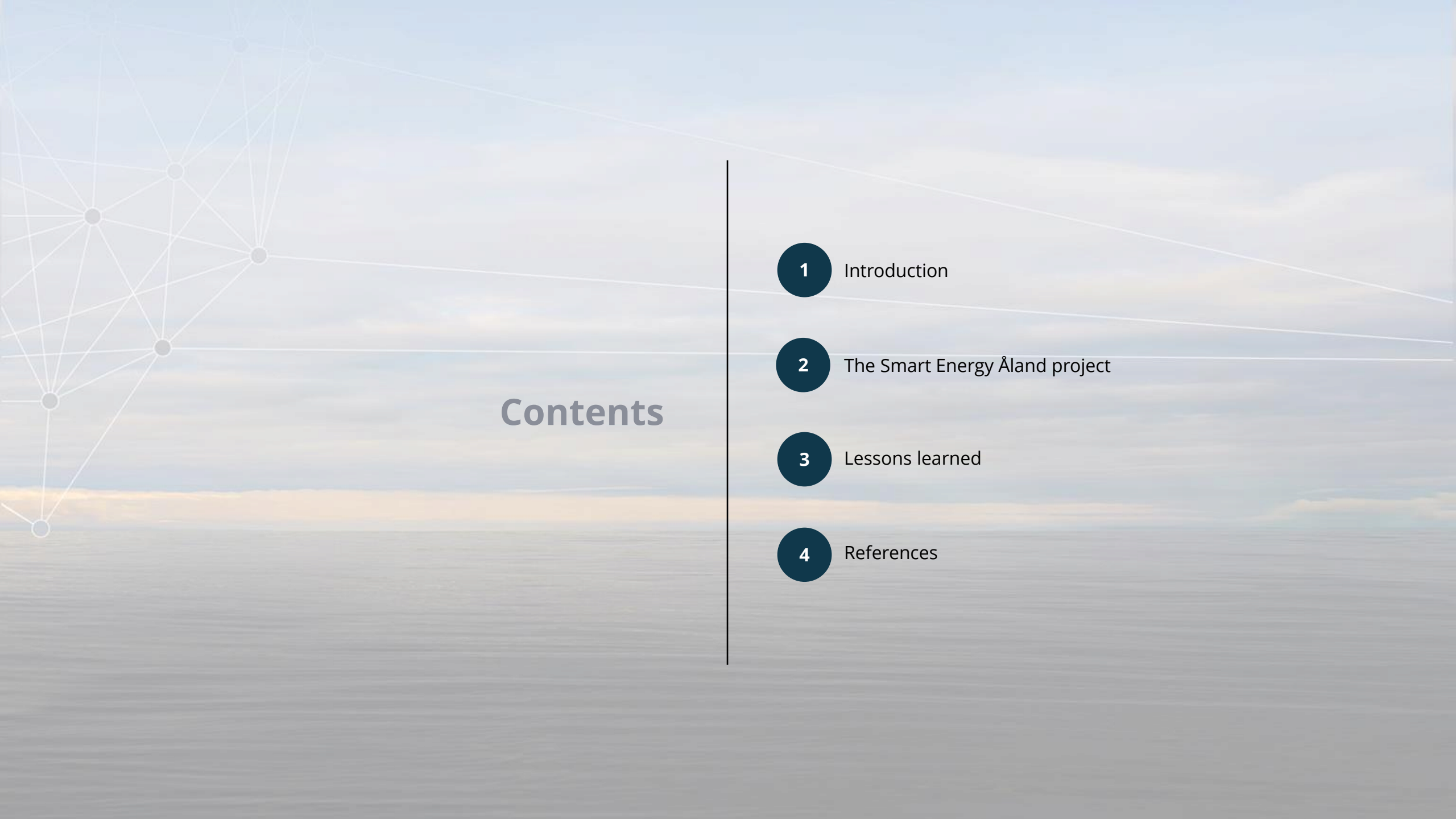


Smart Energy Åland

The Future of Maritime Operations Conference

Nuuk, Greenland, October 6, 2022



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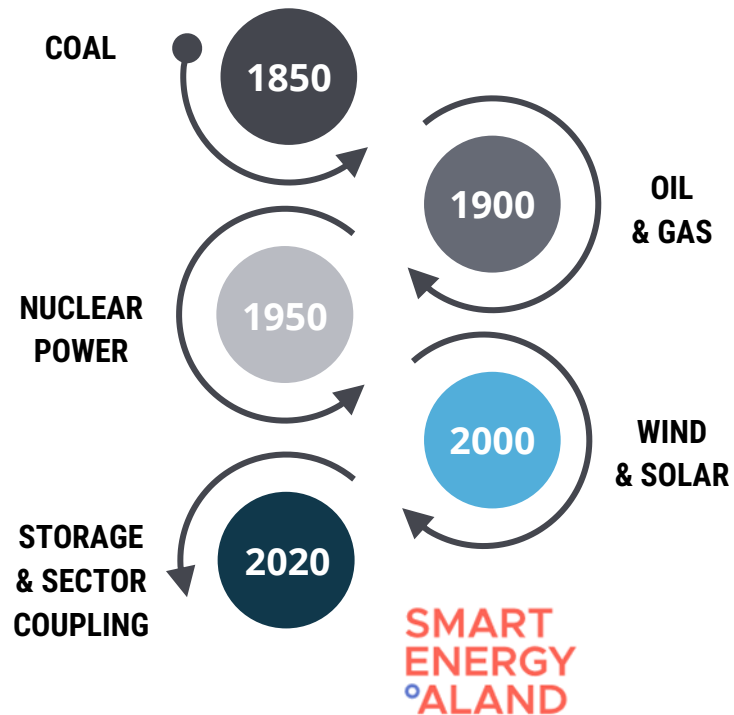
1. Introduction



Flexens is a renewable energy systems project developer

We focus on creating storage and sector coupling enabling 100% use of renewable energy

BUILDING FLEXIBLE ENERGY SYSTEMS BASED ON 100% RENEWABLES



ENERGY STORAGE WILL BE A VITAL COMPONENT IN VALUE CREATION FROM RENEWABLE ENERGY

MARKET SEGMENTS

ENERGY ISLANDS

Our main reference is the technology demonstration of a society working on 100% renewables on Åland

OFFSHORE

Engagements in progress with undisclosed offshore wind developer for the Åland opportunity

PORTS

Advisory engagements with undisclosed port clients

INDUSTRIAL GREEN H2

Green NorthH2 Energy; 100 MW ammonia production plant – in cooperation with Elomatic

MOBILITY E-FUEL SUPPLY

Hydrogen ferry fuelled by locally produced green H2 for the Åland Islands

2. The Smart Energy Åland project



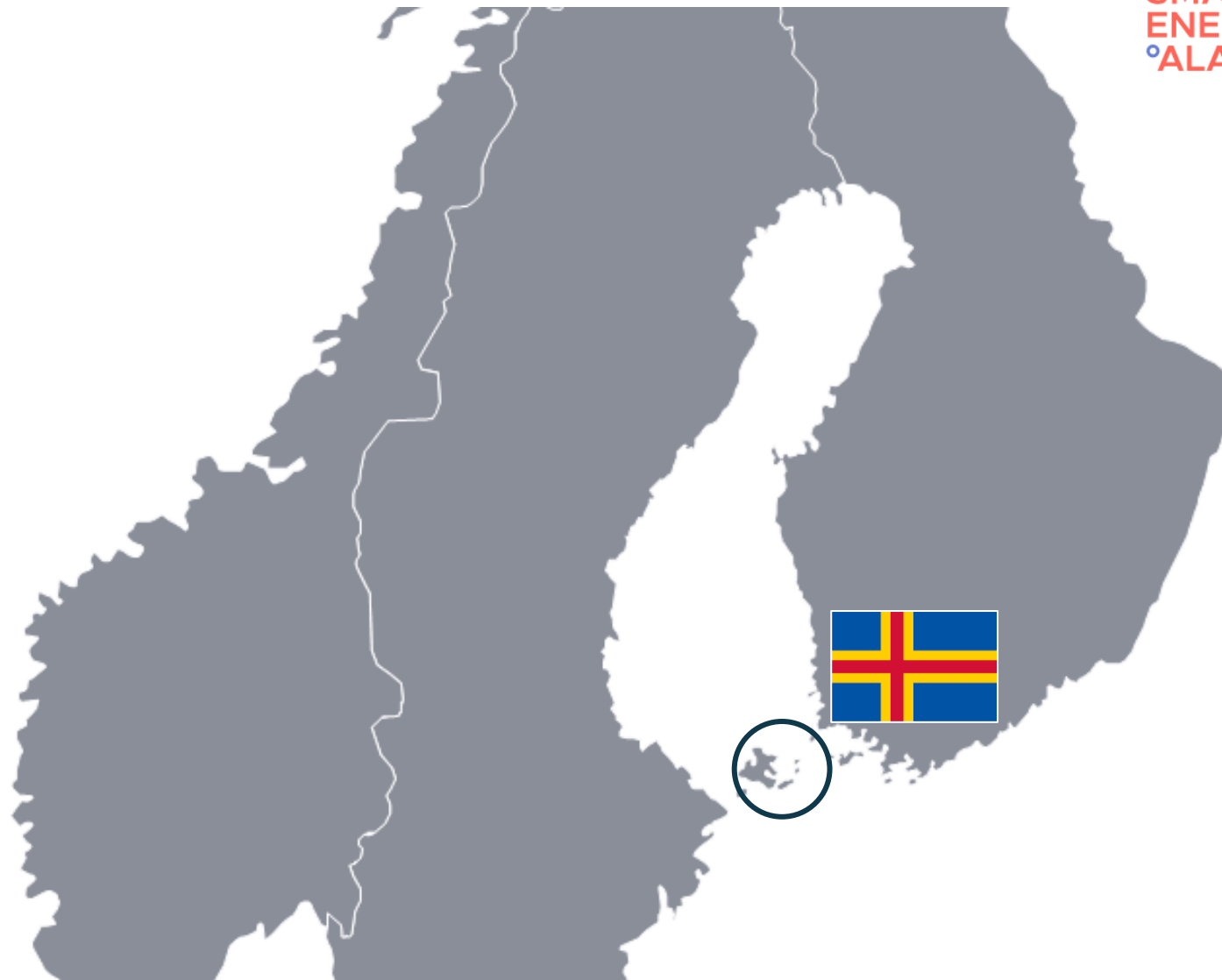
ÅLAND – THE IDEAL SITE AS REFERENCE

BASIC FACTS ABOUT ÅLAND

- Self-governed Finnish province, only official language is Swedish
- The Government of Åland is committed to the Smart Energy Åland project by Flexens
- 30 000 inhabitants
- 25% of GDP is related to tourism
- 60 inhabited islands, 6 757 islands in total

ENERGY ON ÅLAND

- Great wind and solar conditions
- Currently peak electricity demand 75 MW and annual consumption 320 GWh
- AC cable connection to Sweden and DC cable to Finland
- Today large share of annual electricity is delivered from Sweden
- Fossil fuels used mainly in district heating, residential oil boilers, road traffic and ferry traffic
- 10 domestical ferries operating in the archipelago



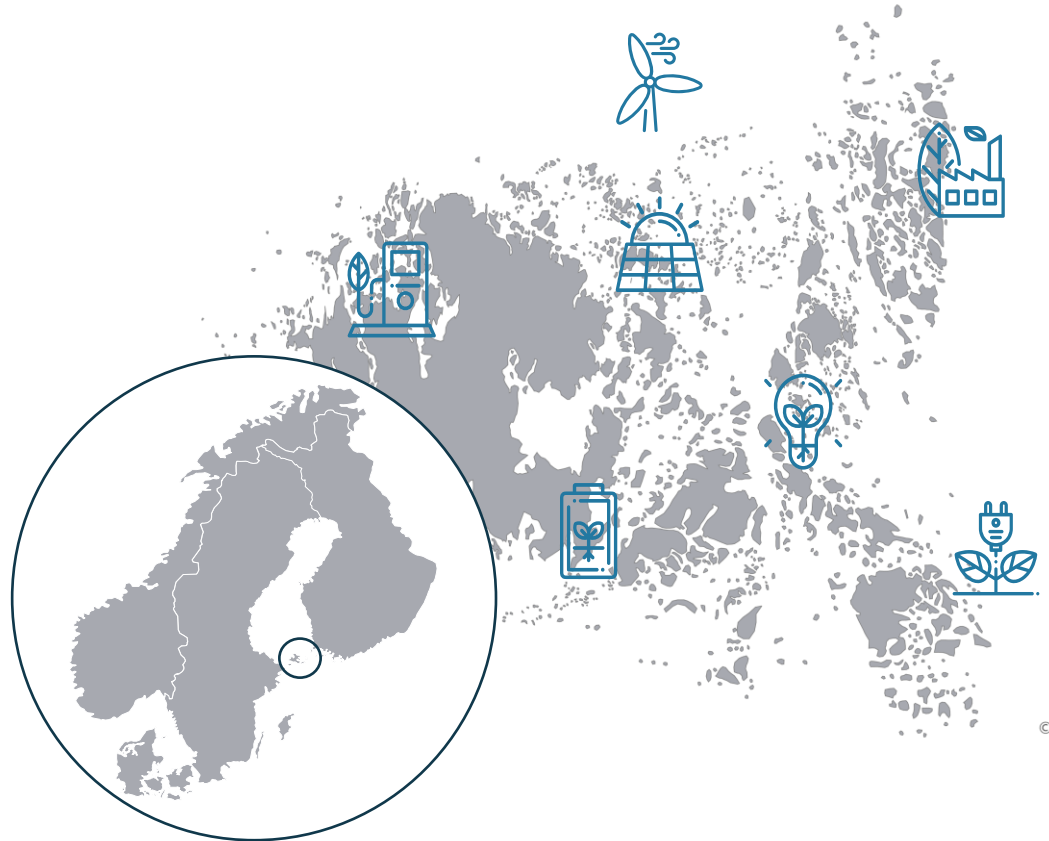
Our heritage

In Åland we have showcased how a society can run 100% on renewables

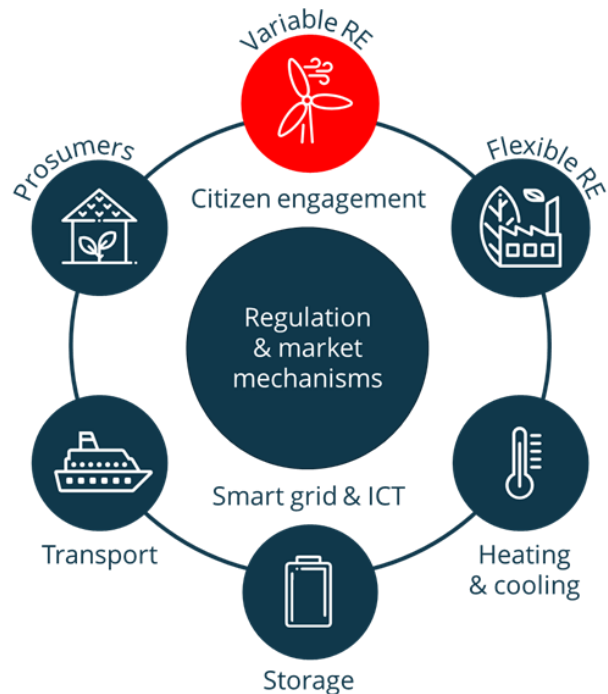
SMART ENERGY ÅLAND (SEÅ) IS A SOCIETY-SCALE TESTBED

- In Åland we demonstrate how a society can run self-sufficiently on renewable energy, without increasing the cost to the end customer
- Flexens current SEÅ project pipeline consists of 20+ sub-projects
- Smart Energy Åland
 - Provides a unique piloting platform for emerging technologies, operating as base for new business ventures and market models to attract international awareness and business leads
 - Gives Flexens a strong local presence, offering significant opportunities to all major renewable projects planned in the Åland region, including significant offshore wind opportunities
 - Has created international excitement and leads, which proves the importance of an integrated approach in turning the green transition into a competitive advantage.

ÅLAND IS LOCATED BETWEEN SWEDEN AND FINLAND

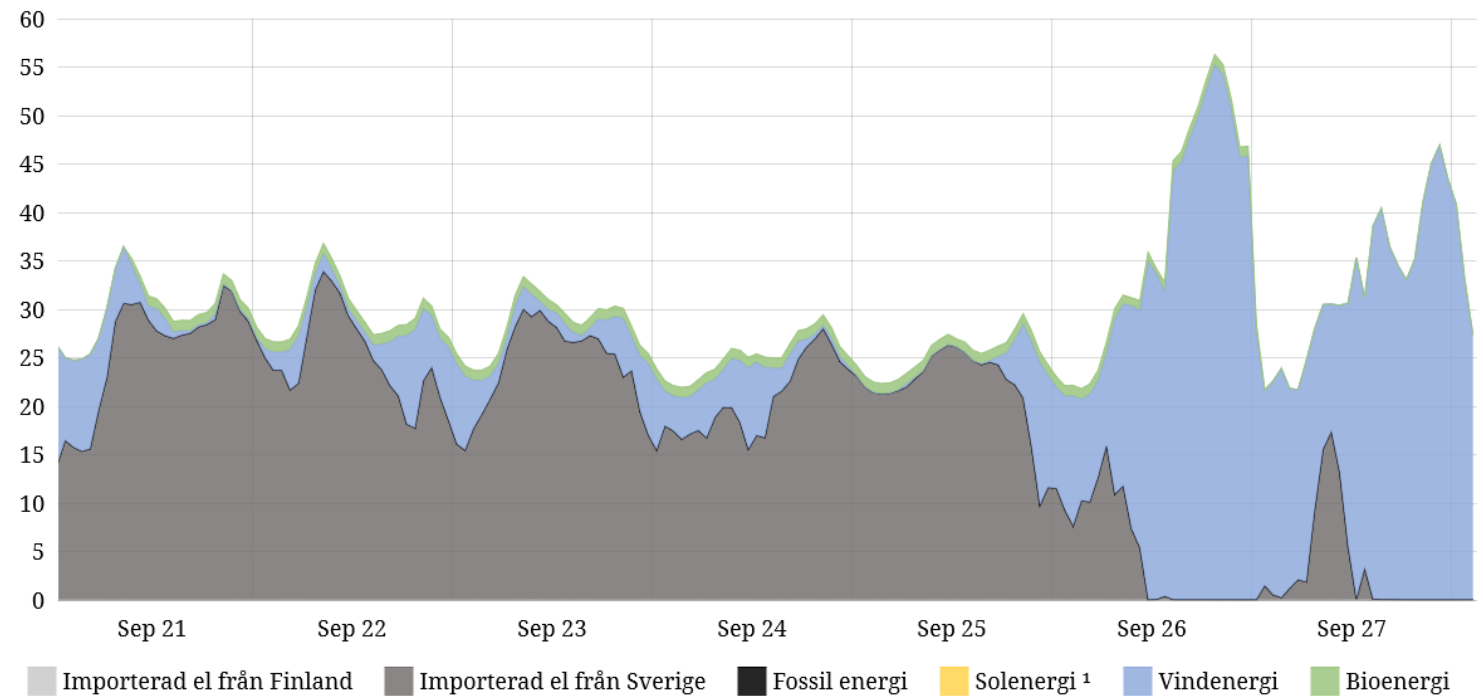


Sector coupling and citizen engagement in focus



ELECTRICITY USE ON ÅLAND IN REAL TIME

This interactive graph illustrates the origin of the electricity consumed on Åland. The time limits can be changed and the options below the graph can be unchecked and checked. The graph is updated daily via Flexen's Energy Portal.



Källa: flexens.com

Examples of demo projects



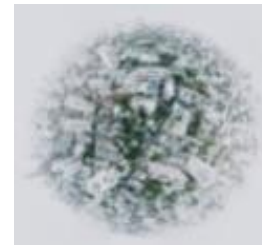
Hydrogen ferry running on locally produced green hydrogen



Energy storage integrated in wind farm



Pumped hydro energy storage



Flexibility market



Energy Island community

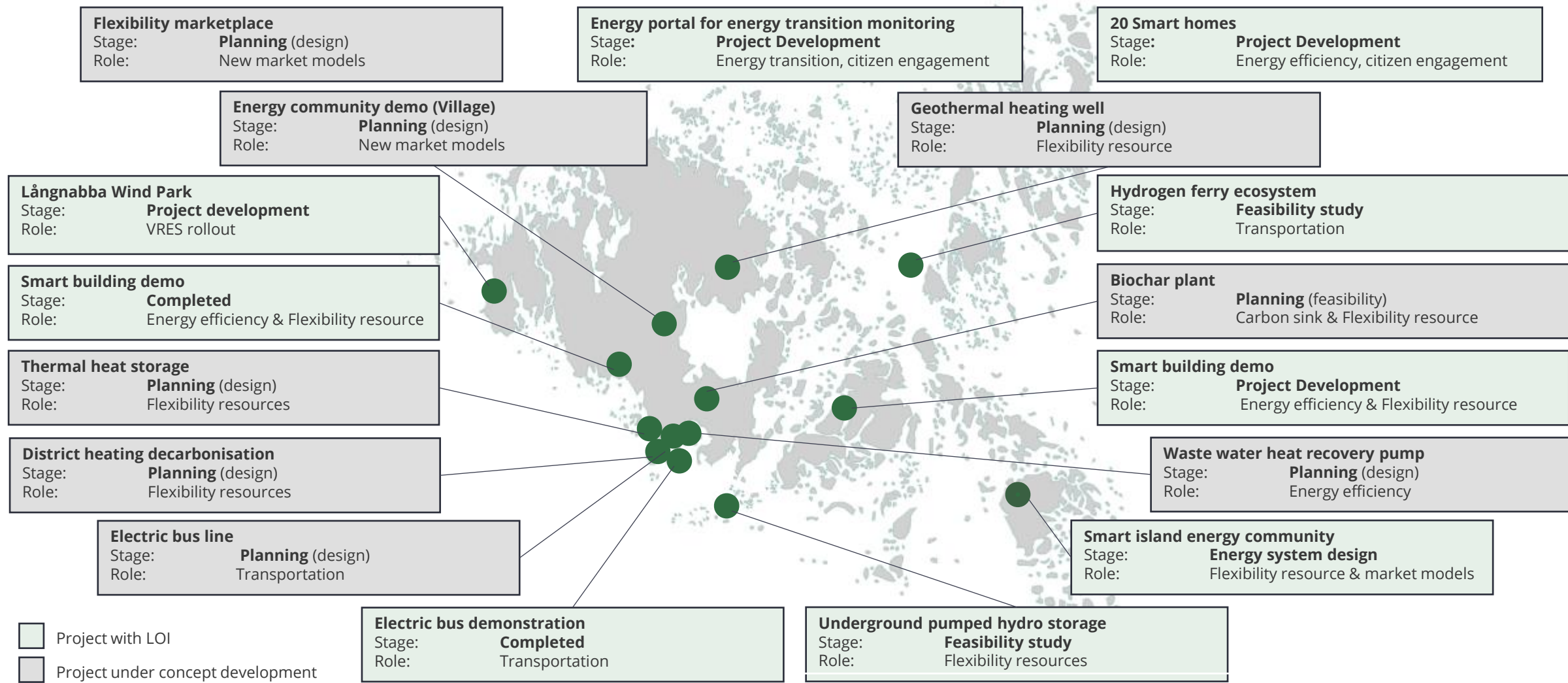


This project has received funding from the European Union's Horizon 2020 Programme under the Grant Agreement no. 957819



Energy portal

Smart Energy Åland subproject overview

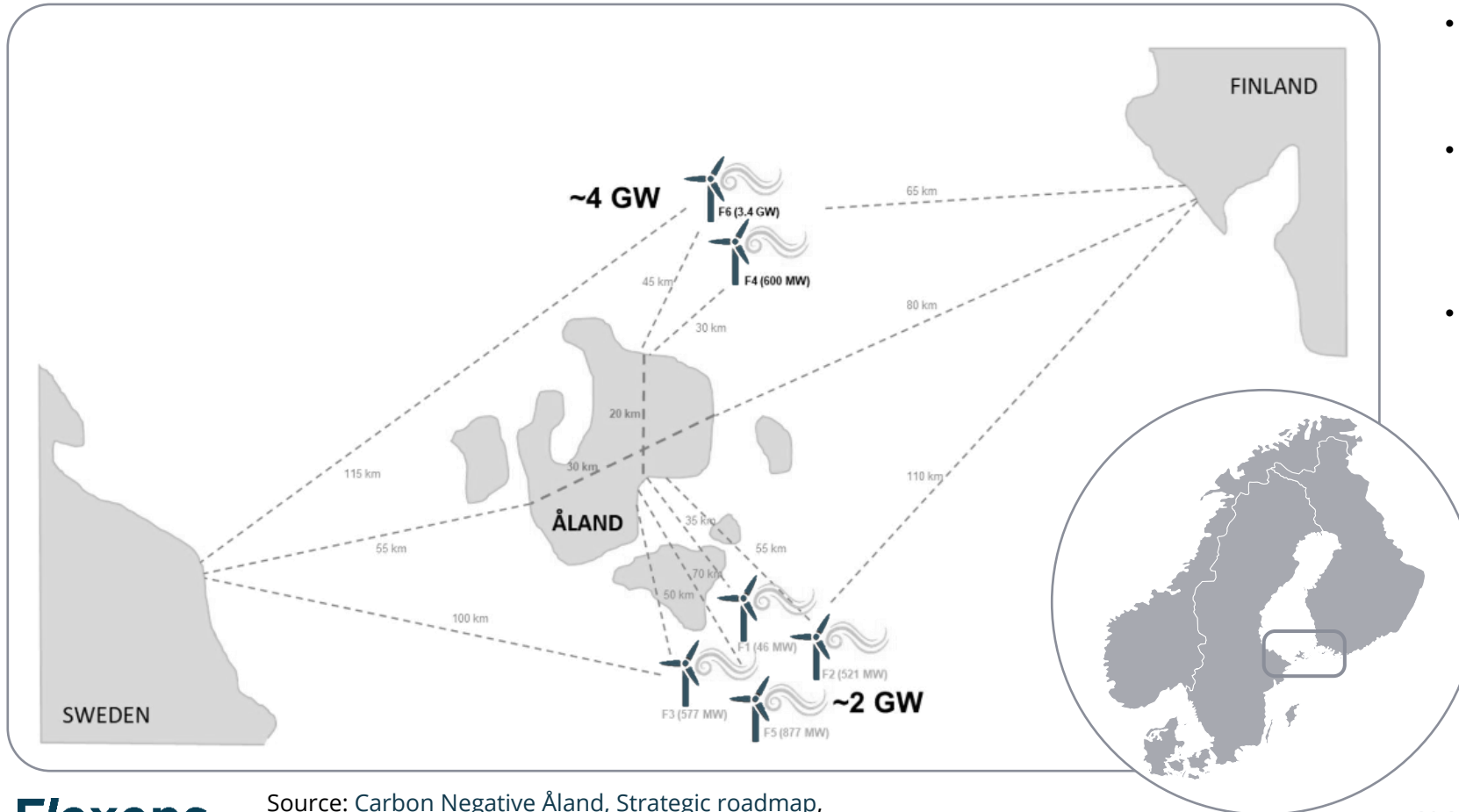


20+ subproject leads in pipeline

Small nation – big opportunities in renewable energy production

ILLUSTRATION OF PRINCIPLES OF MAIN CONNECTION ALTERNATIVES AND INDICATIVE DISTANCES FROM WIND FARMS TO ÅLAND AND CONTINENT

COMMENTS



- Åland faces many challenges with offshore wind, requiring a unique sector development approach.
- This includes limited domestic demand and the reduced capability to support the sector or provide revenue stabilization mechanisms financially.
- At the same time, neighboring markets Finland and Sweden have seen an increasing interest in offshore wind, raising the threat of competition and time pressure.

3. Lessons learned: New solutions and opportunities in transport, cities and ports

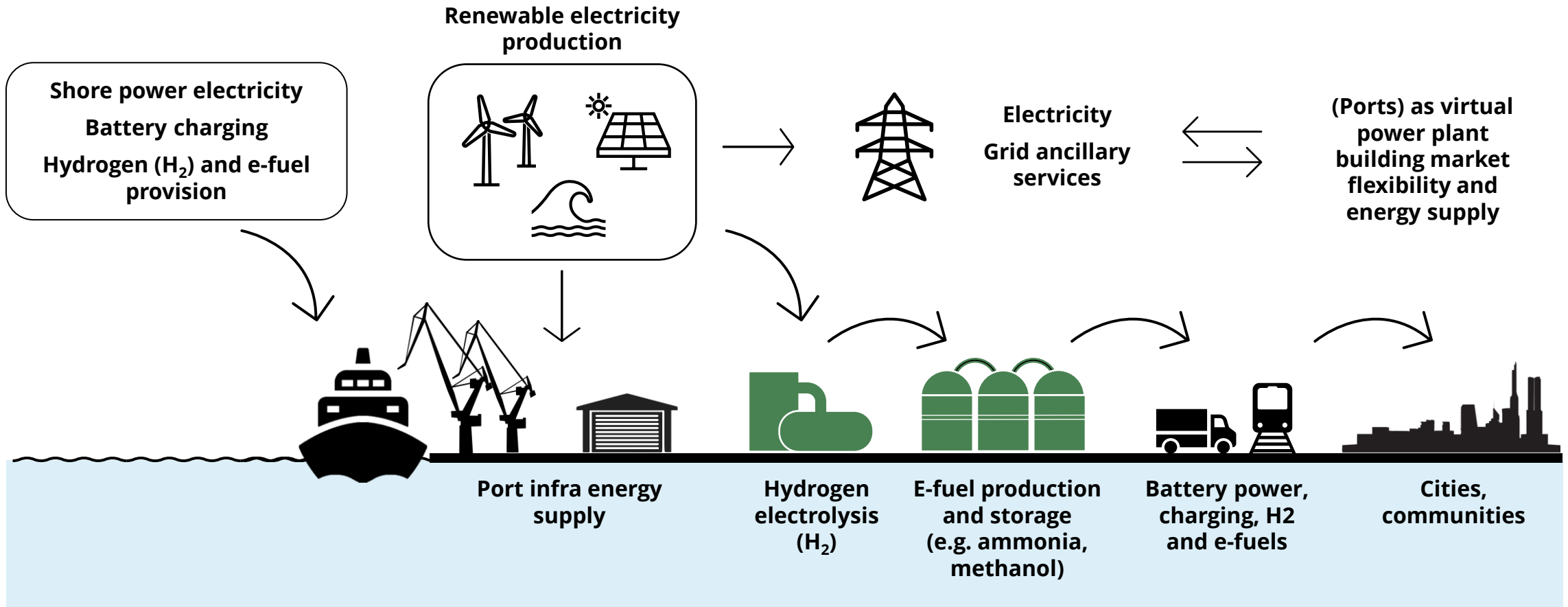


New opportunities in transport, cities and ports

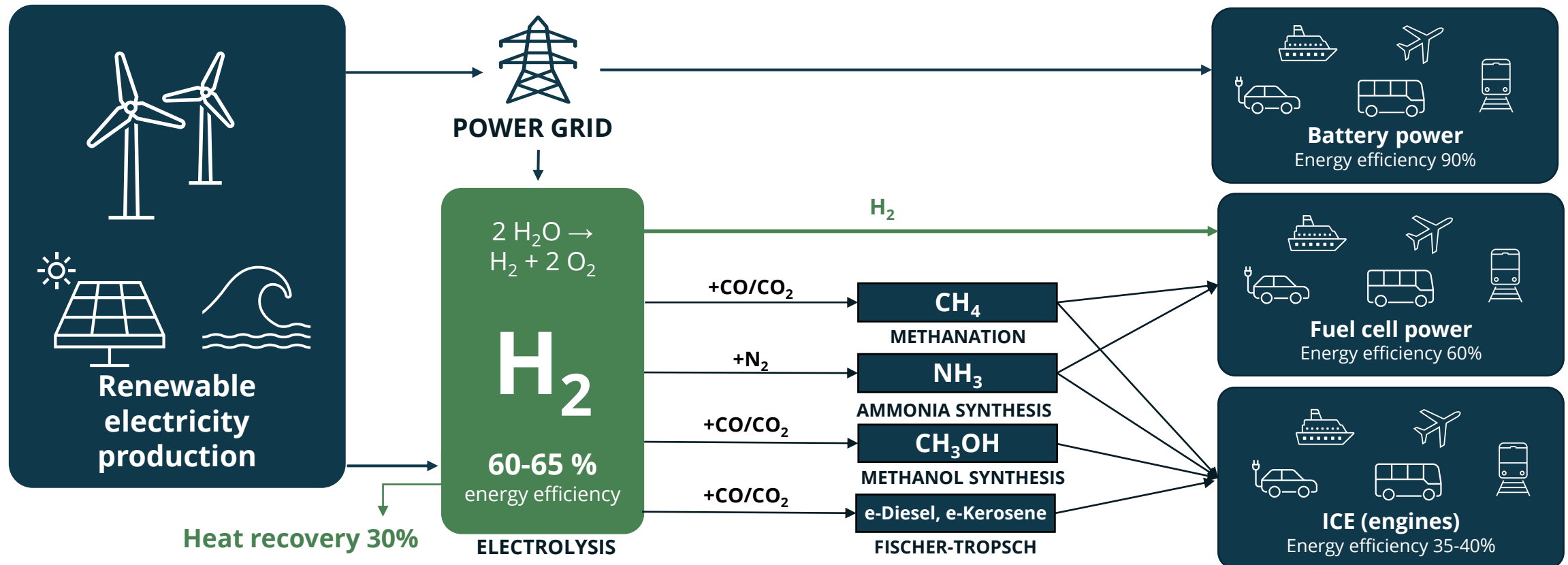
Innovative solutions in energy storage, hydrogen and e-fuels

FROM THE PERSPECTIVE OF A SHIPPING COMPANY

FROM THE PERSPECTIVE OF A PORT, CITY OR COMMUNITY



The power sector will run future logistics



Green ammonia shows great business cases already today

Flexens is developing green ammonia projects in Finland

- Invested in a green ammonia production project of Green NorthH2 Energy in Naantali
- Consulted a renewable IPP in green ammonia production concept (IPP: Independent power producer)

Green ammonia is a clean fuel both for deep-sea shipping and raw material input for nitrogen fertilizers and chemicals

- Local production increases the security of supply for both energy and fertilizers
- Fossil ammonia production is dependent on natural gas costs – High fossil fuel prices in 2021 and 2022 have caused a dramatic increase in fertilizer and food prices

Green $H_2 + N_2$



AMMONIA SYNTHESIS

Green NH_3

GREEN AMMONIA
PRODUCTION

INDUSTRIES AND FUEL CELLS

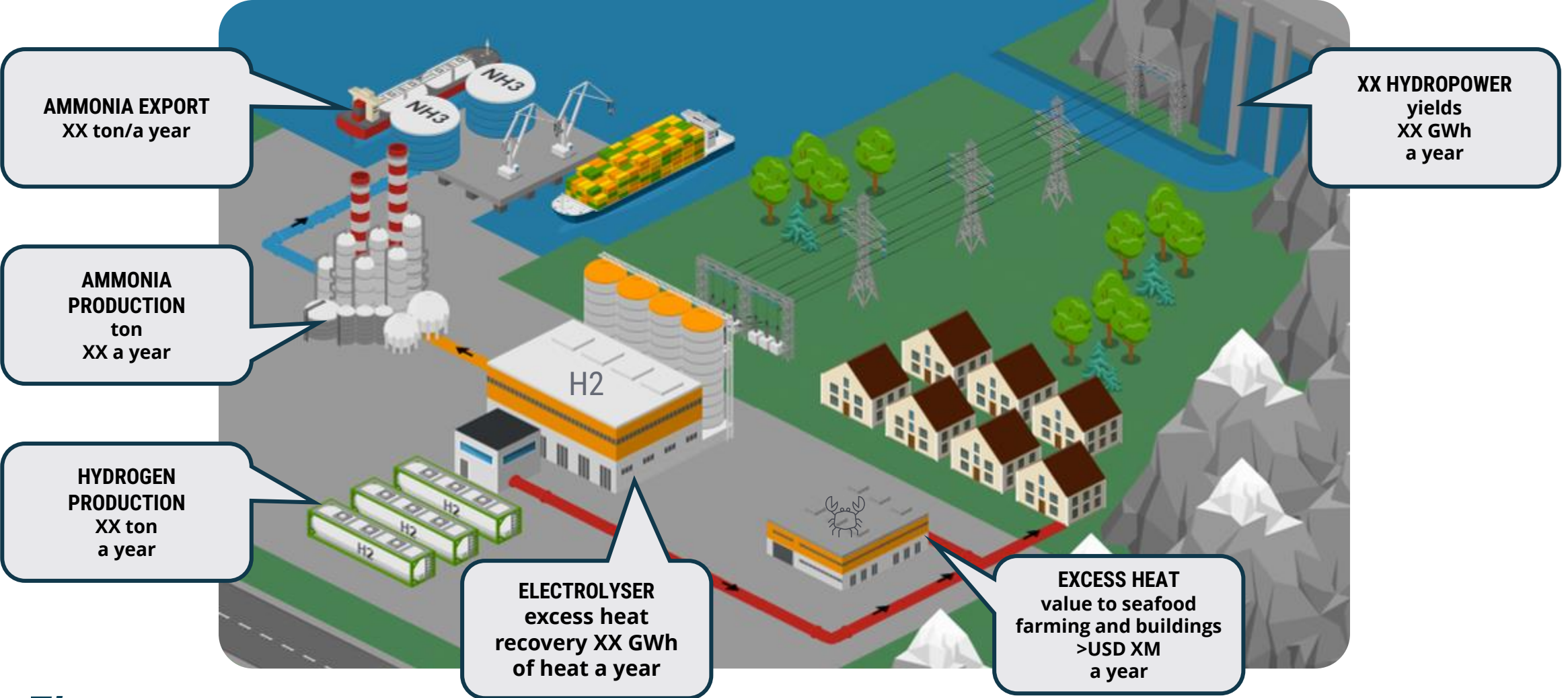


NITROGEN FERTILIZERS AND
CHEMICALS

ENGINES

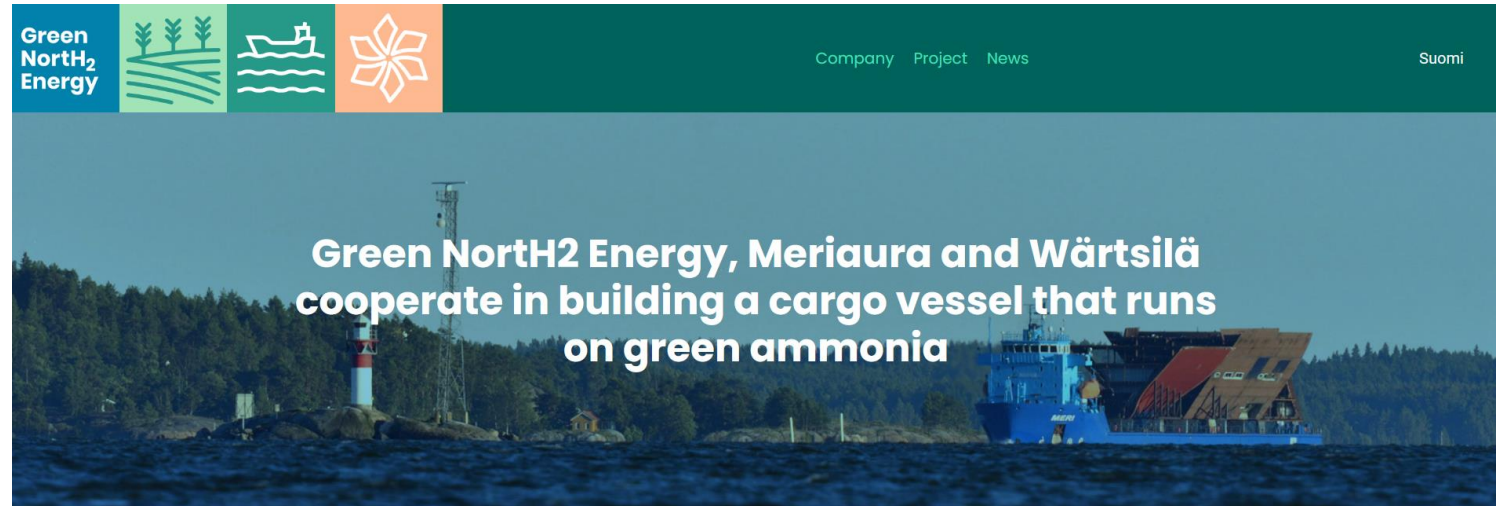


Dynamic green ammonia production on Greenland



Green ammonia in shipping

BREAKING NEWS



FINLAND, 21.9.2022. Green NorthH2 Energy, Meriaura and Wärtsilä have signed Letter of Intent for building of a cargo vessel that runs on green ammonia. The vessel, equipped with Wärtsilä's modular multifuel main engines, will be ordered and operated by Meriaura, and Green NorthH2 Energy is responsible for supplying green ammonia fuel, which is produced with renewable electricity. The delivery of the vessel is targeted for 2024 and it is planned to start operating on green ammonia in 2026.

Green NorthH2 Energy Oy is a green energy project development company established in 2021, which enables the operation of green hydrogen and ammonia plants.

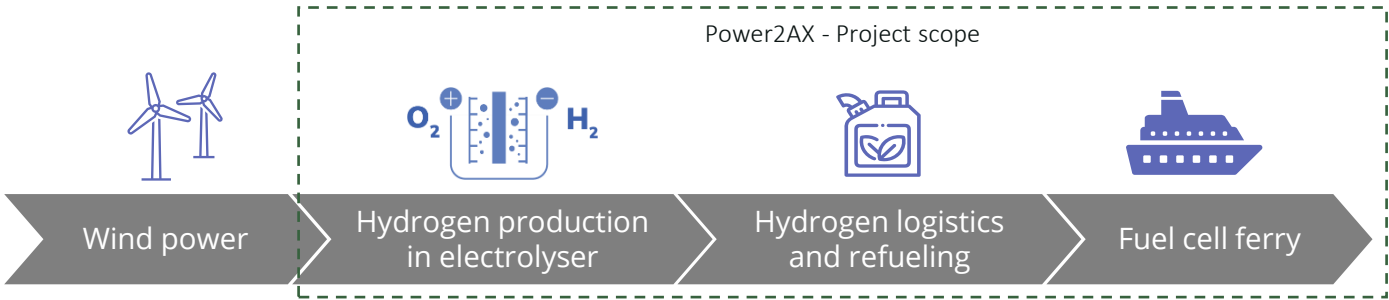
4. References



Power2AX Project

Local green hydrogen production for a fuel cell ferry in Åland, Finland

Preliminary studies on hydrogen ferry operation in the Åland islands were started several years ago in the Finnish national research programs. Flexens took the project over in 2019 and launched a feasibility study with the Government of Åland on different concepts in May 2020. The overall scope covers hydrogen production, logistics and use in one or more ferries.



The best-case scenario for implementation of the Power2AX project



Reference – partnership in Green NorthH2 Energy

Green ammonia production in Naantali - Spearhead project within the Finnish hydrogen economy

Finland's best located green hydrogen project with strong political support provides immediate and incremental commercial applications with synthetic products.

- Reuse of power plant premises
- Strong electricity network connections
- Waste heat to be used in Turku district heating network
- Great sea, railway and road transportation opportunities
- Availability of bio-base CO₂
- Use of O₂ in current power plant
- Refinery area to build hydrogen valley

Flexens is an 8% minority owner in the SPV "Green NorthH2 Energy Oy"



**GREEN
NORTH2
ENERGY**

**Hydrogen and
ammonia production
in Naantali**



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Thank you



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