THE JOINT BALTIC-NORDIC ENERGY RESEARCH PROGRAMME
BALTIC-NORDIC ROADMAP FOR CO-OPERATION ON CLEAN ENERGY TECHNOLOGIES
Background

Determine which clean energy-related technologies (CET) are most relevant in the Baltic and Nordic countries, in terms of Baltic-Nordic cooperation for decarbonising the energy system from now to 2030, 2050 and beyond.

5 step method

1. International and EU CET overview
   - Identifying broad spectrum of relevant clean energy technologies

2. Assessing needs for CETs from the Baltic energy systems perspective
   - Key CET needs in the Baltic states based on national energy and climate plans and existing scenario studies

3. Baltic CET stakeholder overview
   - Analysis of literature and stakeholder information
   - Interviews and surveys

4. Technology-needs matrices
   - Strengths, limitations and stakeholders of most relevant CET solutions with respect to challenges and time perspective
   - Potential key R&I activities on national and Baltic levels

5. Development of Baltic-Nordic Roadmap for Co-operation on Clean Energy Technologies
CET category framework

Clean Energy Related Technologies (CET)

- Integrated power and energy systems
- Zero emission power generation technologies
- Low emission transport systems
- Industrial energy systems
- Urban and built environments
- Cross-cutting technologies
Common needs of Baltic and Nordic energy systems

Now
• Increased production and use of renewable energy for electricity
• Further reduce dependence on fossil fuels in district heating
• Decarbonise transport sector
• Energy efficiency in all sectors
• Increase energy independence and interconnections for electricity and natural gas systems

2030
• Near term needs still relevant, with shift in focus towards electrification advanced bioenergy, hydrogen, and carbon capture and storage and utilisation (CCS/CCU)
• Increased efforts for transition of hard-to-abate sectors, such as transport and some industrial sectors

2050+
• Continued and strong electrification of the energy system
• Cross-sectorial integration
• Smart production and demand side management
• Integration of hydrogen in the energy system
  - as energy carrier
  - for energy storage, stabilising renewable power generation
  - for electrofuel production
Country-specific needs and opportunities for Baltic energy systems

Estonia

Now
- Abate shale oil in energy sector
- Heating/cooling, enabling smart urban areas

2030
- Mitigating remaining shale oil use
- Unlocking potential for CCU/PtX applications with bioenergy and hydrogen
- Opening up for deep decarbonisation in industry

Latvia

Now
- Reduce natural gas use in energy systems
- Large biomass potential
- Hydropower for storage/balancing
- Solar heat in district heating

2030
- Opportunities for biogas and hydrogen, through existing gas infrastructure
- Biomass potential in biorefineries/bioeconomy

Lithuania

Now
- Increase domestic renewable electricity generation
- Reduce natural gas use in energy systems
- Increasing share of biogas
- Strong photovoltaic (PV) stakeholders

2030
- Opportunities for biogas and hydrogen, through existing gas infrastructure
- PV at larger scale, new materials, system integration, use in multiple sectors (e.g. building-integrated)
Co-operation Roadmap

Continue & Strengthen
- Sustainable and integrated power systems
- Large-scale deployment of offshore wind power
- Zero emission buildings

Initiate New
- Efficient industrial waste heat utilisation in district heating
- Future biorefineries for the bioeconomy
- Electrification of private transport

Exploratory
- Baltic-Nordic implementation of CCS and CCU
- Digitalisation in the energy system
- Deep decarbonisation of energy intensive industry
- Potential role of distributed energy systems
Co-operation Roadmap

2030

**Continue & Strenghten**
- Developing zero emission power systems
- Positive energy buildings and smart cities
- Efficient waste heat utilisation in district heating
- Future biorefineries for the bioeconomy
- Deep decarbonisation of energy intensive industry
- Electrification of transport

**Initiate New**
- Hydrogen society – demand-side aspects
- Deep decarbonisation of energy-intensive industry
- CCS/CCU technologies and infrastructure
- Distributed energy systems

**Exploratory**
- Exploring new advanced technologies within renewable energy sources (RES) power generation, energy storage, CCS/CCU/PtX and hydrogen production

2050+

**Continue & Strenghten**
- Zero emission transport system
- Hydrogen society
- CCS/CCU/BECCS for net zero/negative emissions
- Integration of flexible power generation, storage and demand side

**Initiate New**
- Development/implementation of new advanced technologies within RES power generation, energy storage, CCS/CCU/PtX and hydrogen production
Baltic-Nordic Roadmap for Co-operation on Clean Energy Technologies was a collaborative effort between Nordic Energy Research, who administered the project, and CIT Industriell Energi AB, who lead the project with support from Tallinn University of Technology (TalTech). The work was jointly funded by Nordic Energy Research, the Ministry of Economic Affairs and Communications of the Republic of Estonia, the Ministry of Economics of the Republic of Latvia, and the Ministry of Energy of the Republic of Lithuania, within the Joint Baltic-Nordic Energy Research Programme.

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