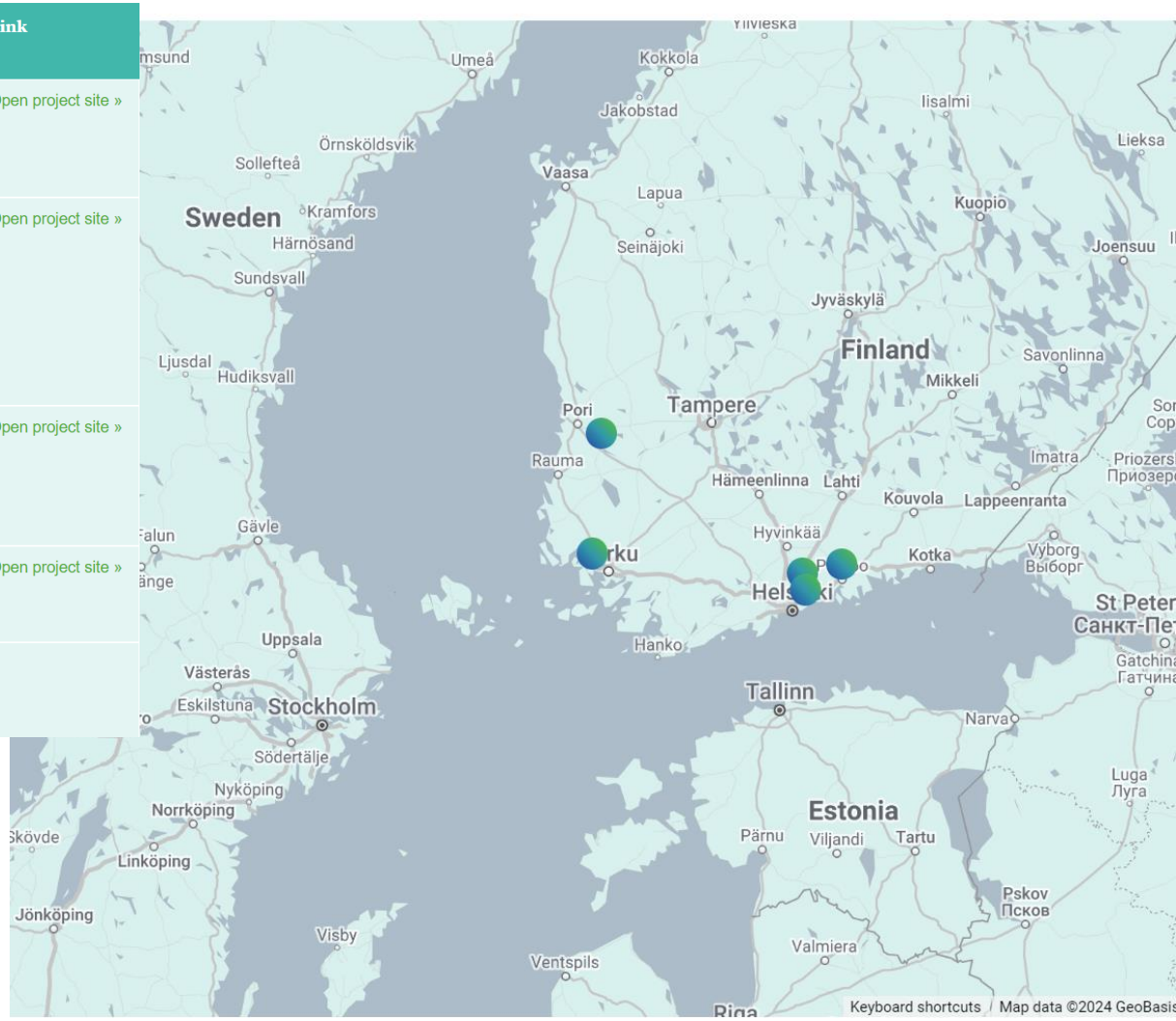
- Planned to produce green hydrogen and district heating as a side stream
- IPCEI status
- Operational 2026 (tbc)

Oulu 100 MW production plant (planning)

- Would also include a carbon capture plant, a hydrogen and carbon dioxide storage and processing to methanol/methane
- FID planned for 2025, operational 2028 ->

BalticSeaH2-connected investment projects

Name	Investing organisation	Location	Description	Link
GHP01 Harjavalta	P2X Solutions	Harjavalta, Finland	P2X Solutions constructs and operates 20MW electrolyser with synthetic methane production capacity in Harjavalta, Finland. Investment decision was made in Q1/2022 and plant wil be operational in Q3/2024. Plant includes the capabilities to deliver pressurized green hydrogen and synthetic methane containers to all customers in industry and transport sector.	Open project site »
3H2	Helen	Helsinki, Finland	Helen will build a green hydrogen production plant in Vuosaari, Helsinki, in the vicinity of Helsinki's district heating network and the busy Vuosaari Harbour. The capacity of 3H2 – Helsinki Hydrogen Hub pilot plant project – will be approximately 3 MW. The produced hydrogen will primarily be used through a hydrogen refuelling station that will be build next to the hydrogen plant. The refuelling station will be mainly for heavy-duty vehicles. In addition, the produced hydrogen can be delivered to customers in containers. The waste heat generated in the production process will be utilised in Helen's district heating network. The aim is to launch the hydrogen production in the new plant in 2026 and open the hydrogen refuelling station in 2027.	Open project site »
	Green North Energy	Naantali, Finland	One of the first green ammonia plants in Finland, which will also include one of the largest green hydrogen plants currently being planned in the country. As a result, contributing to 1) a substantial environmental impact through reduced carbon emissions, 2) ensuring European food security by enabling localized fertilizer production and 3) supporting maritime continuity with alternative fuel options, which is also essential for European security of maintenance.	Open project site »
	Neste	Porvoo, Finland	120 MW electrolyzer for green hydrogen production at Neste Porvoo refinery Neste's objective is to reach Final Investment Decision readiness during 2024. The aim is to utilize the heat generated in the production process for district heating purposes.	Open project site »
Industrial-scale hydrogen production	Helen	Helsinki, Finland	Helen's industrial-scale prcject case is in the range of 100 to 200 MW, where we study a possibility to construct an industrial-scale hydrogen production facility in Vuosaari, Helsinki.	



Our connected investment projects integrate multiple Use Cases to create full hydrogen value chains.

Not all investment projects are published yet – follow the project to know first when our partners publish their cases!

https://balticseah2valley.eu/investment-cases/

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2. Co-creation for shaping of the hydrogen economy

Greatest risks for the implementation of clean hydrogen economy in the Baltic Sea region include:

- Regulatory and market barriers for implementation
- Failure in raising financing for the investments
- Lack of societal acceptance

We will co-create, engage, and share to shape the economy

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Best practice: Success in hydrogen transition requires trust, place-technology fit and shared benefits!

BalticSeaH2

Local burden and benefit-sharing

Local opposition to green energy initiatives is gaining prominence in the BSR and can pose significant challenges to H2 transition.

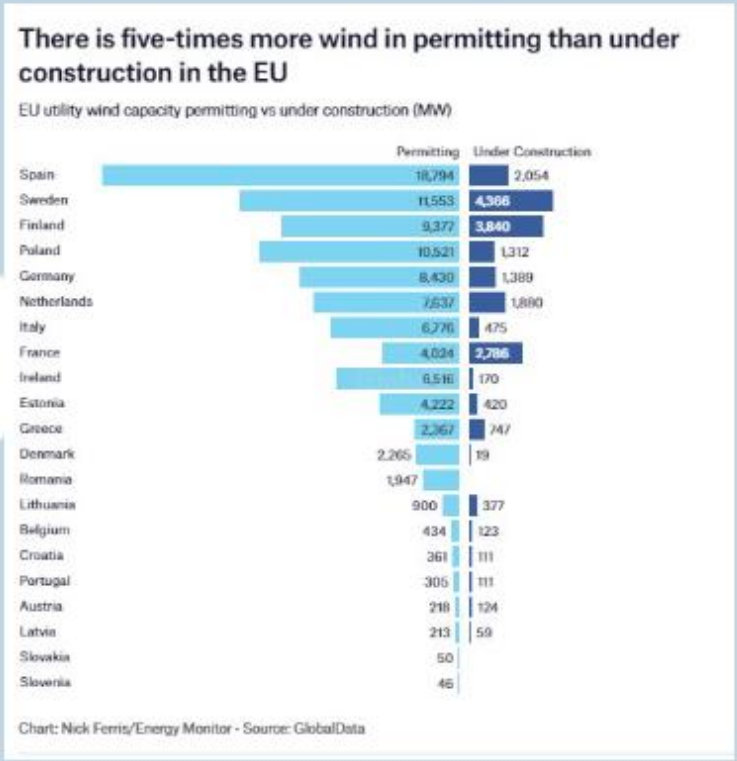
E.g., Wind power, solar power, and green steel mills have faced local opposition in the BSR, stemming from concerns over [1]

- *biodiversity*
- *noise and visual disturbance*
- *place identity & place-technology-fit*
- *perceived threats to other industries*
- *indigenous rights*

Other factors in local opposition [2]

- *lack of trust in governments, science & companies*
- *lack of meaningful engagement*
- *fast pace of the planning and execution*
- *unawareness*

H2 transit & justice.



Power Technology 24.10.2023

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Lesson learnt: Biogenic CO_2 is an important part of a sector-integrated hydrogen valley

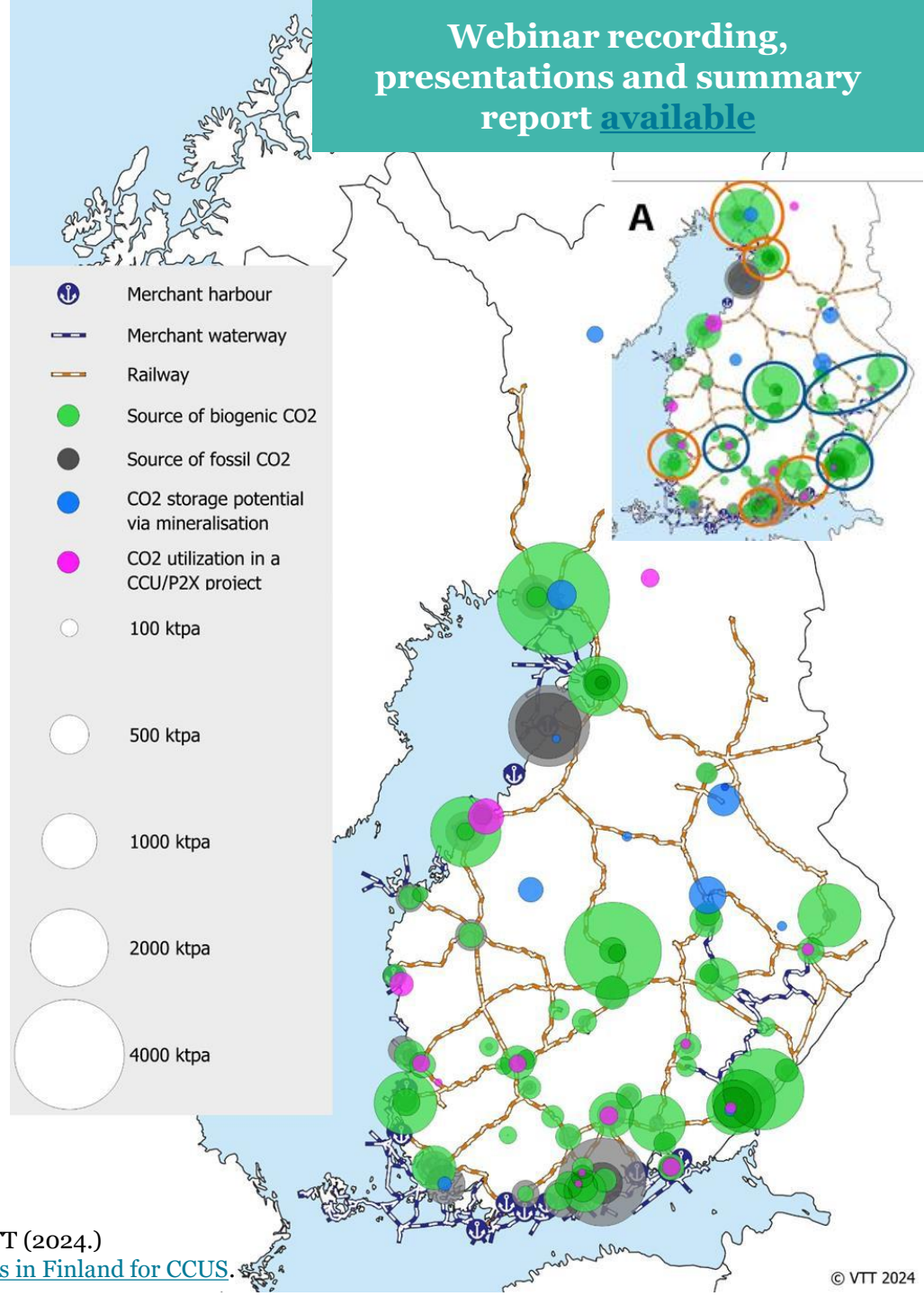
VTT conducted a study on CO_2 logistics and infrastructure to create an outlook on CO_2 terminals and inland hubs and find the optimal modes of CO_2 transport.

The study shows:

- A great CO2, especially biogenic CO2, potential in Finland
- The cost benefits of utilizing the existing railway infrastructure for CO2 transport when possible
- That pipelines provide a least-cost transport option for larger CO2 volumes
- That the benefits of shared infrastructure are considerable compared to individual transmission solutions

→ A holistic view and coordinated planning is needed for the development of hydrogen, electricity, and CO_2 infrastructures

Webinar recording, presentations and summary report available



Source: VTT (2024.)
Outlook of CO2 logistics in Finland for CCUS.

2025 Hydrogen Valley vision workshop series

- Diverse national stakeholders brought together to discuss the future of regional and national hydrogen economy
  - Drivers and barriers; technical, financial, environmental and social aspects

2025 Podcast episodes overview

Ep1. Hydrogen Economy: Why now if not back then?

Ep2. Show(el) me the money! Regulation, incentives, and investments.

Ep3. Nuts and bolts of hydrogen production

Ep4. Putting the hydrogen in the pipes: infrastructure of H2 transportation

Ep5. Green is good! Replacing gray hydrogen in industry

Ep6. E-wind for the sails: H2 derivatives as fuel in maritime sector

Ep7. H2appy couples? Sector coupling as a driver for hydrogen economy

Ep8. Do the ends justify the means? How to make the transition to hydrogen society just?

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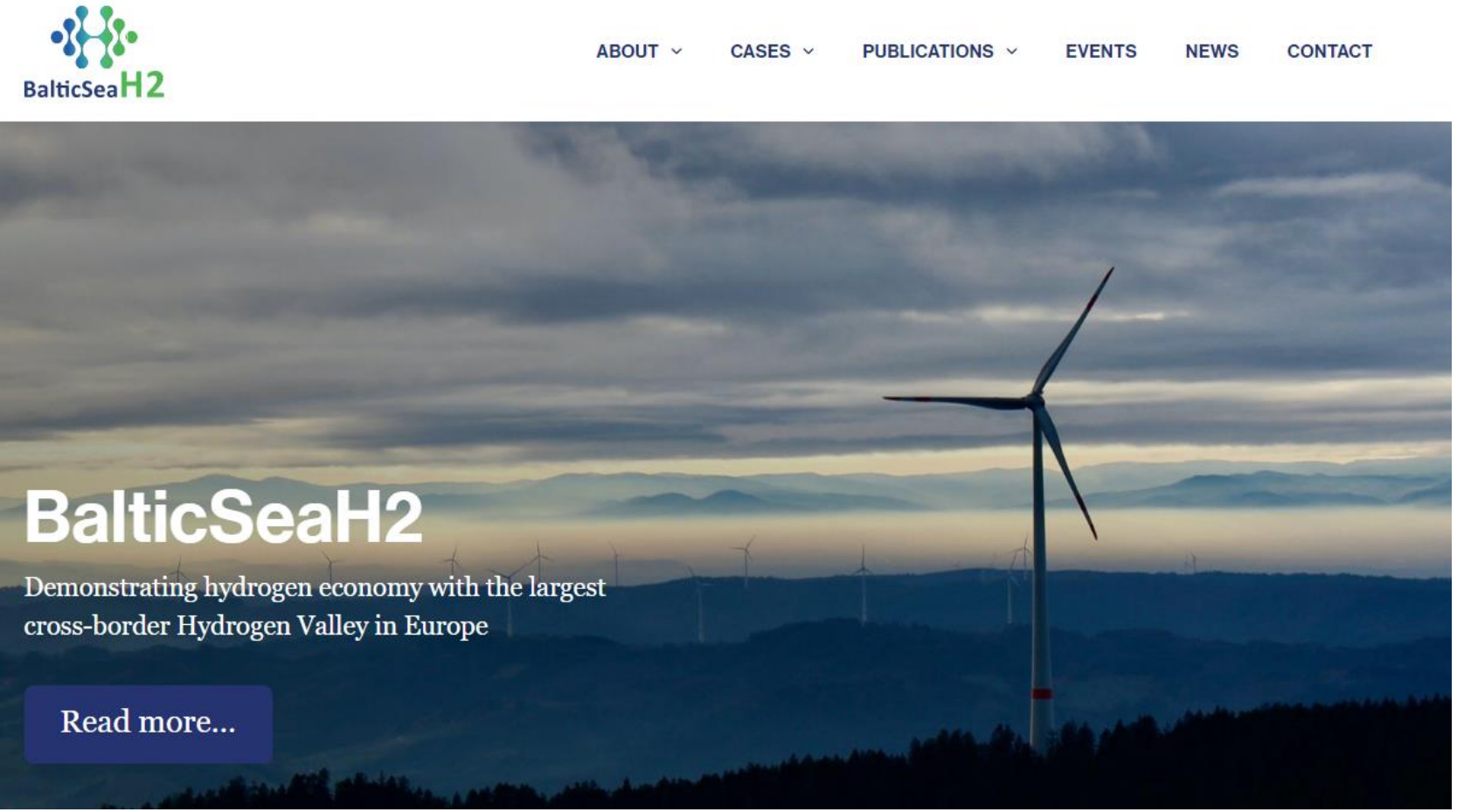
Learn more about BalticSeaH2



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