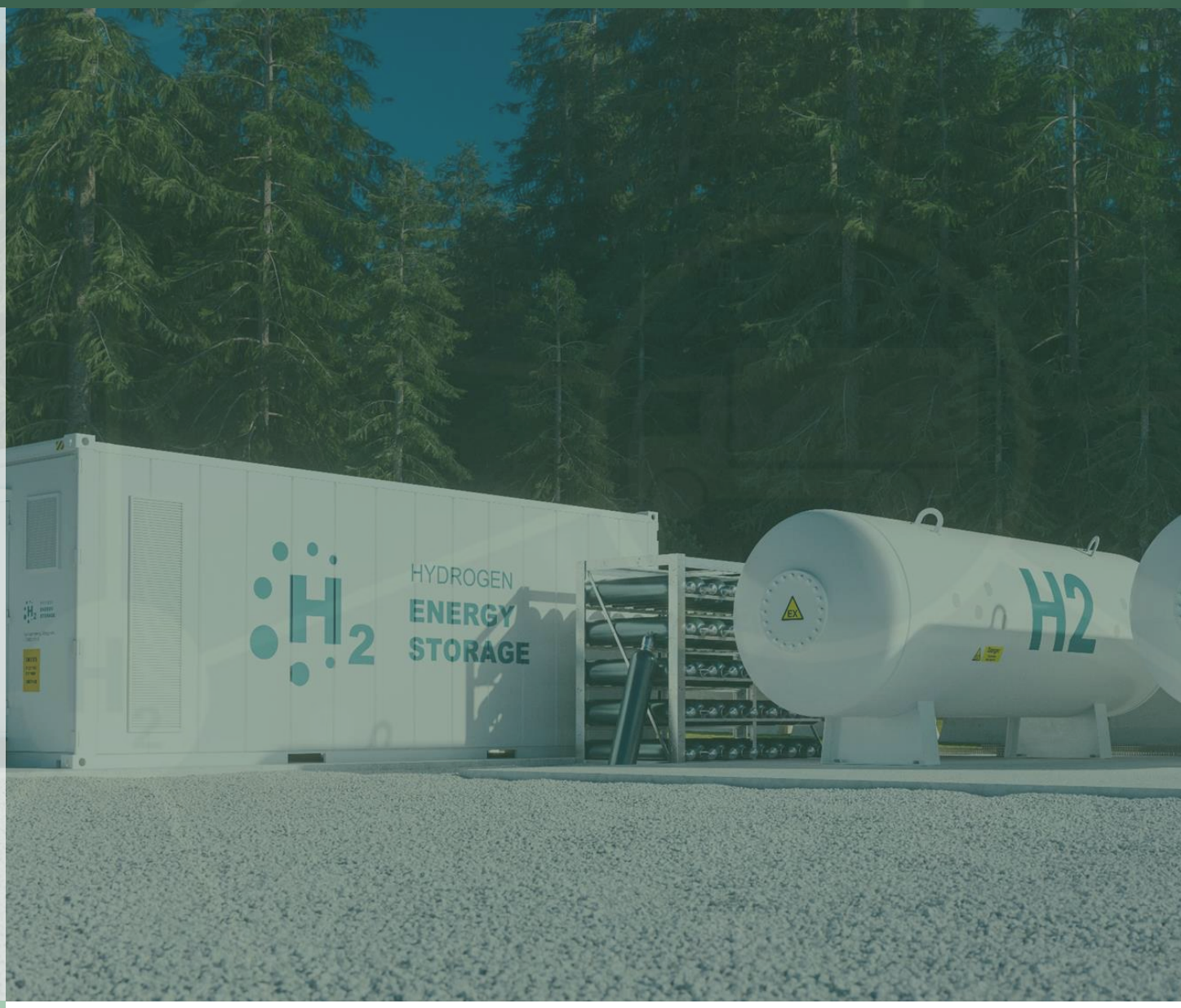
# H2 ECOSYSTEM ROADMAP

## FOR OSTROBOTHNIA

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Regional Council of Ostrobothnia

Leverage from the EU 2014–2020

European Union
European Regional Development Fund

# Project Summary

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**Title:** H2 Ecosystem Roadmap for Ostrobothnia

**Year:** 2022

**Language:** English

**Pages:** 11

**Keywords:** Hydrogen, Energy, Roadmap, Energy storage

# Acknowledgements:

This report is prepared as part of the H2 Ecosystem Roadmap (for Ostrobothnia) -project. The project has been co-funded by the European Regional Development Fund (ERDF), the City of Vaasa, Vaasa University of Applied Sciences (VAMK), Novia University of Applied Sciences (Novia), and Hanken School of Economics.

# 1 Introduction

Energy systems globally are in a phase of transformation. Increasing interest in sustainable development, environmental concerns and energy security is forcing business and society to look for new solutions to ensure economic growth and fight climate change. In 2019, the European Commission presented Green Deal, outlining the new growth strategy which aims to transform the European Union (EU) into a fair and prosperous society, with a modern, resource-efficient, and competitive economy where there are no net emissions of greenhouse gases (GHG) in 2050 and where economic growth is decoupled from resource use. Among many innovations, green hydrogen could play a significant role in reducing GHG and help reach no net emission of GHG by 2050. The EU Commission launched *A Hydrogen Strategy for a Climate Neutral Europe* in the summer of 2020 and the Commission has since then promoted green hydrogen as a key technology in the transition to carbon-neutral societies and industries. Major investments are now being made at EU level to realize this strategy and finance various types of demonstration and scale-up projects in green hydrogen.

The Vaasa region has branded itself as the Energy Hub of the Nordics and energy system solutions are key export products produced by the region's companies for global markets. Hydrogen has however not been a focus area for either the businesses or the education sector in our area. In light of the strategic focus areas on EU level, a holistic mapping and update of the green hydrogen related knowledge and activities for the Ostrobothnia has been timely and highly needed.

This work has been carried out under the project "H2 Ecosystem Roadmap (for Ostrobothnia)". The project has been a collaboration between three Universities in Vaasa namely Vaasa University of Applied Sciences (VAMK), Novia University of Applied Sciences, and Hanken School of Economics. The project's goal has been to build the regional network of actors with an interest in green hydrogen, create a knowledge base for the role of green hydrogen technology as part of system level energy solutions, support the development of new business opportunities related to green hydrogen, and through this promote the regional transition to CO2 neutral society.

The key activities in the project have been:

1. Investigate the conditions for the development of the hydrogen economy in the Ostrobothnia region through a study of technical information, market status and future forecasts regarding green hydrogen.

2.Through interviews, investigate the strengths and challenges of the export coast regarding hydrogen technology and the development of a hydrogen economy. Identify actors who could take a place in the ecosystem from producer to end user through direct contacts and meetings

3. Facilitate the sharing of knowledge through publishing blogs and articles, starting a hydrogen network and developing a common vision by arranging networking seminars and workshops.

4. In addition to the already started demonstration projects around hydrogen, identify possible pilot projects and R&D activities around hydrogen production, distribution, storage and usage that various actors in the region have an interest in collaborating upon. Write a report that analyses and synthesizes the common vision and the project's results in the form of a roadmap for the development of the hydrogen economy in the Ostrobothnia region.

The results of these activities have been reported in three different work packages (WP1, WP2 and WP3), which are published as separate reports.

**Contribution of the project to the development of the green hydrogen economy in the Ostrobothnia region**

Since the start of the project, a massive leap in both general media coverage on hydrogen and actual projects that have been initiated in the region of Ostrobothnia has taken place. Major players in the region are investing heavily in developing systems and solutions using hydrogen technology. However, hydrogen production, distribution, and storage had before this project not been investigated in regional EU funded projects and know how within the education sector, regional development organisations, and among public decisionmakers was lagging behind.

The results of this project contribute to information about the latest knowledge in the technology and markets for green hydrogen in Europe and the Nordic countries and an increased understanding among companies, universities, and municipal and regional decision-makers of the opportunities for new business activities in the region of Ostrobothnia.

At EU level, major investments are being made to finance various types of RDI and demonstration projects in green hydrogen and the regions actors have been made more aware of these opportunities. The latest international expert reports indicate that the hydrogen economy will hit breakthrough both in Europe and globally over the next 5-10 years. This project has helped the region to prepare for this and investigate the regional actors' opportunities to participate and serve this new market. Through the project's technical and market study, interviews and workshop seminars, a basis is created for identifying specific goals for research, development and innovation collaboration.

Hydrogen will play a major role in sector integration energy systems and therefore knowledge is needed about the integration of hydrogen in existing systems and how different actors can develop these systems together. Starting a collaboration network among regional actors on green hydrogen and identifying roles and positions that can be taken by new actors in the future regarding the hydrogen economy (large and small companies, research and educational institutes, municipal and regional decision-makers, financiers) has been a key activity within the project.

The project has sought to answer the need to create a common picture regarding the role and function of hydrogen for the region as whole, but also how especially small and medium-sized suppliers can use their expertise to be able to deliver components to the major players in the region and the international markets directly. Potential subcontractors, producers of renewable electricity and municipal decision-makers have been proactively approached to take part of the information and networks built up during the project. This has been a way to ensure that key stakeholders develop their own knowledge on the possibilities and challenges of green hydrogen production, storage, distribution and use so that new hydrogen ecosystems can be developed in the Ostrobothnia region.

At the core of all the activities in the project has been to collaborate with a broad base of different actors and to engage the practitioners to become involved as much as possible. For this project it has been essential to work in close collaboration with the regional development companies and the National Hydrogen Network (Kansallinen Vetyverkosto). This has enabled the project to gain momentum and engage a broad base of companies, municipalities, and the education institutions in our region. During the project more than 150 individuals, including representatives from over 65 companies,

have taken part in the project activities and expressed interest in exploring collaboration around hydrogen in the Ostrobothnia and Kvarken region.

Knowledge and plans for cooperation to develop a hydrogen ecosystem in the region must be developed in collaboration with different actors. In addition to an updated picture of the situation, a common vision is needed that drives development forward. The project's end result is a regional roadmap for a green hydrogen ecosystem in Ostrobothnia that summarizes a common vision and identifies new R&D and business opportunities around hydrogen technology that can be realized through the collaboration of different actors.

Summary of contributions:

- Information about the latest knowledge in the technology and markets for green hydrogen in Europe and the Nordic countries
- Increased understanding among companies, universities, and municipal and regional decision-makers of the opportunities for hydrogen business activities in the region of Ostrobothnia
- Contribution to a common picture regarding the role and function of hydrogen for the region as whole
- Information of the regional actors' opportunities to participate and serve the emerging hydrogen market
- Increased understanding of how sme suppliers can use their expertise to deliver components to the major players in the region and the international markets directly
- Identification of specific goals for research, development and innovation collaboration
- Starting a collaboration network among regional actors on green hydrogen and identifying roles and positions that can be taken by new actors in the future
- Creation of a vision and roadmap that can drive development forward
- Helping the region to prepare for the coming change

# 2 Project timeline and outputs

1.8.2021

**The H2 Ecosystem Project started**

*Read more about the project specifications*

21.9 -15.10.2021

**Survey: mapping of companies interested in hydrogen**

*Read more about the survey*

21.9.2022

**Article: Do you already have a role in the hydrogen ecosystem? (In Swedish and Finnish)**

*Läs artikeln | Lue artikkeli*

4.10.2022

**Article: Future of green hydrogen in our region**

*Read the article*

28.10.2021

**Article: So, what is Green Hydrogen and why are we talking about it (Shiva Sharma)**

*Read the article*

11.11.2021

**Seminar: Hydrogen seminar day in Vaasa (Kansallinen vetyverkosto kick-off)**

*Read more about the day*

19.11-20.11.2021

**Panel discussion: Hydrogen economy from an open innovation ecosystem perspective during the Science Carnival**

*Read more | Kuuntele podcast*

20.1.2022

**Report: Future Cleantech solutions (Kjell-Owe Ahlskog)**

*Läs rapporten på svenska | Lue raportti suomeksi*

10.2.2022

**Seminar: From ideation to project plan**

*Read more about the day*

3.3.2022

**Article: Challanges and opportunities in the new hydrogen economy (Kjell-Owe Ahlskog & Kaisa Penttilä)**

*Läs artikeln | Lue artikkeli*

11.4.2022

**Article: The role of networks for developing the hydrogen economy (Kjell-Owe Ahlskog & Kaisa Penttilä)**

*Läs artikeln | Lue artikkeli*

10.5.2022

**Article: Hydrogen on the west coast: BotH2nia seminar in Oulu and Raahe**

*Read more*

12.5.2022

**Article: Hanken studies commercialization of green hydrogen in Ostrobothnia**

*Read the article*

19.5.2022

**Delegation visit from Groningen, the Netherlands in Vaasa**

*Read more*

24.5.2022

**Kaisa Penttilä presented the project during Hanken Research Day**

*Read more | See the video*

16.6.2022

**Interview with Kaisa Penttilä on WIC Science Channel: Vety tulee! Vai tuleeko sittenkään? Suuntaammeko vetytulevaisuuteen riittävän tiedon varassa?**

*Katso video*

1.7.2022

**Article: What business opportunities do SMEs have in the hydrogen value chain?**

*Läs artikeln | Lue artikkeli*

21.7.2022

**Article: Hydrogen vs lithium-ion batteries (Shiva Sharma)**

*Read the article*

10.8.2022

**Wasa Future Festival 2022 focusing on hydrogen**

*Listen to the presentations*
*Läs mer om dagen | Lue lisää päivästä*

18.8.2022

**Report: Hiukkasen vedystä (Seppo Mäkinen)**

*Lue raportti*

18.8.2022

**Report: Green Hydrogen for Carbon Neutral Society: Opportunity, Challenges and Levelized Cost of Production (Shiva Sharma)**

*Read the report*

2.9.2022

**Workshop: vision and scenario workshop related to hydrogen production, transmission, storage, usage and consumption.**

6.10.2022

**Article: What business opportunities do SMEs have in the hydrogen value chain? (Kjell-Owe Ahlskog & Kaisa Penttilä)**

*Läs artikeln | Lue artikkeli*

27.10.2022

**Final seminar**

*Read the final reports*
*Watch the final seminar*

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