

# The role of municipalities and regions in the development of hydrogen economy and infrastructure

27.6.2023 SuomiAreena

— Hydrogen  
— Natural gas



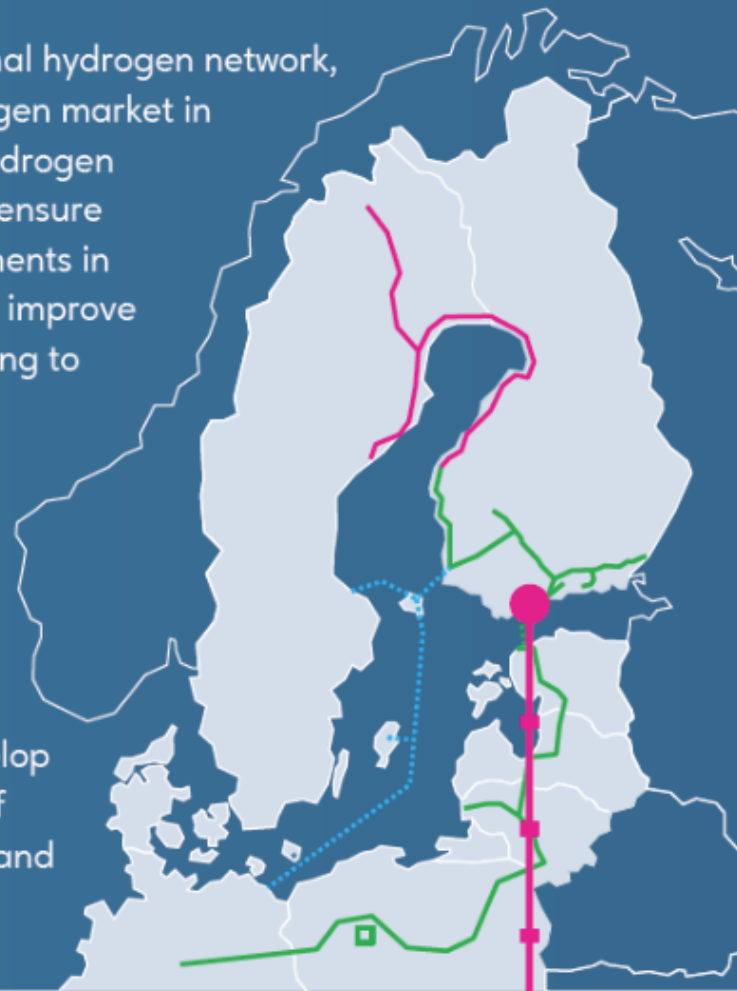
# Gasgrid Finland Oy

- Gasgrid Finland Oy is a state-owned company that acts as the responsible gas transmission systemoperator (TSO) in Finland.
- We offer our customers safe, reliable, and cost-efficient transmission of gases.
- We actively develop our transmission platform, services, and gas market in a customer-oriented manner to promote the carbon-neutral energy and raw material system of the future.
- Gases enable a carbon-neutral society - we provide a platform for it.

Gasgrid Finland promotes the development of the national hydrogen network, international infrastructure cooperation and the hydrogen market in the Baltic Sea region. Gasgrid has launched several hydrogen infrastructure development projects in the Baltic Sea region to ensure energy independence and promote hydrogen economy investments in Finland. Investments in hydrogen production and infrastructure improve Finnish competitiveness, bringing work and sustainable well-being to the whole country.

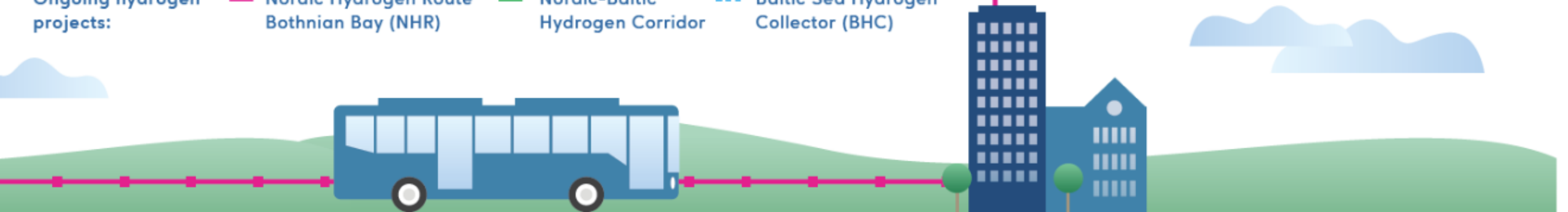
We are a trailblazer in the future of energy. We are building a hydrogen transport pipeline that connects hydrogen producers and consumers not only within Finland, but also across Europe.

The task of **Gasgrid Vetyverkot Oy**, founded in 2022, is to develop hydrogen transmission infrastructure to promote the creation of investments and jobs in Finland, support the needs of industry, and achieve the carbon neutrality goals of Finland and Europe.



Gasgrid has developed a development vision for the Finnish hydrogen network as part of the European Hydrogen Backbone initiative, a joint project of 31 European infrastructure operators. It has an envisioned trans-European hydrogen network that would connect the hydrogen infrastructure of 32 countries with a network of almost 40,000 kilometres by 2040.

- Ongoing hydrogen projects:
- Nordic Hydrogen Route Bothnian Bay (NHR)
- Nordic-Baltic Hydrogen Corridor
- Baltic Sea Hydrogen Collector (BHC)



# We examined the situation of the hydrogen economy in municipalities and regions

Gasgrid promotes hydrogen infrastructure development projects and is currently investigating options for aligning the hydrogen pipelines. To support this work, an interview round was carried out to map the situation of land use planning in municipalities and regions.

## Promoting the hydrogen economy is a joint effort of many parties

- The energy system transformation has started with renewable energy projects and project announcements. Most of the current projects are in Western Finland. New project initiatives emerge throughout the whole Finland.
- It was pointed out that there are many parties involved in the promotion of the hydrogen economy, which emphasises the need for cooperation and information sharing.

## There is a demand for information related to hydrogen

- Land use planning professionals request versatile information about hydrogen and its infrastructure, such as technical and safety information.
- The bottlenecks of planning and implementation were found to be, among other things, the consideration of nature values, the coordination of the planning work as well as project schedules.

## Gasgrid's role was seen as important in the creation of the hydrogen economy

- Gasgrid's accessibility and visibility were emphasised.
- The information needs addressed to Gasgrid included, for example, further refinement of hydrogen pipeline plans, practical information about gas and hydrogen, and technical information about hydrogen pipelines.

An aerial photograph of a two-lane asphalt road winding through a dense, lush green forest. A small blue car is driving on the road, positioned in the lower-left lane. The forest consists of tall, thin evergreen trees. The lighting is bright, suggesting a sunny day. A semi-transparent dark grey horizontal band is overlaid across the center of the image, containing the text.

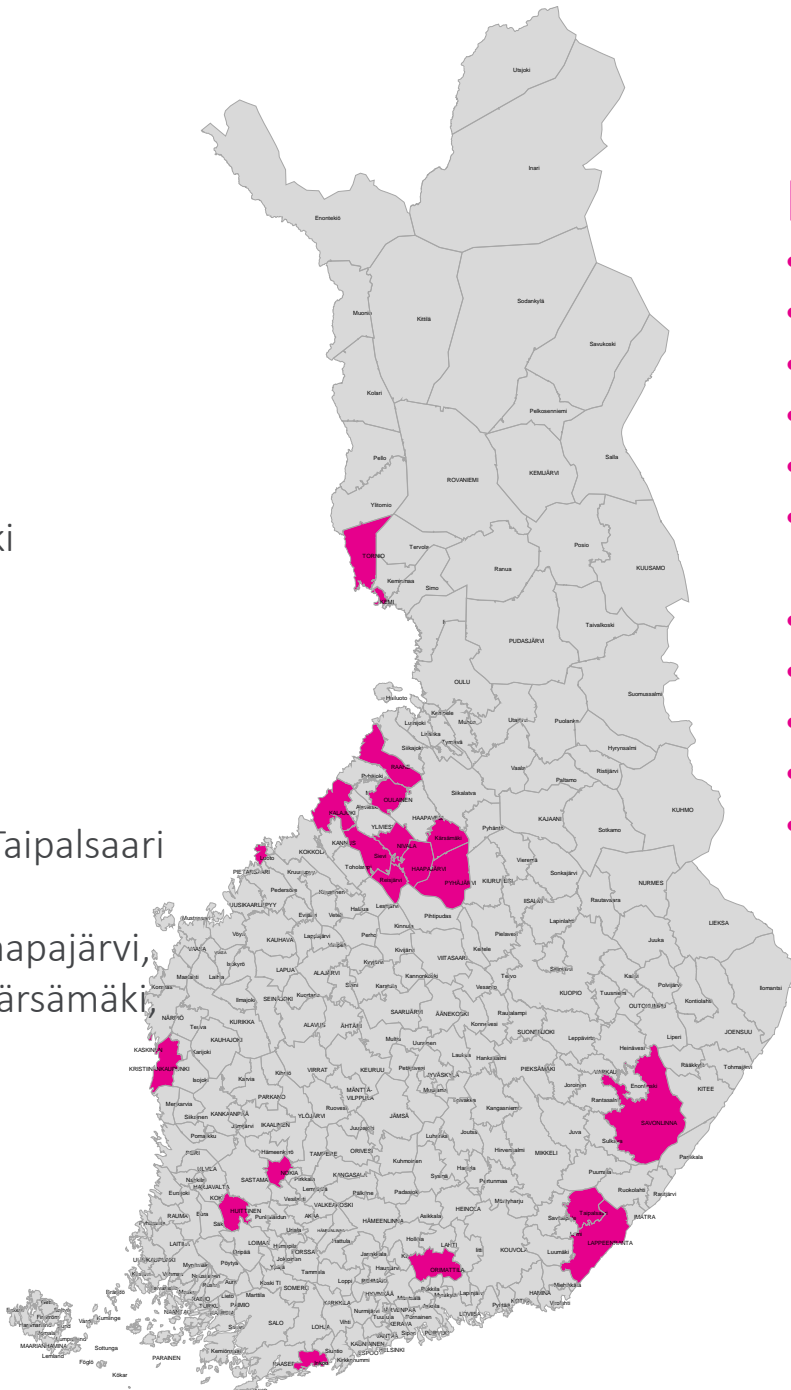
Practical implementation of the interviews

# Regions, cities and municipalities were interviewed for the report

- Interviewed regions and municipalities
  - 11 regional councils, representing regions, were interviewed.
  - 17 cities and municipalities were interviewed, some of them together with representatives from the regions and in one of the municipal interviews one person represented several small municipalities.
- The interviews were conducted in May and June 2023
  - Interview slots were booked online or by phone after the announcement of the project in the opening webinar. All available slots were booked in a short period.
  - The interviews were conducted as video interviews.
  - 1-5 people participated in each interview.
  - The interviewees received the questions beforehand.
- A memorandum was written based on the interview
  - The memo was accepted by the interviewees and after that, the memo was delivered to Gasgrid.
  - Some of the interviewees provided Gasgrid with additional material.
- The main points of the interview are summarised in this presentation.

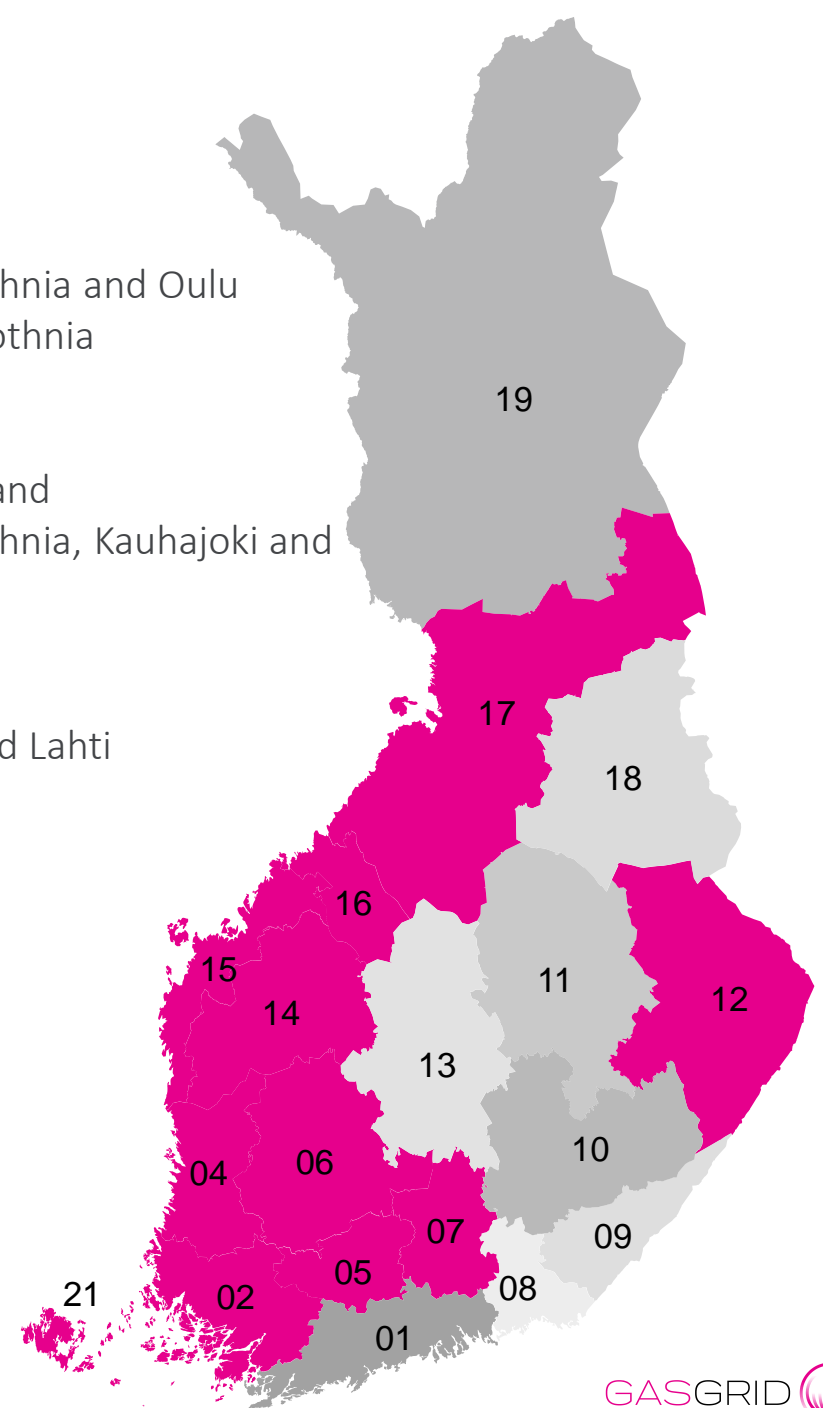
## Cities and municipalities

- Kemi-Torneå
- Raahе
- Kalajoki
- Luoto
- Kristiinankaupunki
- Oulainen
- Huittinen
- Nokia
- Inkoo
- Orimattila
- Lappeentanta & Taipalsaari
- Savonlinna
- NIHAK (Nivala, Haapajärvi, Sievi, Pyhäjärvi, Kärämäki, Reisjärvi)



## Regions

- North Ostrobothnia and Oulu
- Central Ostrobothnia
- Ostrobothnia
- Satakunta
- Southwest Finland
- South Ostrobothnia, Kauhajoki and Seinäjoki
- Pirkanmaa
- Kanta-Häme
- Päijät-Häme and Lahti
- North Karelia
- Åland



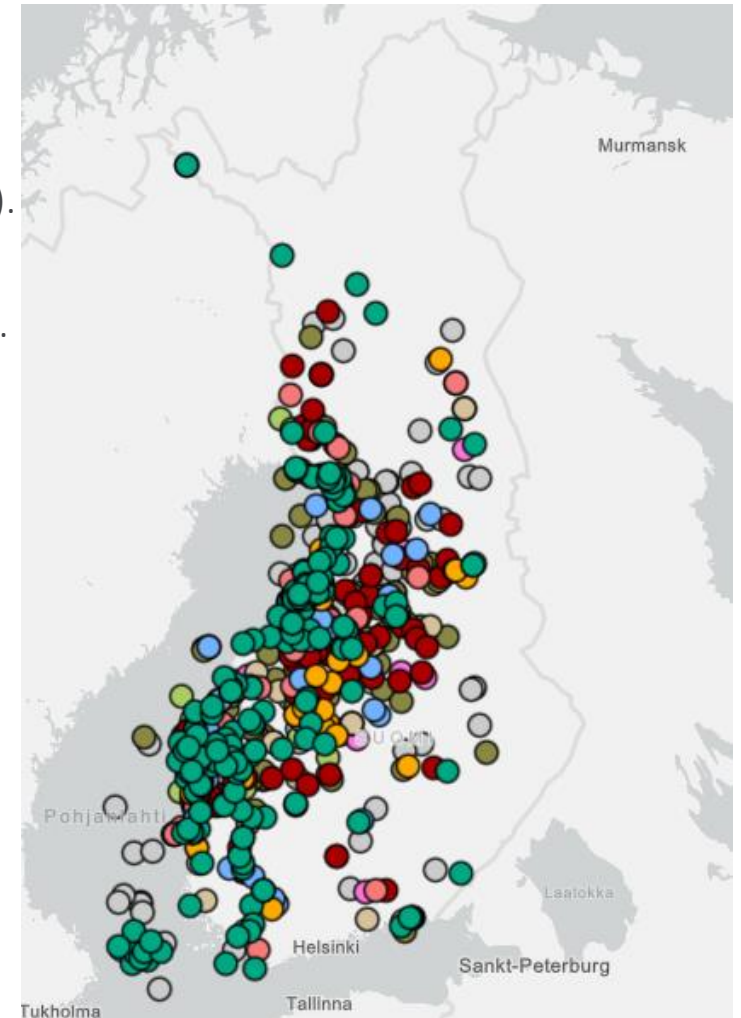
An aerial photograph of a large body of water, likely a reservoir or lake, with several forested islands. The sky is blue with scattered white clouds. A semi-transparent dark grey banner is overlaid across the middle of the image, containing white text.

# Hydrogen economy and renewable energy projects as part of land use planning



# The energy system transformation has started with renewable energy projects and project announcements

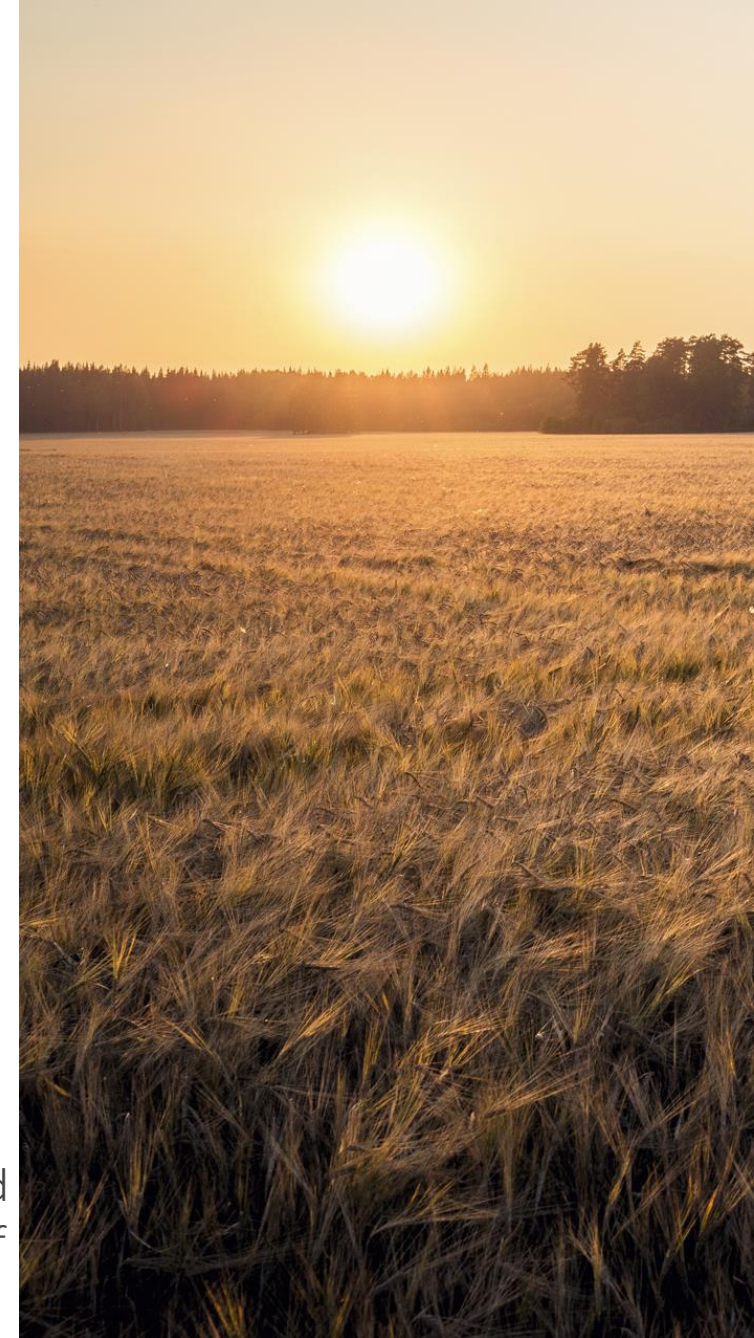
- There are a lot of wind power projects underway, and they generally follow the public information shared by the Finnish Wind Power Association (Suomen Tuulivoimayhdistys Ry). Activity in solar power projects has significantly increased.
- Based on the interviews, there are various development zones and activity levels in Finland. The focus of the current wind- and solar power project activity is in Western Finland. The active zone is "widening", and more projects emerge constantly in all Finland.
- There are P2X projects all over Finland.
- Hydrogen economy projects often combine the elements of bioeconomy, especially elsewhere than near the coast.
- In most of the regions, the discussion about hydrogen transmission infrastructure is just starting. The plans regarding the pipeline are most developed along the west coast.
- There are also some hydrogen storage projects, e.g., a hydrogen rock storage project. The hydrogen pipeline is typically considered a potential storage.



Map: Suomen Tuulivoimayhdistys Ry. [Link](#).

# Promoting the hydrogen economy is a collaboration involving many parties

- The regional land use plan is a general plan for the use of the land on a regional level and is therefore a key plan when discussing the hydrogen pipeline crossing several areas.
- In all the regions that participated in the interview, work on updating the regional plan or parts of it was being prepared or underway. There are no hydrogen pipelines in the plans yet.
  - Information regarding the pipelines should be available when the plans are updated.
- There are many different parties involved in building the hydrogen economy, which requires efficient communication and clear roles:
  - regional councils, municipalities, business development companies, centres for economic development, Transport, and the Environment (ELY), Tukes, Gasgrid and companies.
  - information about the operator is always needed to make impact assessments.
- Municipal actors often try to facilitate projects, and this is done e.g., by acquiring land areas beforehand. Usually, the planning work starts after the public announcement of the project.



# Regions and municipalities promote prosperity of their areas

- In all interviews, the hydrogen economy and the hydrogen pipeline were seen as means to promote the vitality of the own region. The promotion of renewable energy and the hydrogen economy is seen as part of strategy work.
- To promote the acceptability of the hydrogen-related actions, it was hoped that the overall picture of Finland's role as part of the European hydrogen economy would be further clarified. There are also information needs regarding hydrogen value chains.
- Those areas through which the pipelines would pass according to the existing scenarios are satisfied ("the construction of the pipeline could start in our area") and it is seen that investors have already valued that positively.
- An often-posed criticism was that "Finland should be developed with regional equality". Many regions actively brought up modified or new hydrogen pipeline alignment options.

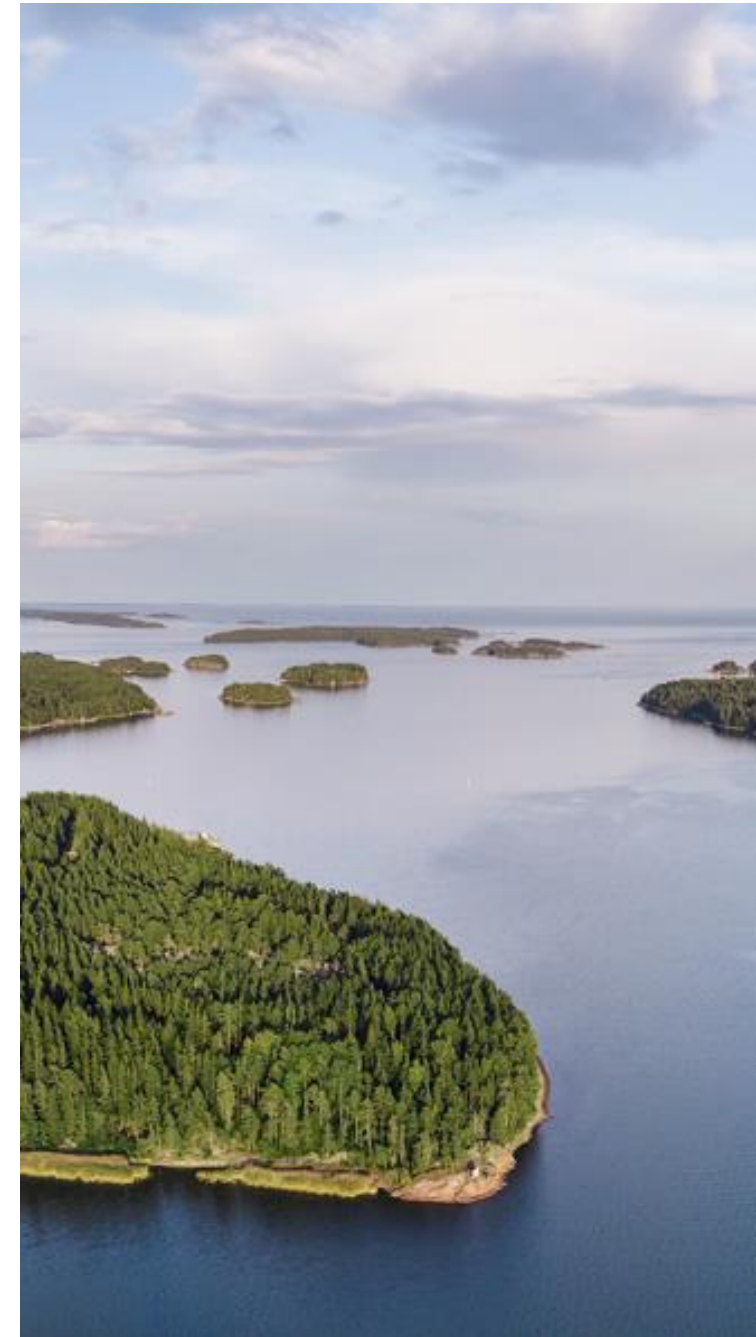


An aerial photograph showing a winding asphalt road on the right side of a large, deep blue lake. The road curves along the shoreline, bordered by a dense forest of green trees. A small red car is visible on the road. A semi-transparent dark grey horizontal band is overlaid across the middle of the image, containing white text.

Information needs and design challenges

# Land use planning professionals need information

1. Technical information on quantities, equipment, water crossings etc.
2. Information related to safety and risks.
  - Required safety and safety distances in land and sea areas.
  - Required protective structures.
  - Necessary space reservations (industry, pipes, corridors).
  - Information about what can be near, on top of and under the hydrogen pipe.
    - The matter is emphasized when discussing pipelines with bigger diameters.
    - Project sizes should be considered in regulatory work, for example in permitting.
3. Design guidance
  - Practical information about e.g., T/Kem markings
  - A comparison with natural gas may not be sufficient for the planning work.
4. Models for organising work and highlighting best practices.
  - E.g., best practices in making land reservations in advance.



# The bottlenecks were quite similar among the interviewees

## Residential and summer house areas

Vacationers have different criteria than permanent residents and that may reflect in municipal policies

Traffic, existing infrastructure, agriculture, and fisheries

Fragmented community structure

Impact assessment in the planning process  
Concrete information is needed to carry out the process

Consideration of values  
Nature values, breeding times, groundwater areas, culture, archaeology, etc.

Design expertise and resources

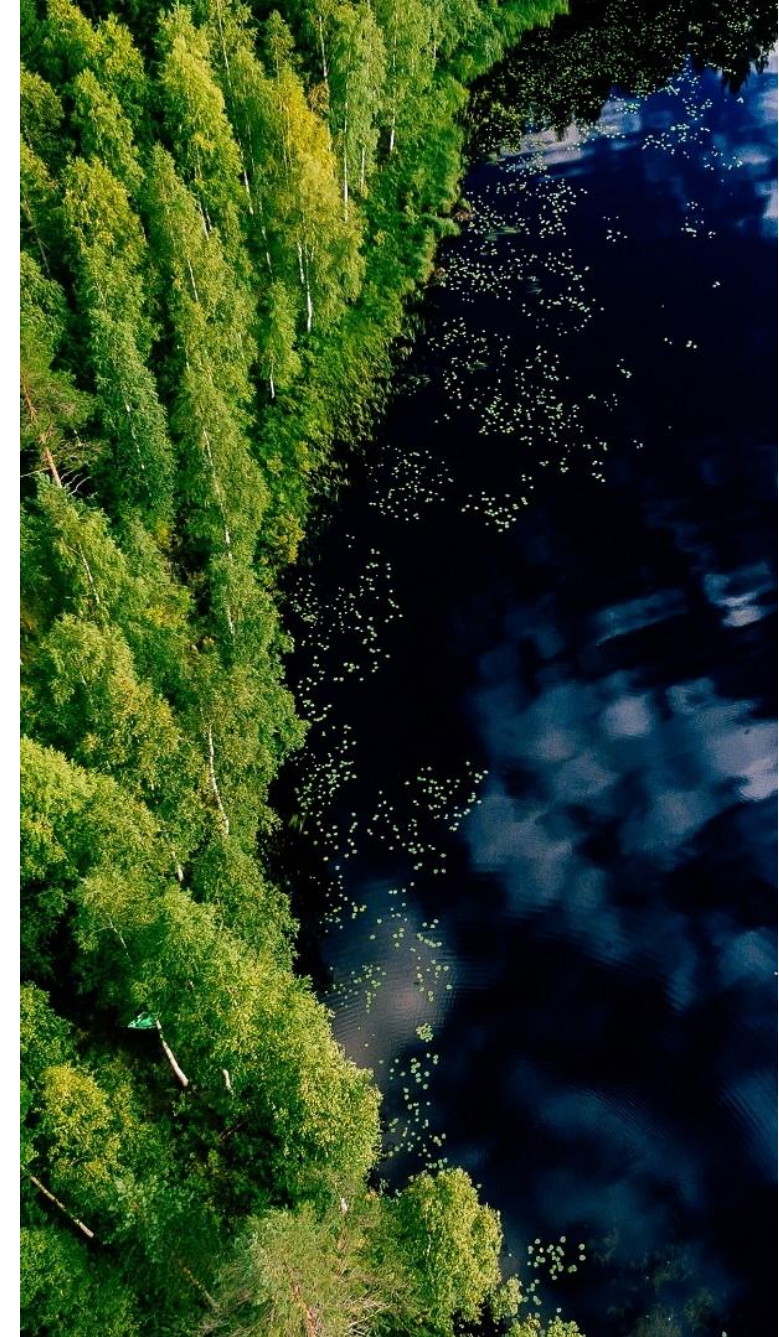
Schedules  
Coordination of processes and planning work

An aerial photograph of a two-lane asphalt road stretching through a lush green landscape. The road is flanked by dense forests of various trees, some with vibrant autumn colors. To the left, a dirt road curves through a grassy field. The scene is bathed in warm, golden light, suggesting late afternoon or early morning. A semi-transparent dark horizontal band is overlaid across the center of the image, containing the text.

# Expectations on Gasgrid

# Gasgrid's role as an information producer and as a partner

- Gasgrid's role in sharing the situational information regarding hydrogen development and as a communication channel:
  - Many parties are involved in building of the hydrogen economy and the discussion takes place on many levels.
  - Operators need a channel to share information on hydrogen development, as well as information on how to get started.
- Information needs addressed to Gasgrid:
  - Further refinement of pipeline plans - from visions to locational information
  - Practical information about gas and hydrogen
  - Technical information, such as pipe capacities, components, and design information.





# Visibility and accessibility as a goal

- Suggested forms of cooperation:
  - Visibility in general
    - For example, regional road shows to meet landowners, citizens and officials
  - Newsletters
  - Seminar events and trainings on selected topics, such as safety
  - Material, also in Swedish, to communicate with landowners.
- In general, good accessibility of Gasgrid's personnel was felt to be important.

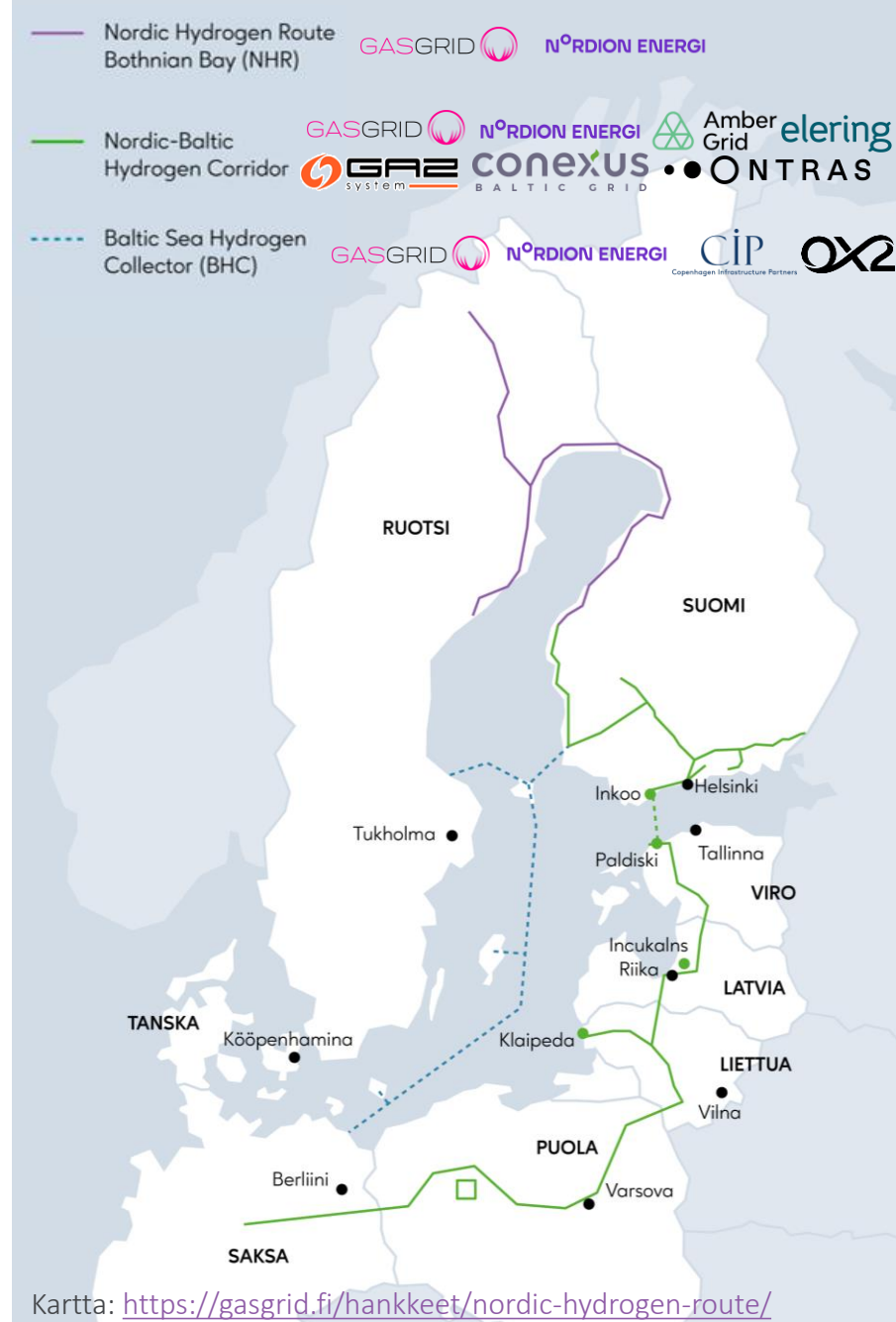


An aerial photograph of a rural landscape. A winding river flows through the center of the frame, surrounded by lush green fields. In the background, there are golden-brown fields, a small barn, and a line of trees under a blue sky with scattered clouds. The text "About Gasgrid's plans regarding hydrogen infrastructure" is overlaid in white on a semi-transparent dark band across the middle of the image.

About Gasgrid's plans regarding hydrogen infrastructure

# Gasgrid continues to promote the development of hydrogen infrastructure

- Gasgrid was positively surprised by the interest in participating in the interviews and will take the issues raised into account in further planning.
- Gasgrid continues to collect information from parties that could not be interviewed in this first round.
  - The goal is to create a comprehensive understanding of the land use planning situation of municipalities and provinces throughout Finland.
  - Additional information about this will be shared separately later.
- Gasgrid Finland promotes the formation of hydrogen networks with the help of its three projects, which are all in the pre-feasibility phase.
  - The planning focuses on mapping different route options and a more detailed analysis of production and consumption points.
- Gasgrid launched a Hydrogen Market Consultation -study, which is used to find out ongoing and planned industrial hydrogen investment projects and the interest in joining the future hydrogen infrastructure.





Transmitting energy.

# Nordic Hydrogen Route

1000 km dedicated H2 pipeline and open market by 2030

- Drives decarbonization
- Supports regional economic development
- Enables an independent energy future

## RENEWABLE RESOURCES IN BOTHNIAN BAY CAN ENABLE GREEN INDUSTRIALIZATION



**48 GW wind capacity**  
installed by 2040



**65 TWh hydrogen**  
demand exceeded by 2050



E-fuels



Fertilisers



Green chemicals

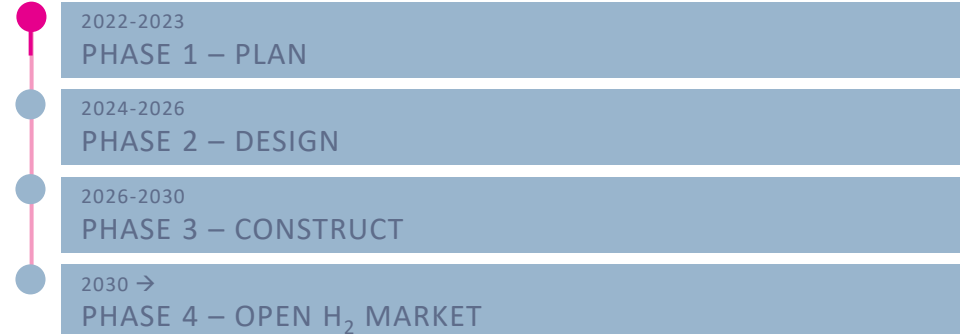


Iron, steel & metals

NORDIC  
HYDROGEN  
ROUTE

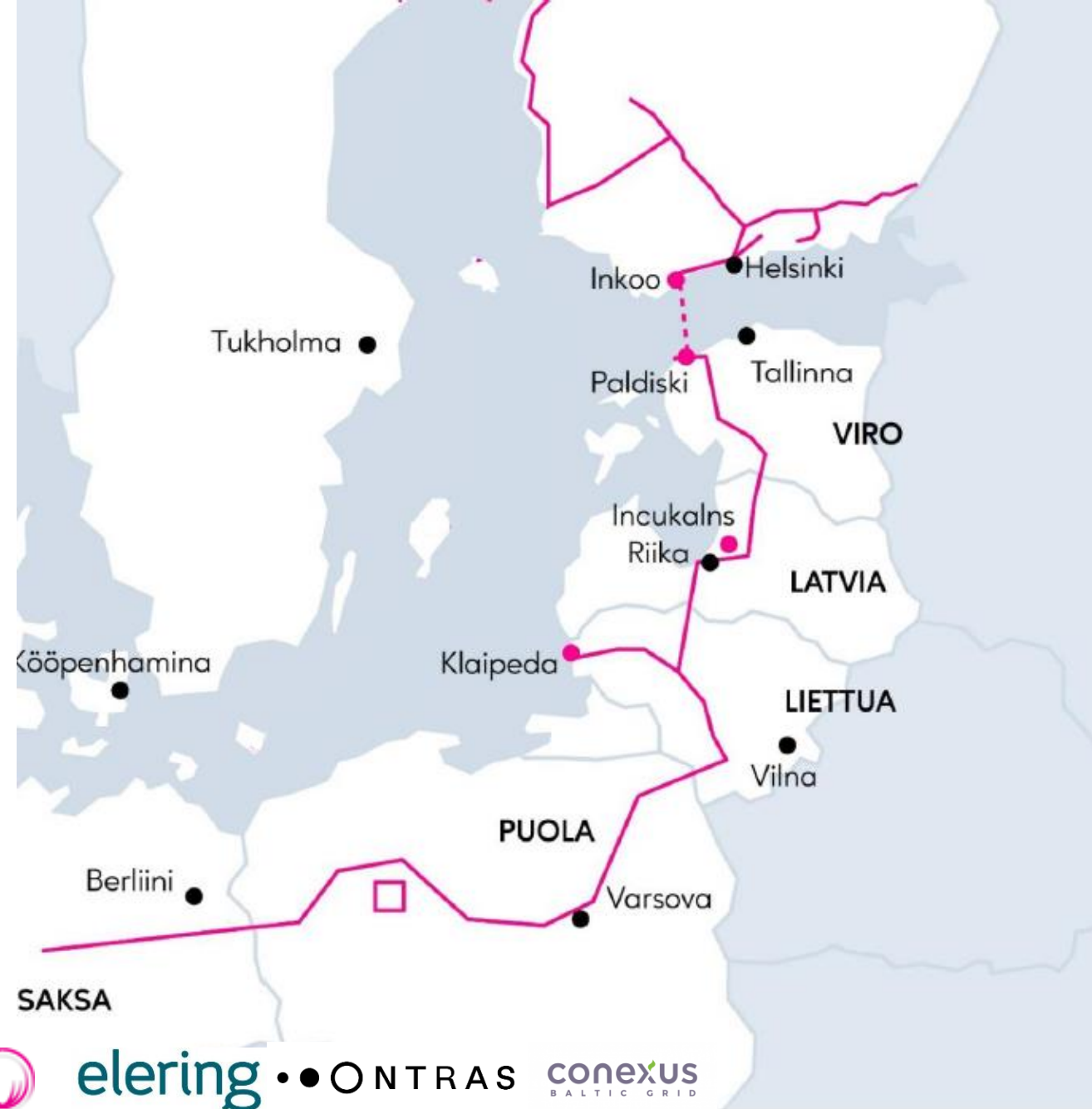
BOTHNIAN BAY

**1000 km of  
H2 pipeline  
and an open  
market by  
2030**



# Nordic-Baltic Hydrogen Corridor

- In this project the development and construction of a cross-border hydrogen pipeline infrastructure from Finland to Germany via Estonia, Latvia, Lithuania and Poland by 2030 is studied.
- The TSO parties are: Gasgrid Finland, (Finland), Elering (Estonia), Conexus Baltic Grid (Latvia), Amber Grid (Liettuva), Gaz System (Puola) ja ONTRAS (Germany)
- In the first stage of the project a prefeasibility study will be conducted during 2023.
- After the prefeasibility study more detailed engineering and feasibility studies including permitting and eventually construction would follow.
- Gasgrid is focusing especially on the development of pipeline infrastructure in Finland and in the development of the hydrogen infrastructure and market around the Baltic Sea.





# Baltic Sea Hydrogen Collector

- In the development project the construction and feasibility of developing an offshore hydrogen pipeline connecting Finland, Sweden and Germany will be studied. The project would enable large scale production, transmission and storage of clean hydrogen.
- Project partners are Gasgrid Finland, Nordion Energi and industry companies OX2 and Copenhagen Infrastructure Partners
- The planned route of the hydrogen pipeline would go from mainland Finland to Åland island, to Sweden to Åland and through southern Baltic Sea to Germany by 2030.
- Gasgrid is focusing especially on the pipeline sections located in Finnish territorial waters and to facilitate the use of wind power and hydrogen market development around the Baltic Sea.
- *Offshore pipeline (underwater) shown in the picture with dashed line*



NORDION ENERGI



PUOLA



Transmitting energy.