

Hydrogen, Ammonia and Methanol in hydrogen hubs in the Nordic region

Joakim Lundgren, Project leader H2AMN

Professor, Deputy Director, CH2ESS

Div. of Energy Science, Luleå University of Technology

Background

Ports serve multiple industries - energy, shipping, trucking, railways, fisheries, cruise-tourism, and manufacturing etc.

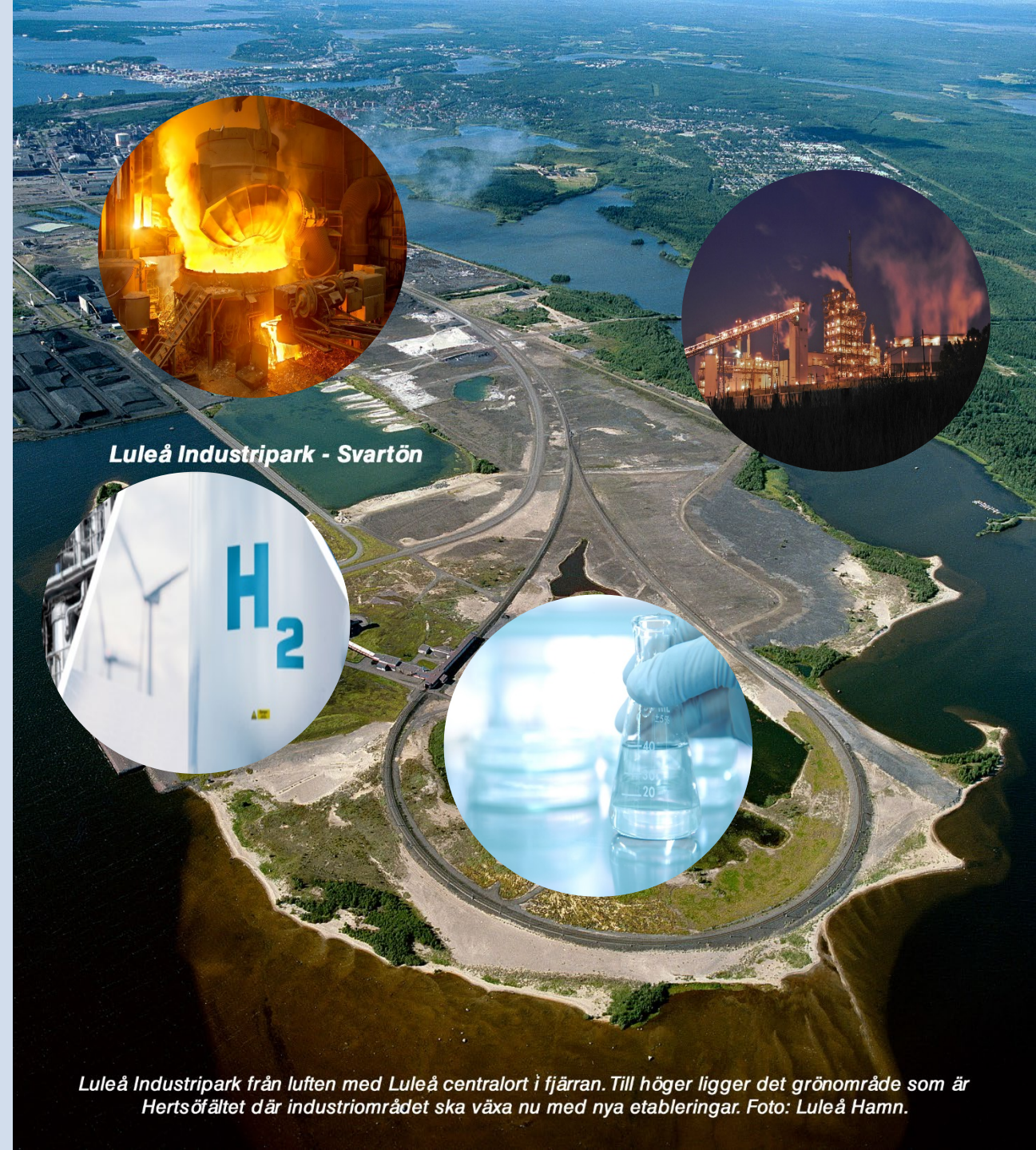
Central nodes for sector couplings and energy systems integration.

Ports will have a key role in the transition to a fossil free society.



Increased knowledge is crucial

- Logistics, scales and localizations of H₂/H₂-carrier-production
- Bunkering guidelines and storage possibilities.
- Uncertainties on demands and type of H₂-carrier
- Business-related opportunities and challenges
- New sector couplings and use of by-products.
- National policies and international developments.
- ...



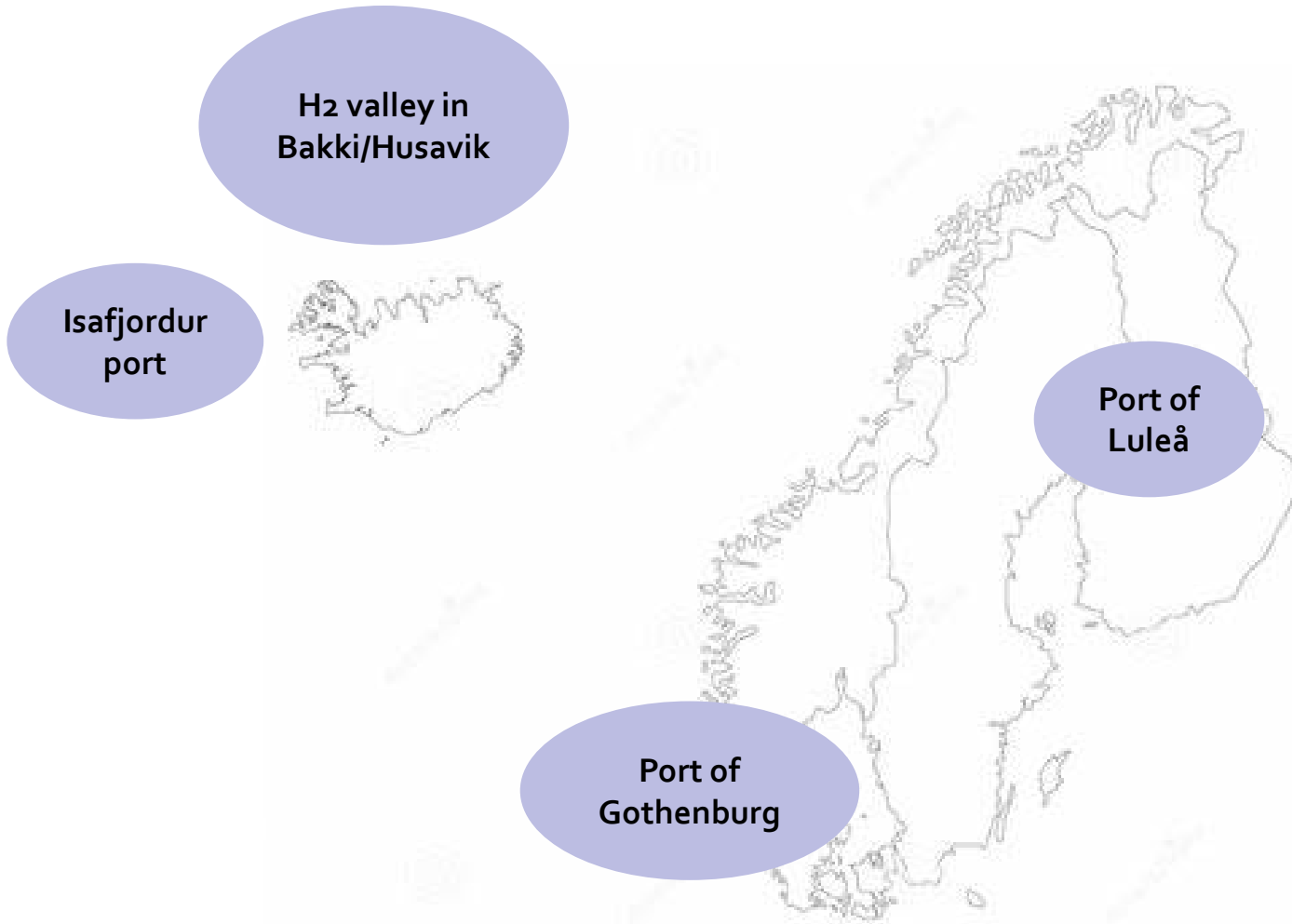


Aim & Objectives of H₂AMN

Increase knowledge on hydrogen-based fuel pathways (hydrogen, ammonia, and methanol) centered around ports in the Nordic region.

- Assess techno-economic conditions for implementation of H₂-based fuel pathways
- Assess drivers and barriers for demonstrating these pathways incl. policy gap analysis
- Assess opportunities for innovative sector couplings and energy systems integration
- Assess possibilities in of using existing underground rock caverns for hydrogen and ammonia storage
- Outline ambitious pathways and strategies/guidelines for the implementation of hydrogen-based value chains in ports in the Nordics by 2030/2040.

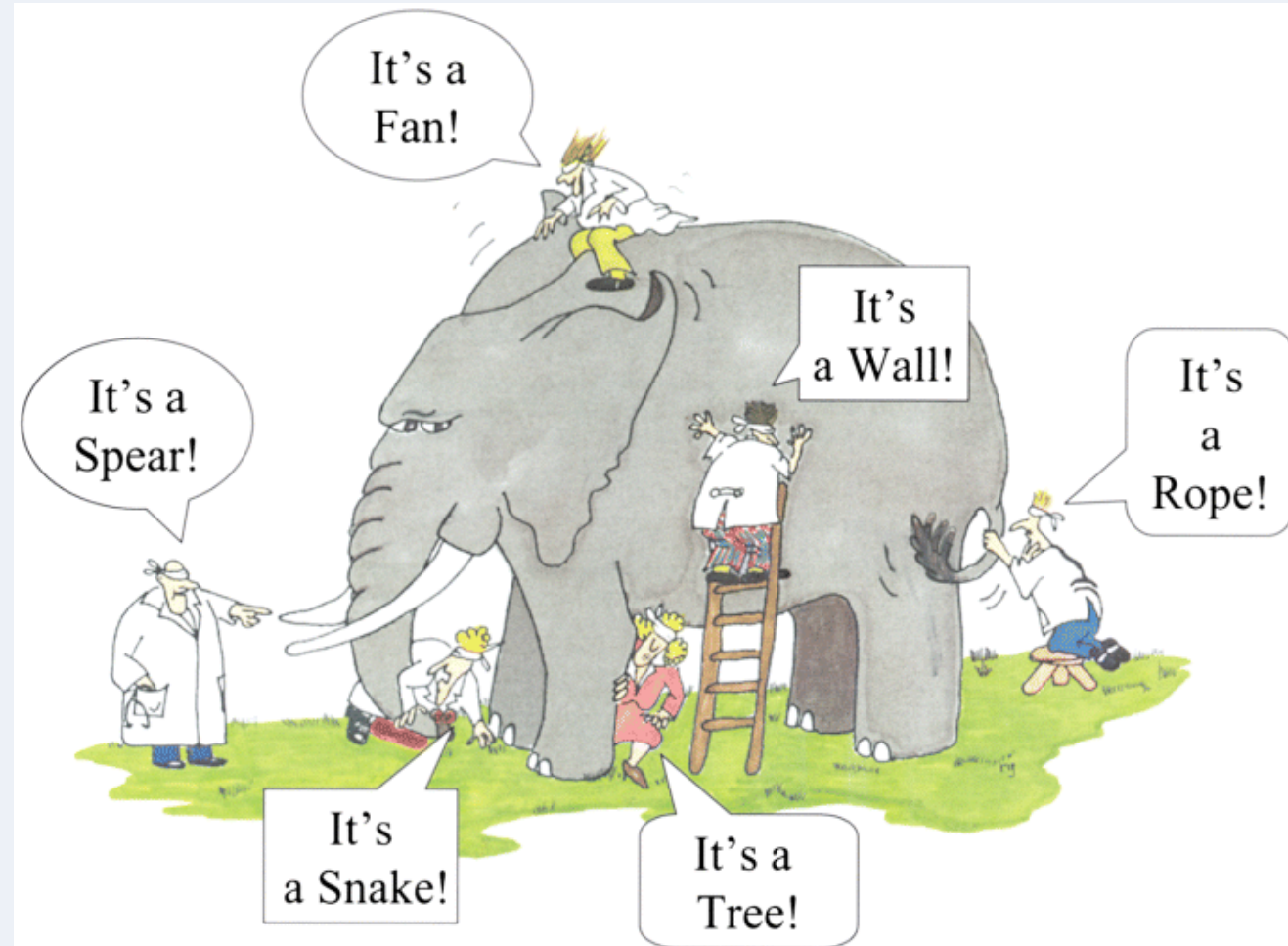
Four case studies in two countries



Tools and methods

- Mathematical linear programming
- Numerical modeling (LRC)
- Techno-economic assessments
- Scenario analysis
- Literature reviews

Seeing the bigger picture is important...





Thanks.

