Interreg
Co-funded by the European Union

Central Baltic Programme

REISFER

Elias Joki-Korpela, Minna-Liina Ojala & Lauri Ojala:

UNIVERSITY OF TURKU

# The Business Environment for Island Ferry Services in the Central Baltic Region

## – Possibilities and Preconditions to Engage in $CO_2$ Reduction

Key findings

September 2025

# Purpose of the report

- To study existing **emission reduction methods**
- To study existing **business environments** in EE, FI, AX, SE (in CBR)
  - Physical & Natural, Social, Technological, Political and Economic elements

**Overview of the preconditions and opportunities the business environment offers for reducing $CO_2$ emissions**

Interreg
Co-funded by the European Union
Central Baltic Programme
REISFER

# Emission reduction methods

| Reducing fuel consumption | Alternative energy source |
|---|---|
| Eco-driving | Electrification, batteries |
| Voyage optimisation | Hydrogen |
| Energy efficient systems | Ammonia |
| Hull maintanence | Methanol |
| | Biofuels, HVO |
| | LNG |
| | E-fuels |
| | Hybrid solutions |

# Batteries and alternative fuels

- **Electrification**
  - High environmental impact, cost efficient to use
  - Limited by route distance, expensive to implement, requires charging infrastructure
- **Biofuels, HVO**
  - Easy to implement
  - Raise fuel costs, do not achieve carbon neutrality
- **Hydrogen, ammonia, and methanol**
  - Zero emission fuels
  - Implementation is expensive and requires specified vessels; lack of a supply network
- **LNG**
  - Availability is high
  - Limited emission reduction potential, requires technical modifications to vessels and bunkering infra
- **E-fuels**
  - Function as zero emission and possibly drop-in fuels. Expensive and not readily available, are likely to become more common in the 2030’s

Interreg
Co-funded by the European Union
Central Baltic Programme
REISFER

# Physical and Natural environments

- Form the base for human activity: where & when
- (Central) Baltic Sea
  - Strong seasonality in climatic and local weather conditions
  - Complex topography and bathymetry
  - Gradual transition from inner to outer archipelago – distances
  - Rich yet threatened biodiversity → protected areas

➔ Affect operation areas, travel times and energy consumption

- Climate change continues to alter the natural environment in long-term

*(source: ESA)*

*(source: NASA)*

# People and tourism

- Population is highly concentrated in coastal areas in all countries
- Actual island populations are aging and declining (large islands viable)
- Seasonal living has become more popular, and second homes better equipped
- Tourism is important for each economy and continues to grow (post-COVID)
  - High seasonality
  - Archipelagos are part of national tourism strategies
  - Promotion of sustainable tourism in each region

# Technological environment

- Observations from the Central Baltic Region
    - Fully **electric battery-powered** ferries are in operation in Finland and Sweden
    - Initiative to establish **charging infrastructure** for battery-powered vessels in Estonia
    - Initiative to establish a green electricity powered **e-fuel** production facility in the Åland Islands
    - **HVO** is commonly used by island ferries in the Stockholm County (SE), also in Helsinki (FI)
    - **Hydrofoil** ferry Candela in Stockholm represents cutting-edge technology

# Political and Economic environment

- Observations from the Central Baltic Region
  - Nordic countries and Estonia have stated ambitious emission reduction goals
    - ➔ Political support for emission reductions
  - Small operators and the public sector play a key role in the island ferry service industry
    - ➔ Financial resources are limited
  - Existing governance structures are based on ferries using fossil fuels
    - ➔ Bureaucracy slows down the implementation

# Conclusion

**Fairly good preconditions for emission reductions regarding island ferry traffic exist in the Central Baltic Region**

**Advantages:**

- Technical knowhow and capabilities
- Political commitment to reduce emissions
- Promotion and development of archipelago travel
- Small scale of both vessels and the ferry traffic industry

**Limitations:**

- Supply: Incomplete infrastructure for alternative energy sources
- Geography: Long distances to remote islands
- High seasonality in weather conditions and demand
- Limited financial resources
- Bureaucracy

# Contact details

- All REISFER reports can be downloaded *here*

- If you need further information of this report, please, contact Project researcher Minna-Liina Ojala at milioj@utu.fi

- Information of the REISFER project is available from
  - REISFER website https://centralbaltic.eu/project/reisfer/
  - Project Manager Kadi Kasepõld at kadi.kasepold@taltech.ee