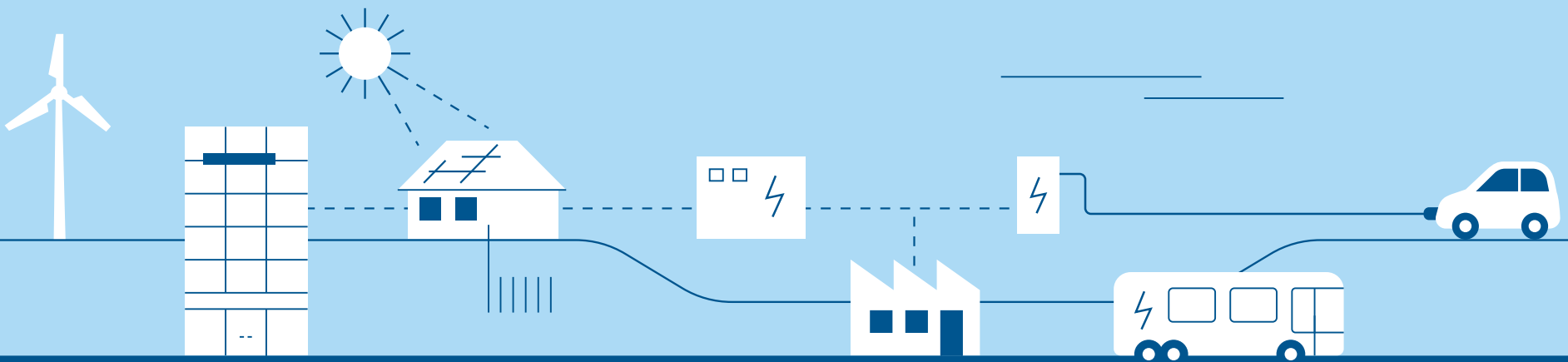


Baltic-nordic roadmap for co-operation on clean energy technologies

FACT SHEETS



Background and method

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 co-operation for decarbonizing the energy system from now to 2030, and 2050 and beyond.

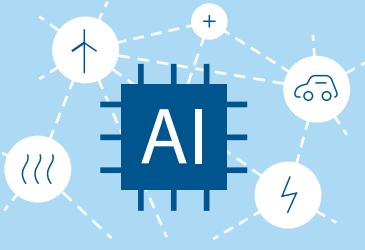
5 step method

- 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, stakeholders for most relevant CET solutions with respect to needs and time perspective
- 5 Roadmap development for Baltic-Nordic cooperation on CETs**

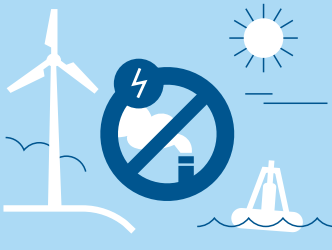
Category framework

BALTIC-NORDIC ROADMAP
FOR CO-OPERATION
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TECHNOLOGIES

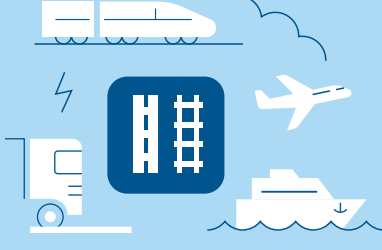
Clean Energy Related Technologies (CET)



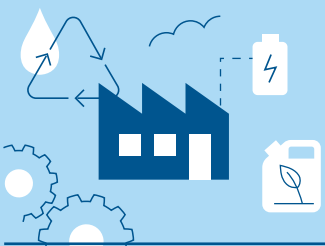
Integrated power and energy systems
(Production, distribution and storage)



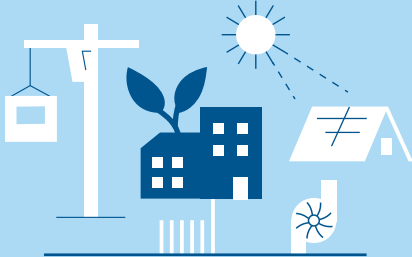
Zero emission power generation technologies



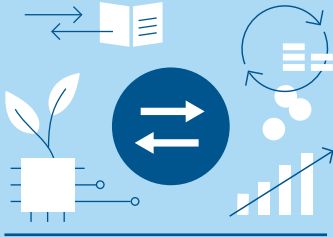
Low emission transportation systems



Industrial energy systems



Urban and built environments



Cross-cutting technologies

Common needs of Baltic and Nordic energy systems

Now

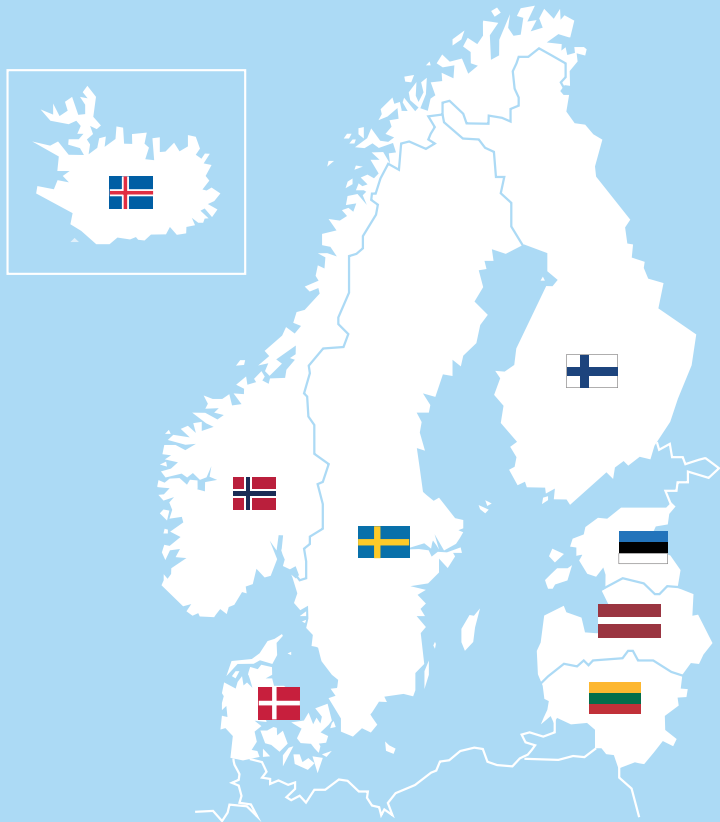
- Increased production and use of renewable energy for electricity
- District heating
- Transportation
- Energy efficiency in all sectors
- Increase energy independence and interconnections for both electricity and natural gas systems

2030

- Near term needs still relevant, with slight shift in focus towards electrification, advanced bioenergy, and carbon capture and storage and utilization (CCS/CCU)

2050+

- Continued and strong electrification of the energy system
- Cross-sectorial integration
- Smart production and demand side control
- Hydrogen can be expected to be an important part of the energy system
- Energy storage, stabilizing renewable power generation
- Electrofuel production



Country-specific needs and opportunities for Baltic energy systems

Estonia

- Now** Abate shale oil in energy sector
- 2030** Mitigating remaining shale oil use

Latvia

- Now** Reduce natural gas use in energy systems
- 2030** Opportunities for biogas and hydrogen, through their existing gas infrastructure

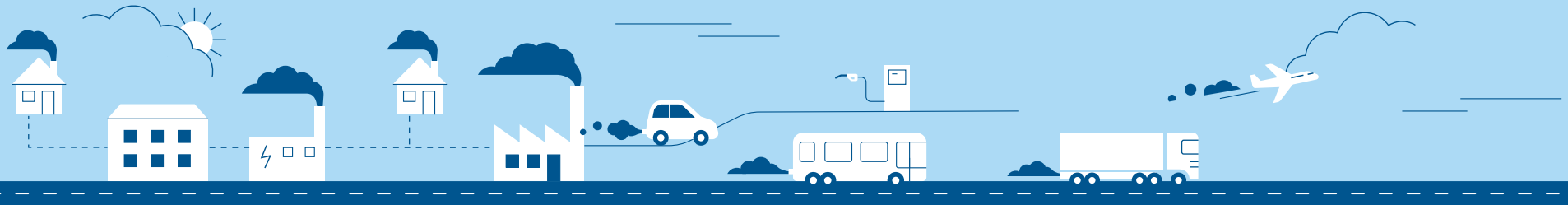
Lithuania

- Now** Increase domestic renewable electricity generation
- Reduce natural gas use in energy systems
- 2030** Opportunities for biogas and hydrogen, through their existing gas infrastructure



Co-operation Roadmap

BALTIC-NORDIC ROADMAP
FOR CO-OPERATION
ON CLEAN ENERGY
TECHNOLOGIES



Now



Continue & Strengthen

- Sustainable and integrated power systems
- Large-scale deployment of off-shore wind power
- Zero-emission buildings



Initiate New

- Efficient industrial waste heat utilization in Baltic district heating
- Future biorefineries for the bioeconomy
- Deep decarbonization of energy-intensive industry

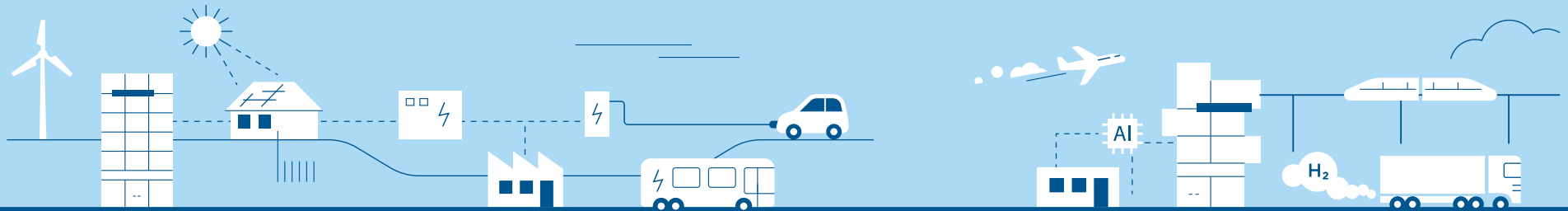


Exploratory

- Electrification of private transport
- Baltic-Nordic implementation of CCS and CCU
- Digitalization in the energy system-intensive industry

Co-operation Roadmap

BALTIC-NORDIC ROADMAP
FOR CO-OPERATION
ON CLEAN ENERGY
TECHNOLOGIES



2030



Continue & Strengthen

- Developing a zero-emission power system
- Positive energy buildings and smart cities
- Efficient waste heat utilization in Baltic district heating Future biorefineries for the bioeconomy
- Deep decarbonization of energy-intensive industry



Initiate New

- Electrification of transport
- Hydrogen society
 - demand-side aspects



Exploratory

- Exploring advanced RES power generation
- Exploring new advanced energy storage technologies
- The potential role of distributed energy systems
- Exploring new advanced technologies for CCS/CCU

2050+



Continue & Strengthen

- Zero-emission transport system
- Hydrogen society



Initiate New

- Development/implementation of advanced RES power generation
- Development/implementation of advanced energy storage technologies
- Development/implementation of distributed energy systems
- Development/implementation of advanced technologies for CCS/CCU