Revitalizing regional ports and city centre terminals
Aalborg & Vordingborg (Denmark)

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Outline

- Research context
  - Factors of change introduced by AEGIS
  - Use-cases in Denmark: SME ports
- Geographical context
  - Port of Aalborg
  - Port of Vordingborg
- Sustainability challenges
Factors of change from the seaside

- **Modality**
  - Short-sea shipping
  - Inland waterway transport
  - Small and medium-sized ports

- **Technological**
  - Alternative fuels (and respective infrastructure)
  - Autonomous vessels
  - Autonomous cargo handling
Relevant outcome of project AEGIS

For UC-C – AHL (Shortsea shipping in the Kattegat/Skagerrak region, RoRo – trailers):
- A RoRo vessel (electric version) with:
  o a capacity of 55 trailers
  o no on-board cargo handling system
  o a fully electric propulsion system with swappable batteries (5 FEU-sized rollable units)
  o a low to medium autonomy level (1–2 according to IMO)
- A RoRo vessel (methanol version) with:
  o a capacity of 55 trailers
  o no on-board cargo handling system
  o a methanol-electric propulsion system
  o a low to medium autonomy level (1–2 according to IMO), autonomy-ready

For UC-C – VH (Combined SSS and IWV in the Baltic and European hinterland, dry bulk, containers, project cargo):
- A SSS-IWV multi-purpose vessel with:
  o a capacity of 3,500 t or 156 TEU
  o an on-board cargo handling system consisting of a movable gantry crane to lift the hatch covers and move the wheel-house
  o a methanol-electric propulsion system
  o a low to medium autonomy level (1–2 according to IMO), autonomy-ready

Synergies between the vessel concepts developed for one use case might be used in other use cases, e.g. the mother vessel in UC-A might also be used in UC-C.
Sustainability challenges of waterfront development

- Citizen participation
- Public health
- Landscape rights
- Geographic isolation
- Economic stagnation
- Sector-wide unemployment
- Capacity building
- Disappearance of local industry
- Demographic mobility
- Policymaking and governance
Port of Aalborg
Region of Nordjylland
Terminal area

- **Yellow**: Container terminal area with capacity of 75,000 TEU
- **Blue**: Future Ro-Ro terminal with capacity to service up to 75 trailer vessel
- **Red**: Railway tracks with unfold capacity and possibilities for huge expansion.

**Figure 12** – Visual overview of complete future terminal operations at Port of Aalborg
Port of Vordingborg
Region of Sjælland
Stort produktionsanlæg er kommet nærmere

På Vordingborg Havn er der planer om verdens første power-to-X anlæg i stor skala.

Det oplyser Vordingborg Business. Det er Arcadia eFuels og de skal producere CO2-neutralt flybrændstof hvor man bruger en masse strøm for vindmøllerne.

Firmaet har indgået kontrakt med den franske virksomhed Technip Energies som skal være med til at finde ud af, hvordan og med hvilke materialer anlægget skal bygges.

Arcadia eFuels og Technip Energies forventer, at produktionsanlægget i Vordingborg er i drift i 2026.
- Vordingborg - Ruhr area, Germany
- Vordingborg – Elblag, Poland

Figure 7 – Considered routes from Vordingborg to northern Europe
Analysis
Sustainability challenges of waterfront development

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Sustainability promises of waterfront development (from AEGIS cases)

- Being informed of the vision of the port and what can change in terms of navigation around the area.
- Less air pollution because of alternative propulsion types.
- Smaller vessels are better for visual pollution/noise (especially for residents in the waterfront).
- Increased economic activity in the region can benefit local industries associated with transport and energy.
- Local industries may have facilitated access to new markets because of the proposed new routes.
- Potential for new job types in the region (namely in the energy industry).
- Autonomous terminals may link well with other such terminals (e.g. Aalborg) and create new industrial partnerships to develop isolated regions in DK.
- Having ports who are first-movers in new tech forces public authorities to regulate and create new policy and this opens the field for other ports.
Conclusion

- Waterfront changes driven by logistics: new waterborne transport systems
- Rehabilitation of smaller ports brings new life:
  - Smaller ports were lost in competition and get a revival driven by reduction of CO2 strategies and by “coastal” shipping that was once outcompeted by trucks
- Challenge of coexistence between SME ports and Danish cities:
  - In Aalborg, to minimize potential risks to various aspects of urban life, the planning law requires the municipality to enforce strict zoning regulations, ensuring that industrial activities are kept separate from other urban functions.
  - In Vordingborg, the port negotiates with the city and residents to set terms to expand its maritime operations (new pier) and green energy production facilities (biofuels and efuels) in the periphery of the city, opting for a new concept of popup terminals.
- Coexistence can be achieved by relocation (Aalborg) or by mitigation (Vordingborg): every strategy has a price and depends on urban pressures