

Sustainable mobility and carbon-neutral future of the city of Jyväskylä

HyTruck Breakfast Briefing November 2024
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esa.eerola@cefmaf.org

Tel +358 50 307 3193

Central Finland Mobility Foundation (Cefmof)

Towards carbon-neutral Central Finland

Cefmof creating awareness and excitement around hydrogen

Promoting the use of hydrogen in transport and mobility

- **H2 refueling station**
- **City buses**
- **Passenger cars/taxis**
- **Trucks**

Summary, Q&A



Cefmof

creating a CN future

Basic Information



Name: Central Finland Mobility Foundation

Address: Kilpisenkatu 1, 40100 Jyväskylä, Finland

Established: January 2024

Capital: EUR 60,000

Founders: JYVÄSKYLÄ 



Cefmof's goal is to...

Promote urban development where people and nature can co-exist in harmony through realizing a carbon-neutral and sustainable society.



Members

Chairman



Timo Koivisto

Mayor of Jyväskylä



Board Member



Yuichiro Haruna

CEO, TGR-WRT



Board Member



Shigeru Hayakawa

Deputy Chairman, TMF



Executive Director



Haruka Arai

Deputy Executive Director



Lauri Perämäki

Director



Tomohiro Nakano

Manager



Esa Eerola

Manager



Netta Hongisto

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Towards carbon-neutral Central Finland

Movement Towards Carbon Neutral (Hydrogen Strategy in Finland)



Hydrogen is a key

part of the entire society's transition to Carbon Neutrality

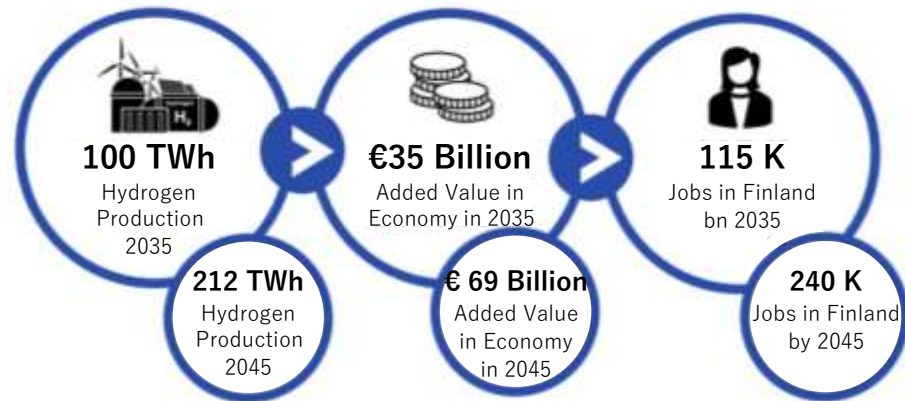
Industry-led hydrogen economy strategy

Produce **3 million tons** of hydrogen annually by 2035

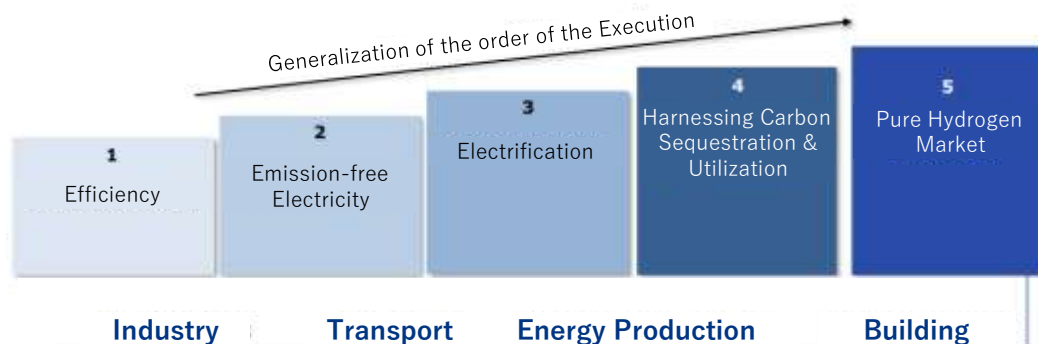
Produce **over 14%** of emission-free hydrogen in EU by 2030

€33 billion in new annual revenue is estimated

Opportunities & Benefits



5 Steps towards Carbon Neutrality



Challenges

1. Limited experience on Hydrogen outside petrochemical industry
2. No hydrogen use in traffic & transportation
3. No formations like salt caverns for storage
4. Changes and/or interpretations of RED II directive that could prove to be unfavourable for Finland
5. Low prices of fossil fuels and CO2 emission allowances
6. Delayed scale-up of manufacturing capacity for electrolyzers
7. Overall cost of Hydrogen technologies remains high

Source: Business Finland, Hydrogen Roadmap for Finland



will support, first focusing on mobility, transportation with hydrogen

Movement Towards Carbon Neutral (Central Finland)



2030

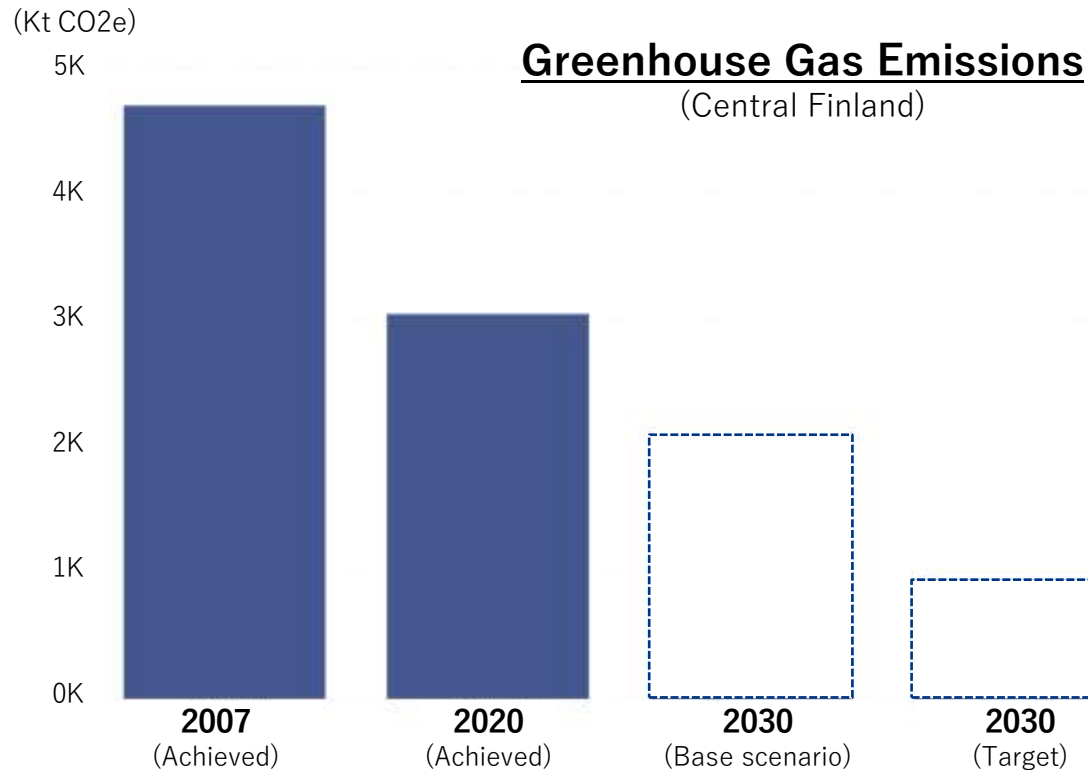
Hiilineutraali Keski-Suomi 2030
(2021)

Stop the loss of biodiversity and restoration

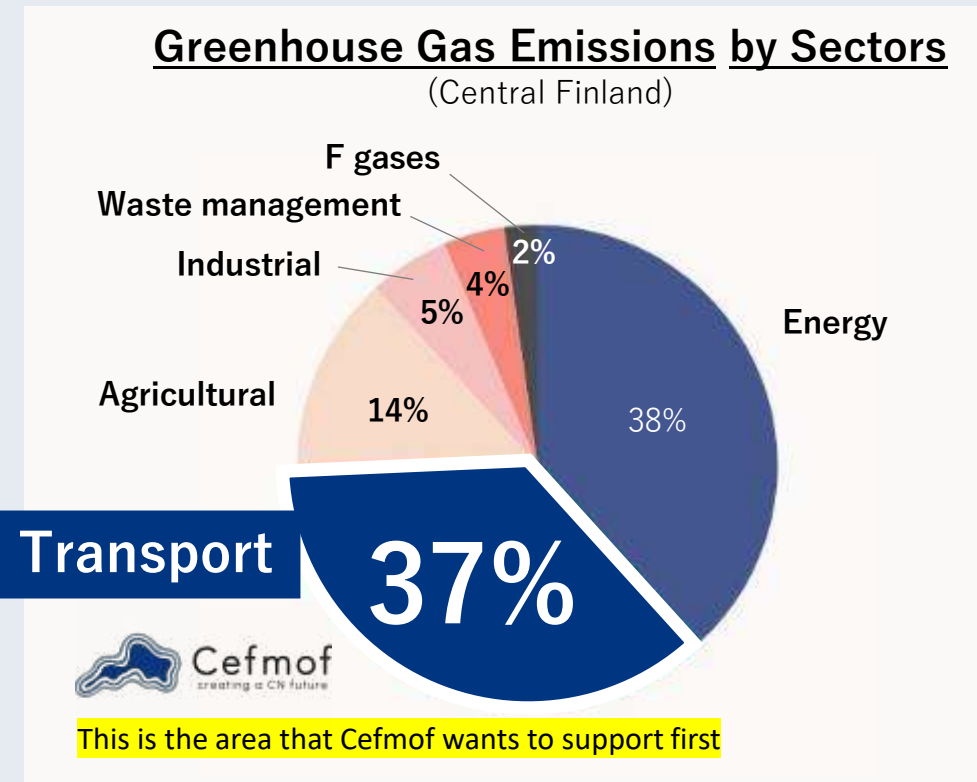
Reduce the use of oil and peat in energy production & transport, and

Minimize economic, social and environmental adverse effects

Accelerate the circular economy: Biogas production & markets, Food localization, Recycling



Current Action



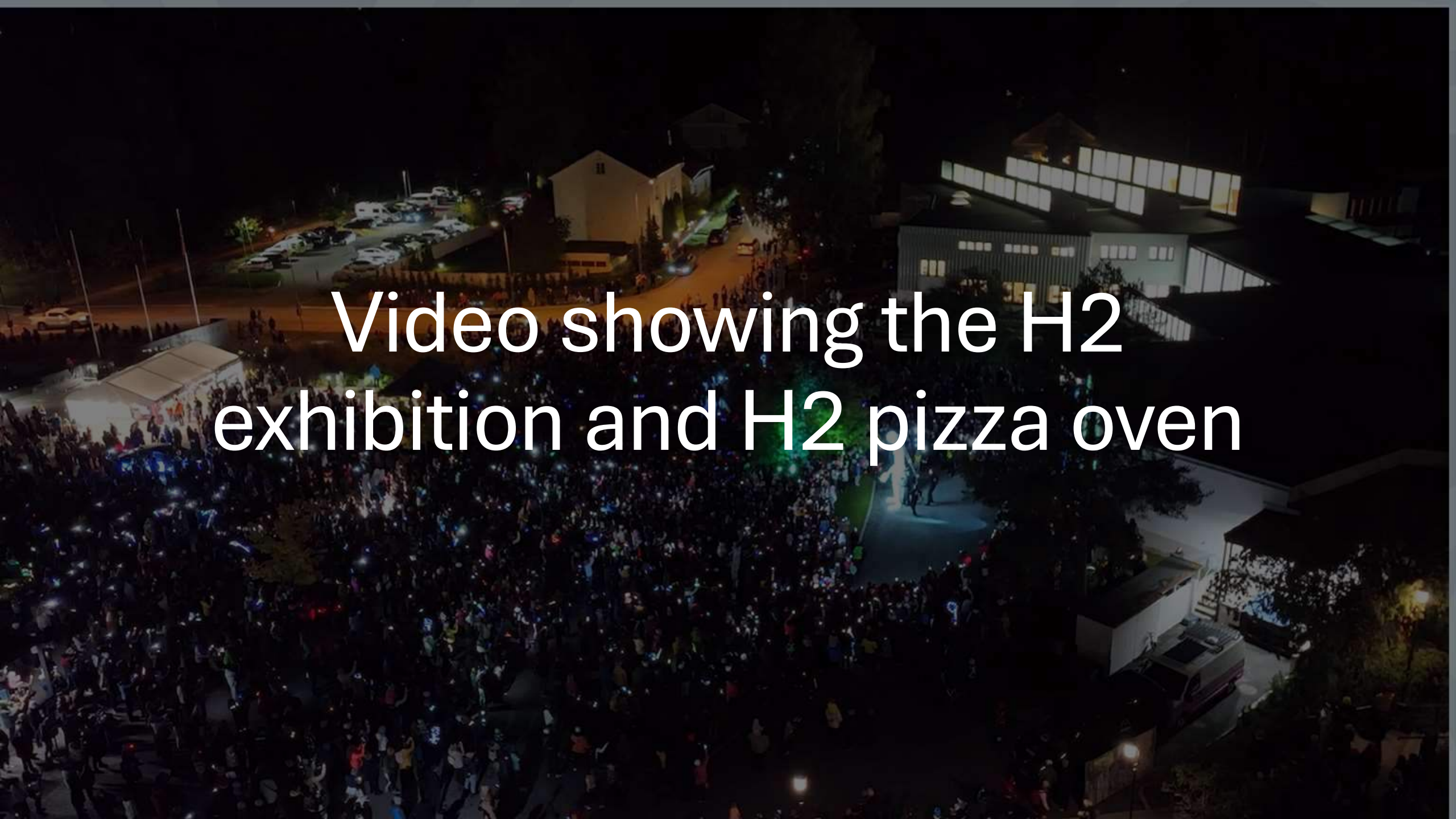
Creating awareness and excitement around hydrogen

H2 exhibition at Aalto2 museum center

H2 pizza oven at city of Light event





An aerial night-time photograph of a large outdoor event. A massive crowd of people fills the foreground and middle ground. In the background, several large, modern buildings with illuminated windows and facades are visible. The scene is lit by streetlights and building lights, creating a vibrant atmosphere. The text "Video showing the H2 exhibition and H2 pizza oven" is overlaid in white on the center of the image.

Video showing the H2
exhibition and H2 pizza oven

The background of the slide features a pattern of wavy, concentric lines in various shades of light blue, creating a sense of movement and depth. The lines are irregular and flow across the entire frame.

Promoting the use of hydrogen in transport and mobility

Finland's newest and only H2 refueling station to be built in Jyväskylä, with hydrogen bus pilot to follow

Vireon is set to construct Finland's first large-scale green hydrogen refueling station in Jyväskylä. The announcement is significant, as currently there are no H2 stations operating in Finland. This station is the first of four strategically located stations in Finland, made possible through a collaborative project between the Central Finland Mobility Foundation (CEFMOF) and the City of Jyväskylä.

The choice of Jyväskylä for the initial station underscores the city's strategic central location in Finland, providing a pivotal point for the hydrogen infrastructure.

"Jyväskylä's central location, combined with strong collaboration with Cefmof and the City, makes it an ideal starting point for our hydrogen infrastructure," says Per Øyvind Voie, Managing Director of Vireon. "This project not only strengthens Jyväskylä's role in the transition to renewable energy but also paves the way for hydrogen-powered transportation across Finland, as more stations will follow soon."

The station is primarily targeting heavy-duty vehicles like trucks and buses but will also cater to lighter vehicles like taxis and vans, promoting the use of green hydrogen as a clean energy source.

In conjunction with the refueling station, the first green hydrogen-powered buses in Finland will be piloted in Jyväskylä by 2025, with five Caetano H2 City Gold buses set to join the city's public transport fleet.

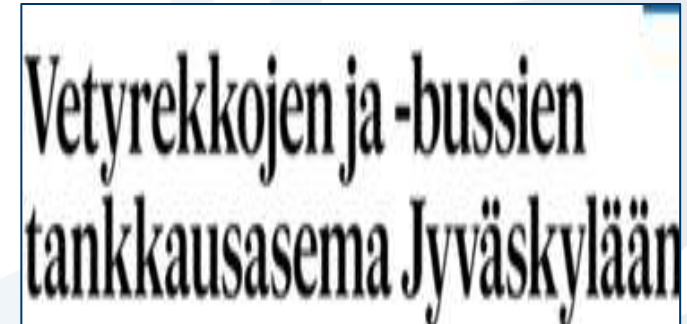
First Green Hydrogen–Powered Buses to be Piloted in Jyväskylä by 2025

Jyväskylä will pioneer the use of green hydrogen–powered buses in Finland by 2025. The pilot project will integrate five green hydrogen–fueled buses into the city’s public transportation fleet, supported by a new hydrogen refueling station. This initiative will test the performance of green hydrogen buses under northern conditions, contributing to sustainable urban transport.

“We are promoting carbon neutrality through various projects utilizing green hydrogen, allowing citizens to experience its potential and raising public awareness. This project aims to enhance urban transport and tackle environmental challenges, supporting Jyväskylä’s transition to sustainable solutions and contributing to a cleaner, healthier urban environment and a resilient local economy,” says **Haruka Arai** Executive Director from Cefmaf.

To generate supply and demand at the same time, The Cefmaf Foundation has secured five Caetano H2 City Gold buses. Production will begin in January 2025, with the hydrogen buses set to enter test use by July 2025.

Nation-wide coverage in media



Main news broadcast on Finnish TV

Facts about hydrogen refuelling stations and comments from our stakeholders (2 min)

Press

Several articles in newspapers and business magazines

See also e.g.

<https://hydrogen-central.com/finland-newest-and-only-hydrogen-refueling-station-to-be-built-in-jyvaskyla-with-hydrogen-bus-pilot-to-follow/>

<https://energynews.biz/vireon-unveils-hydrogen-station-in-jyvaskyla/>

<https://www.h2-view.com/story/vireon-starts-finnish-hydrogen-infrastructure-roll-out-with-station-in-jyvaskyla/2115330.article/>

<https://h2eg.com/h2-view-news-vireon-starts-finnish-hydrogen-infrastructure-roll-out-with-station-in-jyvaskyla/>

Vireon HRS in Jyväskylä

Why Jyväskylä?

- Important logistic and industrial hub in the middle of Finland, thus providing customers for both energy and transport use of green hydrogen.
- Roads passing through E75 south to north and E63 from west to east
- Location is by the Ten-T core road from Helsinki Region to Southern Lapland
- Area has potential for hydrogen ecosystem development
- Cefmof foundation support for H2 ecosystem development
- Proactive and positive attitude from the municipality to support the development
- Good location in Seppälänkangas industrial area

Source: Vireon Sept 2024



A project in two stages

Stage 1

Hydrogen refueling station

Station Operational: June 25

Fulfills all AFIR requirements

Capacity from start: 2000kg/day – 40-60 trucks

Hydrogen produced on site – or delivered in storage containers

Cost: 4-4,5 Million EUR

Grant received: 1 Million EUR

Stage 2

Hydrogen production

Production Operational: June 2026 (estimate, based on Business Finland decision in Oct25)

Capacity: 5 MW – 2000kg/day

Hydrogen used on-site or transported to customers off-site in storage containers

Cost: >10 Million EUR

Grant applied from Business Finland (decision pending)

Source: Vireon Sept 2024

Jyväskylä first – but not last

Building a 5-station corridor from Tornio in the north to Helsinki in the south

Grants received from EU for 4 of 5 stations (4 Million EUR total)

Helsinki Vantaa: FID Q1 25. Opening Q2 26.

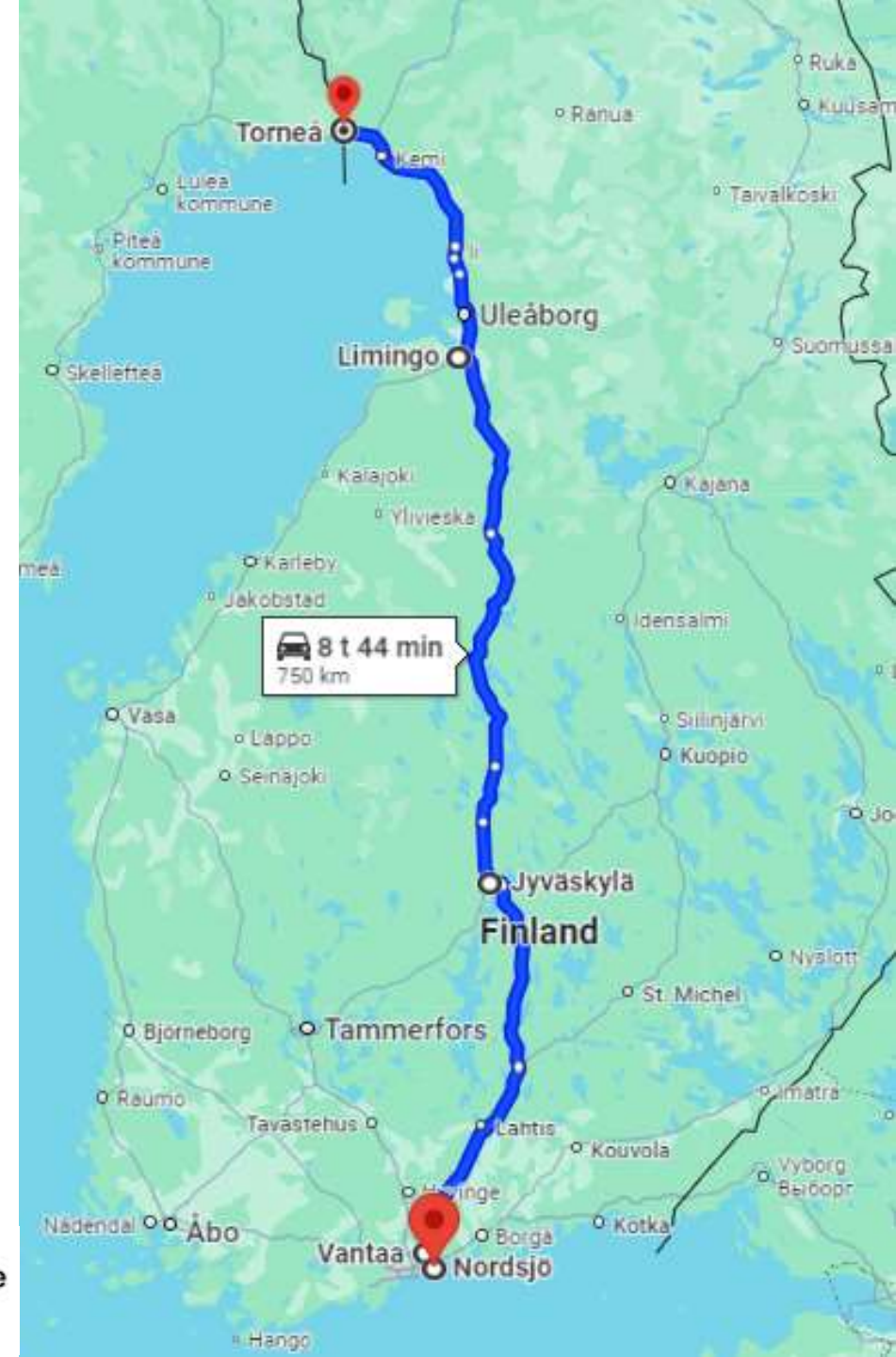
Jyväskylä: Opening Q2 25.

Liminka: FID Q2 25. Opening Q3 26.

Tornia:FID Q2 25. Opening Q3 26.

Helsinki Vuosaari: FID Q4 25. Opening Q4 26.

Source: Vireon Sept 2024



The background of the slide features a pattern of wavy, concentric lines in various shades of light blue and white, creating a textured, topographic-like effect.

Public transport and Caetano H2 City Gold buses

About Linkki service

- 1700 departures/day
- 9.3 M driving kms/year
- 8.7 M travels/year
- 300 bus drivers
- Fleet 100-115 buses
 - 64 electric
 - 4 biogas
 - rest biodiesel
- Population in central Finland: ~274 000
- ~75% live in the Linkki region

Linkki brand



Caetano H2 City Gold

- Five buses ordered for pilot use
- Current plan
 - Production Jan-May 2025
 - Pilot use July 2025-



Information

- H2 tanks: type 4 composite tanks: 5 x 312l (máx. 37.5kg; 350 bars)
- H2 refuel time: < 9 min (In accordance with SAE J2601-2 & SAE J2799 IR)
- FC Stack Power: 60 kW (Toyota FC Stack)
- Cold Start: at -25⁰ without external energy/plug
- Consumption estimated from 5.5 kg/100km (depending on HVAC and operation profile)
- Range: estimated up to ~450 km (depending on operating conditions)

Source and more details: www.caetanobus.pt

H2 passenger cars

About Toyota Mirai and other H2 passenger cars

- Toyota Finland is planning to start sales campaigns, e.g.
 - taxi companies
 - company cars
- Our goal is to have a fleet of Mirai cars in Jyväskylä region starting 2H2025
- We welcome H2 passenger cars from any manufacturer to Central Finland



About H2 trucks in (Central) Finland

Creating awareness and interest

Co-op with project "VISIOK" in the city of Oulu

Increasing interest while waiting for solutions

- Several events arranged by Cefmof, city of Jyväskylä and other actors to create awareness on using hydrogen in logistics
- Increasing/big interest among leading players
- Heavy-duty long-distance traffic seen as a lucrative opportunity
(e.g. trunk route Oulu-Jyväskylä-Helsinki)
- Waiting for offering from truck manufacturers



Collaboration with other cities: VISOK project in Oulu

VISIOK project background

- May 2024-Nov 2026
- 1,4M€ investments, 1,27 M€ development
- Educational Consortium OSAO, University of Oulu, Oulu University of Applied Sciences

One research area:

- the performance of heavy-duty hydrogen vehicles in different logistical tasks
- Also virtual learning environments and more

<https://www.osao.fi/en/osao-invests-in-the-first-hydrogen-truck-in-finland/>

OSAO



OAMK

VISIOK – project tasks related to hydrogen truck

- Market and technology review
- Tendering and hydrogen truck acquisition by OSAO Q2/2025
- Field testing of hydrogen truck in Northern conditions
- Research and development on hydrogen availability, usage, and logistics
- Development of infrastructure and operating models that support the wider adoption of vehicles running on alternative fuels
- Clarification of regulations and licensing related to maintenance
- Development of virtual Learning environment for hydrogen truck maintenance

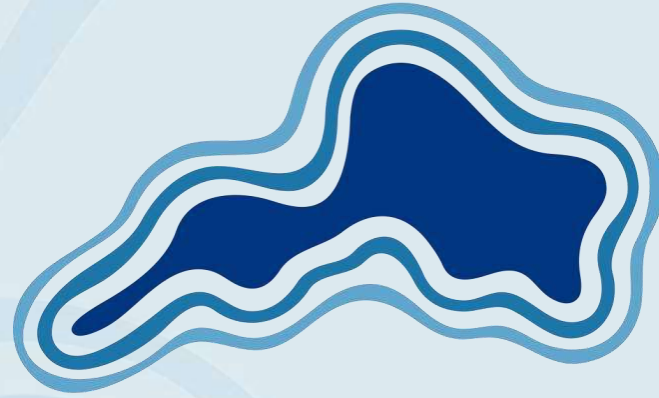


Source: VISIOK project Nov 2024

Summary

- Cefmof is accelerating hydrogen economy in (Central) Finland
- Concrete activities running around three pillars
- With HRS and H2 vehicle projects, current focus on mobility
- Also creating buzz and actively stimulating R&D and innovation projects





Cefmof
creating a CN future

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Thank You!