EISEA
ESTONIAN ISLANDS
ENERGY AGENCY

CE4EUislands workshop

Taavi Liivandi

Co-funded by
the European Union

EISEA

EISEA
ESTONIAN ISLANDS
ENERGY AGENCY

Established in 2023, the Estonian Islands Energy Agency (EISEA) is a socially oriented non-profit operating on six islands in western Estonia: Saaremaa, Hiiumaa, Muhu, Vormsi, Kihnu and Ruhnu.

EISEA helps local authorities, communities and businesses to implement projects aimed at more sustainable energy use and production, and which help reduce carbon emissions.

The founding members of EISEA are the rural municipalities of the islands of Saaremaa, Hiiumaa, Muhu, Kihnu and Vormsi, the entrepreneurs' associations of Saaremaa and Hiiumaa, the Saare Development Centre and the Tallinn University of Technology.

Current situation on the islands

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

ISLAND	POPULATION	KM²	RESIDENTS PER KM²
HIIUMAA	9 778	1 032,58	9,47
VORMSI	445	95,06	4,68
KIHNU	671	17,24	38,9
MUHU	2 092	207,89	10,06
RUHNU	163	11,89	13,7
SAAREMAA	32 075	2718,54	11,8
TOTAL	**45 224**	**4 083,2**	***14,77 (on average)***

Source: Ministry of Interior (01.01.2025)

Energy consumption

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

Electricity consumption data	Unit	Total 2022	Total 2023	Change
Total consumption	GWh per year	215.3	209	-6.3
Solar and wind energy	RE producers	948	1165	217
Renewable energy directed to the grid	GWh per year	58.6	72.3	13.7
Solar energy fed into the grid	GWh per year	24.6	29	4.40
Wind energy fed into the grid	GWh per year	34	34.9	0.90
PV nominal capacity	MW	25.79	33.81	8.02
Wind nominal capacity	MW	16.36	16.51	0.15
Consumption by local authorities	GWh per year	6.2	5.6	-0.60

What needs attention?

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- The islands are too small to organize procurements.
- 2/3 of municipal buildings are below the near-zero energy level.
- Ferries and several buses use diesel fuel.
- Electric vehicles are too expensive.
- There are no energy cooperatives and a strong NIMBY (Not In My Back Yard) effect.
- Grid limitations offshore and on renewable energy sources.
- Subsidies do not adequately compensate for low investment capacity.
- There are gaps in expertise and management of energy technologies.

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

MOBILITY & ENERGY COMMUNITIES

Mobility

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- **Contribution to Mobility Reform**
  Goal – Integrated approach to island mobility as a whole.
- **Development of a demand-based transport concept**
  Goal – A convenient and economically viable model for people.
- **Mapping and development of electric vehicle charging networks**
  Goal – The best solution for local governments (LGUs) and communities, with an emphasis on ports.
- **Mapping of local government vehicle fleets**
  Goal – Data-driven action plan and technical input for fleet renewal and key tenders to decarbonize the transport sector.

Establishing Energy Communities

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- **In collaboration with the Estonian Ministry of Climate, The Association of Estonian Cities and Municipalities and the Energy Cooperative NGO.**

  Goal: A simple and effective process for establishing and operating energy communities.

- **Development of data collection, analysis, and simulation processes.**

  Goal: A straightforward and efficient process for obtaining accurate and necessary data.

- **Technical Solution**

  Goal: A procurement-compliant, future-proof, and economically sustainable technical specification.

Resilience centers

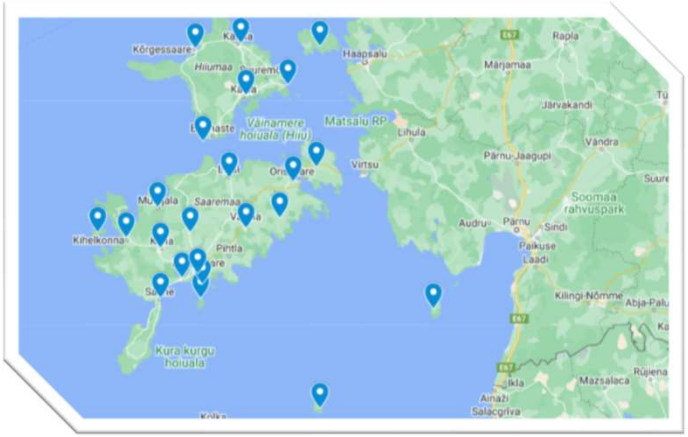
EISEA
ESTONIAN ISLANDS ENERGY AGENCY

☸ Mapping of resilience center locations

Goal – Identify the best locations based on existing infrastructure and people's movement patterns.

☸ Technical solution

Goal – A universal technical solution based on local government buildings, with functionality clearly communicated to nearby residents. It is compatible with the concepts of energy communities and mobility under normal conditions, providing benefits 24/7, 365 days a year.

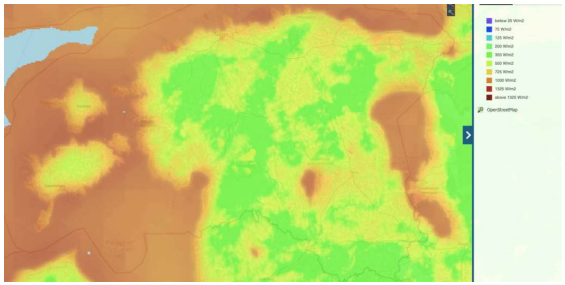


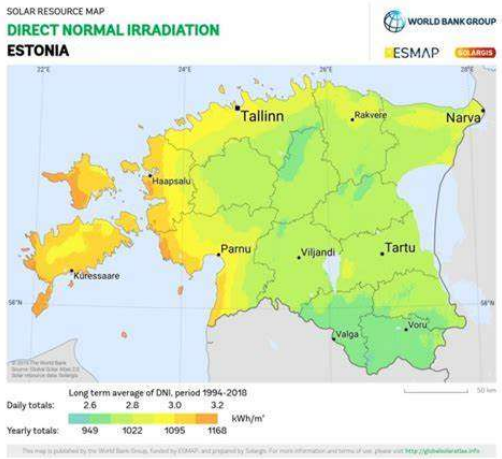
EISEA
ESTONIAN ISLANDS ENERGY AGENCY

Buildings & Heating

Opportunities

- The islands have great potential for utilizing renewable energy sources.
- Renovating and insulating buildings could significantly reduce energy costs.
- Develop energy-efficient renovation projects, including wall insulation, window replacements, and the installation of modern ventilation systems.
- Integrate the production of energy cooperatives with the energy use of public buildings.
- Create a database to monitor energy consumption across small islands and prioritize renovation projects





Heating

- Integrated solutions for district heating systems in small towns.
- **Reconnecting renovated buildings** to district heating.
- Registration of district heating areas.
- A comprehensive district heating operation model for Hiiumaa.
- Reconstruction of the heat storage tank for Kuressaare Soojus.
- Replacing heating oil for peak load and summer hot water supply with a new biogas plant.
- Using waste heat from the sewage treatment plant to heat reactors.
- Applying **geothermal energy** from buildings to small settlements.

EISEA
ESTONIAN ISLANDS
ENERGY AGENCY

LARGE SCALE INVESTMENTS

Off-Grid island Ruhnu

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

A unique solution driven by smart automation

Solar panels
200 kW

Electric wind turbines
50 kW

Battery bank
180 kW and 220 kWh

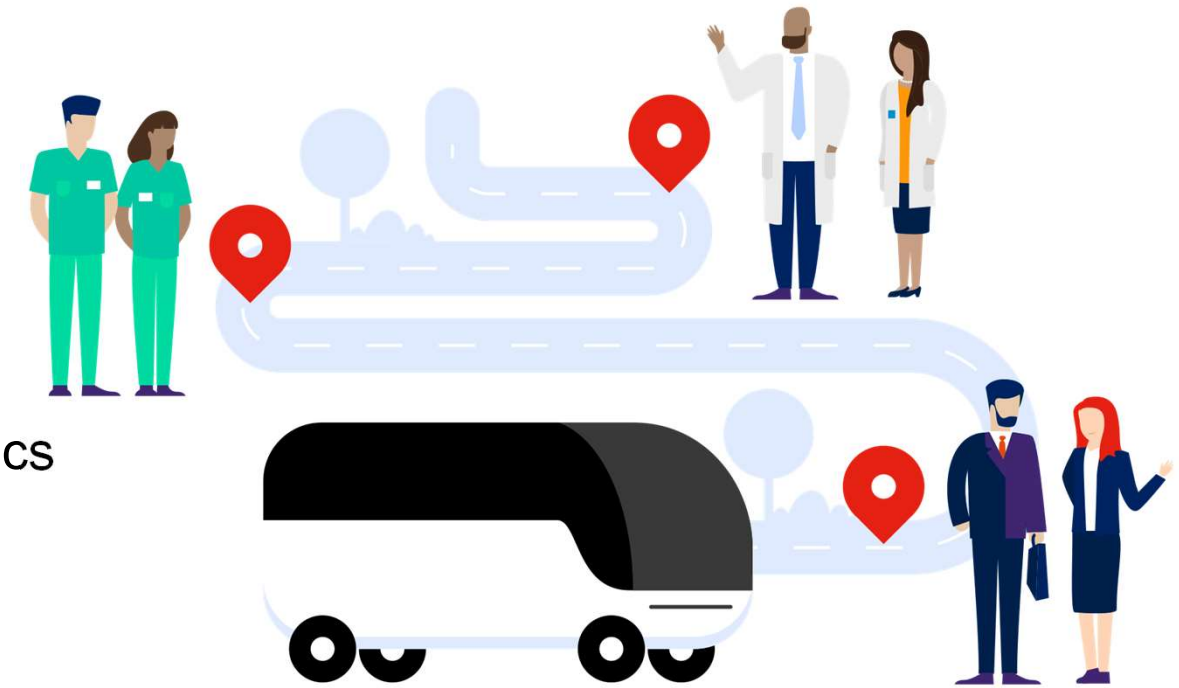
Biodiesel generator
160 kW

On-demand public transport

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- Extends bus lines
- Social transport
- School transport

- IT solution for
  - user
  - driver
  - fleet operaator
  - local municipality for analytics



Tahula Biomethane Plant

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- Total investment 15 million euros.
- EIC support 5 million.
- Produces 58 GWh of biomethane
- The plant covers 15.3% of the electricity consumption and 25% of the thermal energy of Saaremaa Municipality
- The project aims to use carbon dioxide emissions from biomethane production in the manufacturing of carbon nanotubes and graphite, resulting in a carbon-negative initiative.

Wind Energy

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- RENEWFM – Renewable Energy Financing Mechanism aims to provide support for Renewable energy projects in Estonia and Finland.
  - 2800 FLH for wind onshore projects in Estonia. Each project must have a minimum capacity of 10 MWp and a maximum capacity of 71.5 MWp.
  - Max capacity 71.5MW, not exceeding EUR 300,000 per MW.
- Windmill investments by private entities (farm and a fish farm). Each 1MW. Total investment around 2.2 million euros.
- 1.4 + 1.2 + 1.0 GW offshore windfarms around Saaremaa planning commissioning by 2030.

EISEA
ESTONIAN ISLANDS
ENERGY AGENCY

PROJECT PORTFOLIO

Active Projects

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- **Renovation**
  - Renovation of Muhu Sports hall, Vormsi Culture house, Laimjala manor full retrofit
  - Kihnu School Retrofit (one-stop-shop)
- **CE4EUI**
  - 100% Renewable Energy Islands by 2030 Saaremaa ja Ruhnu
  - Follower Islands Programme – Muhu, Vormsi, Kihnu and Hiiumaa
- **Educational through Europe Direct**
  - Renewable energy lessons for kids by Tallinn University of Technology across all islands
  - Video production focusing on renewable energy

In Development

EISEA
ESTONIAN ISLANDS ENERGY AGENCY

- **Nordplus** – BEIC Connect and educational program
- **Horizon Europe** - aimed at further building on existing evidence, knowledge, materials and tools for promoting the social acceptance of renewables.
- **Environmental Investment Center** – Green technology pilot project at Orissaare Gymnasium. Year-round greenhouse using wind energy (vertical-axis).
- **IF23** – ballistic wind turbine, supplying sand thermal and BESS, introducing hydrofoil EV-boat

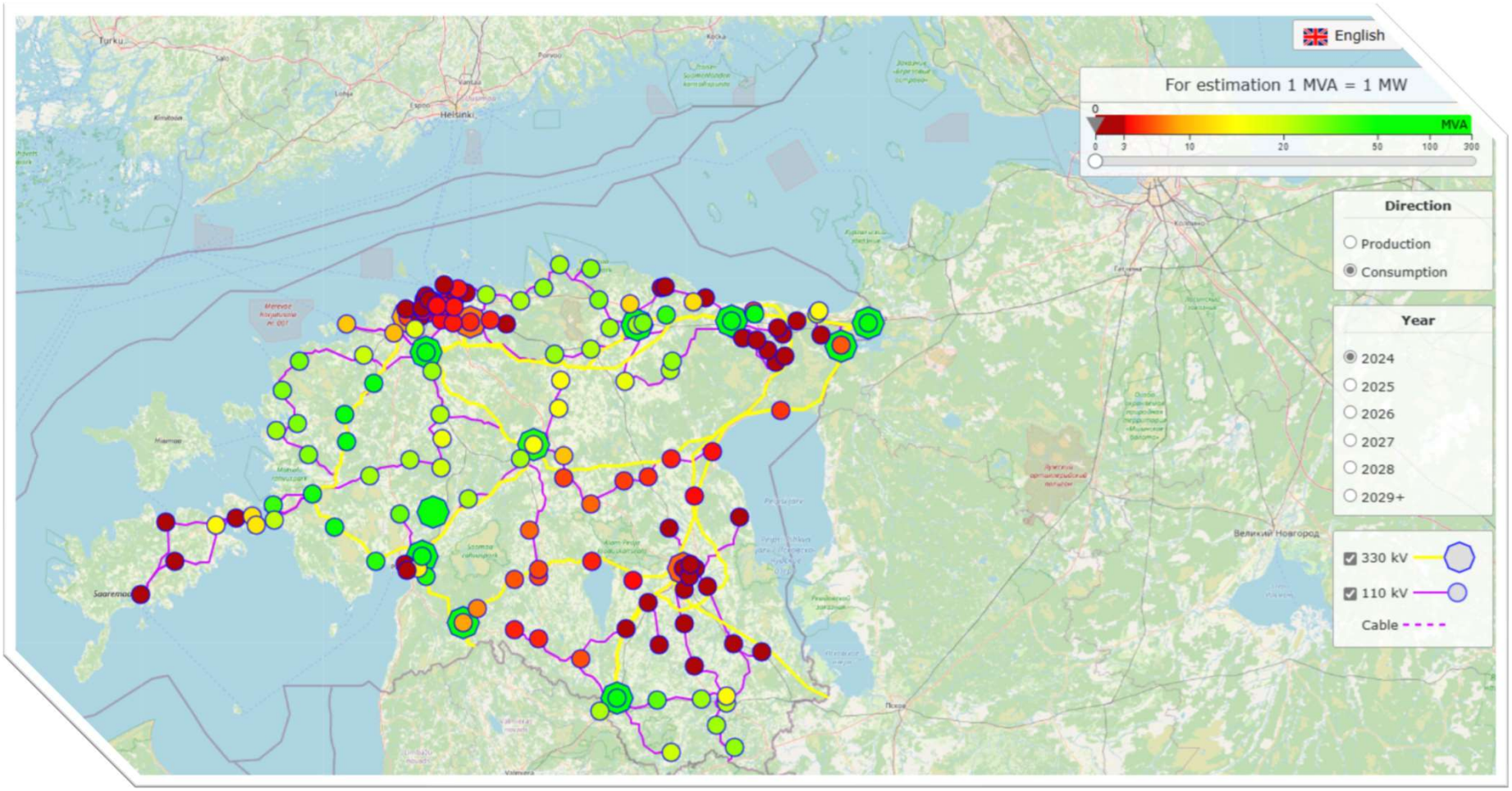
- **Mobility**
  - Käina Health Centre – 250A main fuse, dynamic charging with 6+ charging points.
  - Inter-island operator tender – input to local governments for securing the best offer.
  - Vormsi – Expansion of electric vehicle rental and transition to renewable energy.
- **Energy Communities**
  - Põllu Pilot, Kärdla, Hiiumaa
  - Viskoosa Pilot, Viskoosa, Hiiumaa
  - Kihnu School, Museum, and Town Hall – Kihnu

Finished Projects

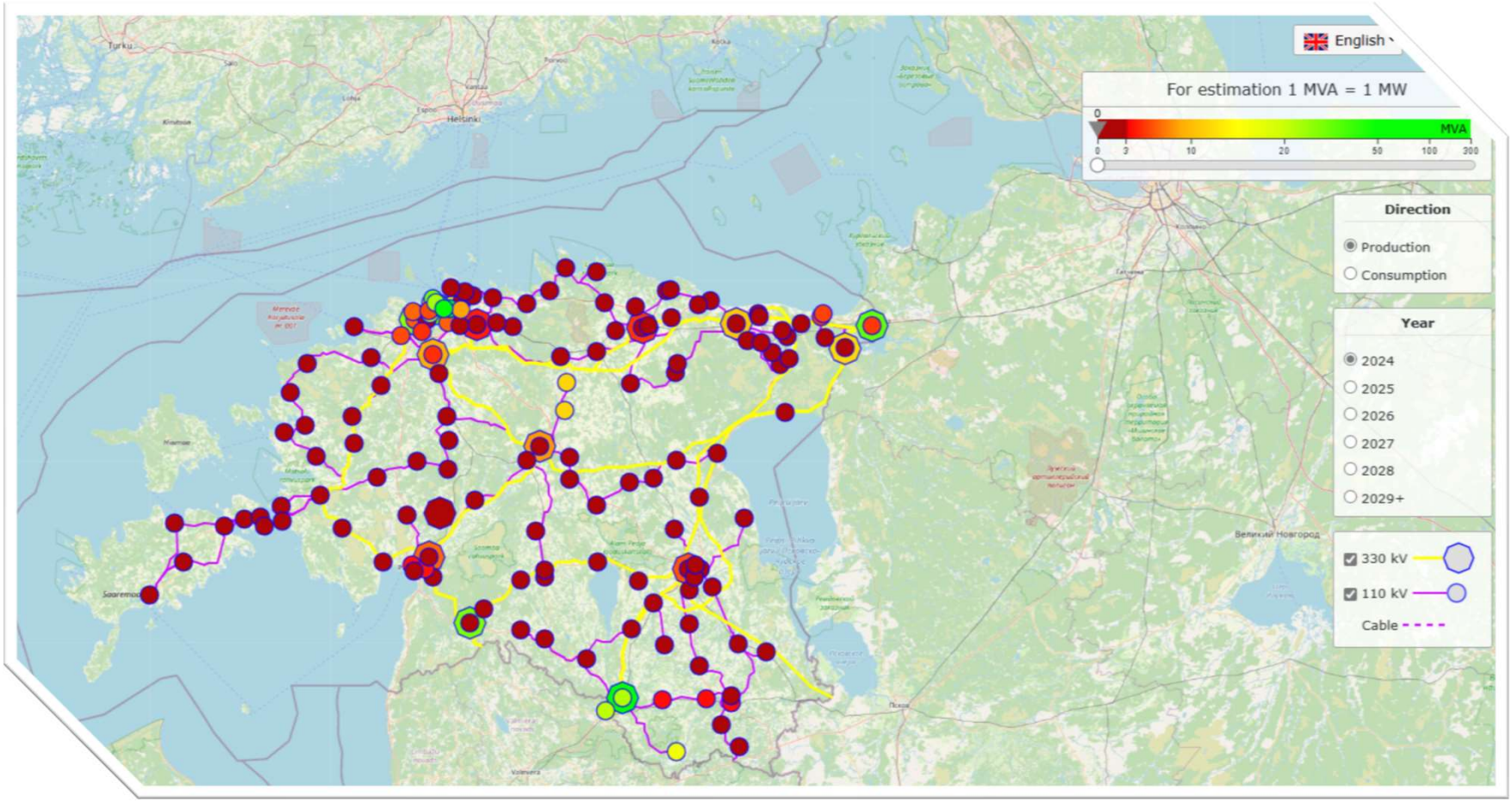
- ManagEnergy Seminars (Fedarene)
- Nordic Council of Ministers 2 projects
- PROSPECT+
- District heating storage tank in Kuressaare, Saaremaa
- Energic Xmas Trees in Kuressaare

Submitted

- CLIMAAX – Assessment of climate risks in Vormsi, Hiiumaa and Kihnu and, as a result, preparation of crisis management plans.
- LIFE2424-CET-GeoHeat - Accelerating the introduction of geothermal and residual heat-based heat pumps. Two pilots are planned on the islands of EISEA.
- EUCF - Preparation of investments for district heating in Hiiumaa



Source: Elering



Source: Elering

New international connections

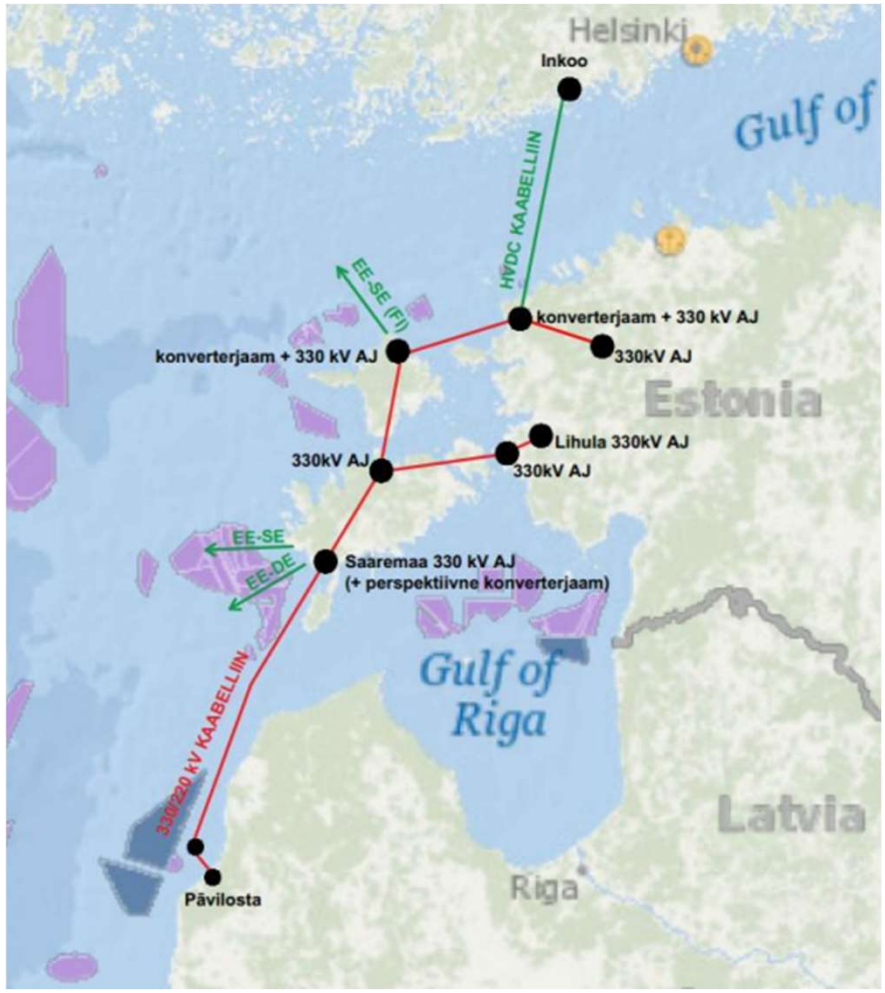
Future additional electricity connections are divided into two:

Formulated projects:

Est Link 3
- Bottleneck fee approx. 300 MEUR - market
- MoU with TSO by 2035
- First joint activities

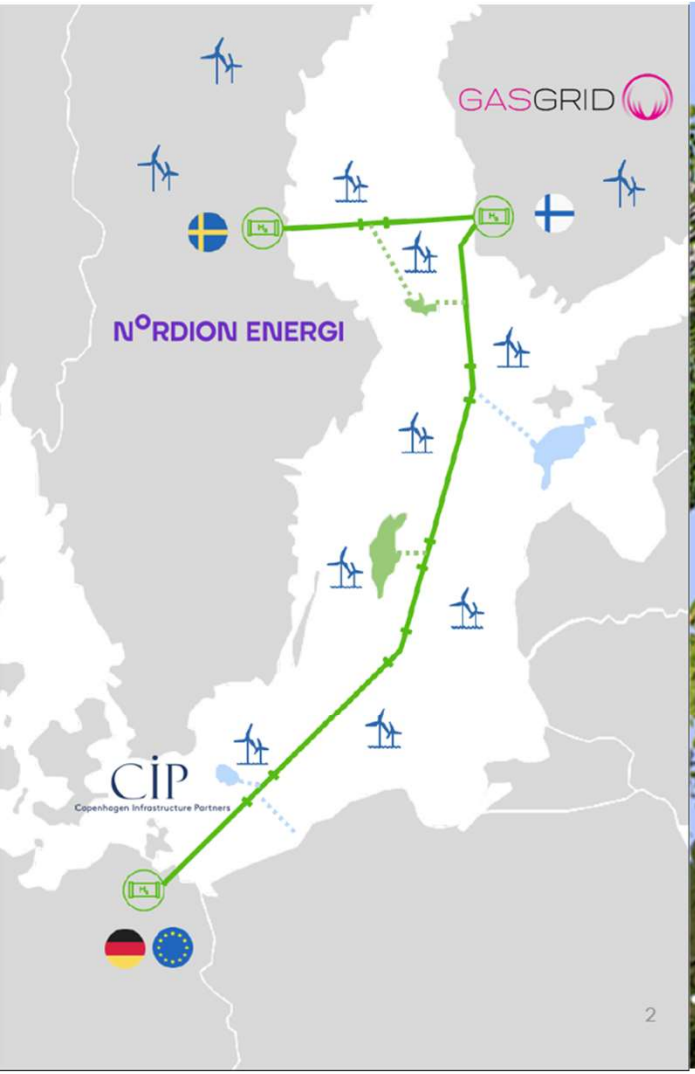
Est-Lat 4
- In 2022, the owner's expectation was to begin development – political will
- MoU with TSO by 2035
- Planning initiated in Saaremaa, goal set for 2033
- 7 years from planning approval to completion

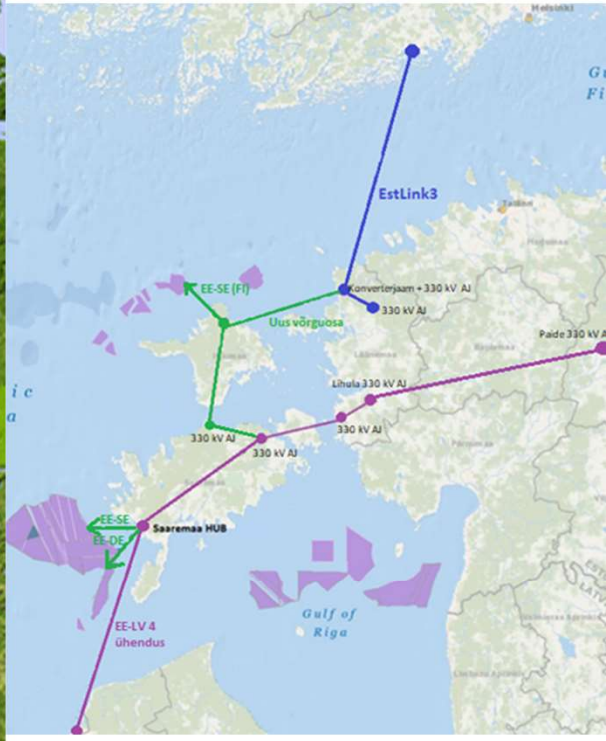
Future vision
- Baltic wind connection
- Line across Hiiumaa
- Potential additional connections with foreign countries



Source: Elering

Hydrogen pipeline





Thank you for listening!

www.eisea.org

Co-funded by
the European Union

ESTONIAN ISLANDS
ENERGY AGENCY