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SMART GREEN MOBILITY

HyTruck

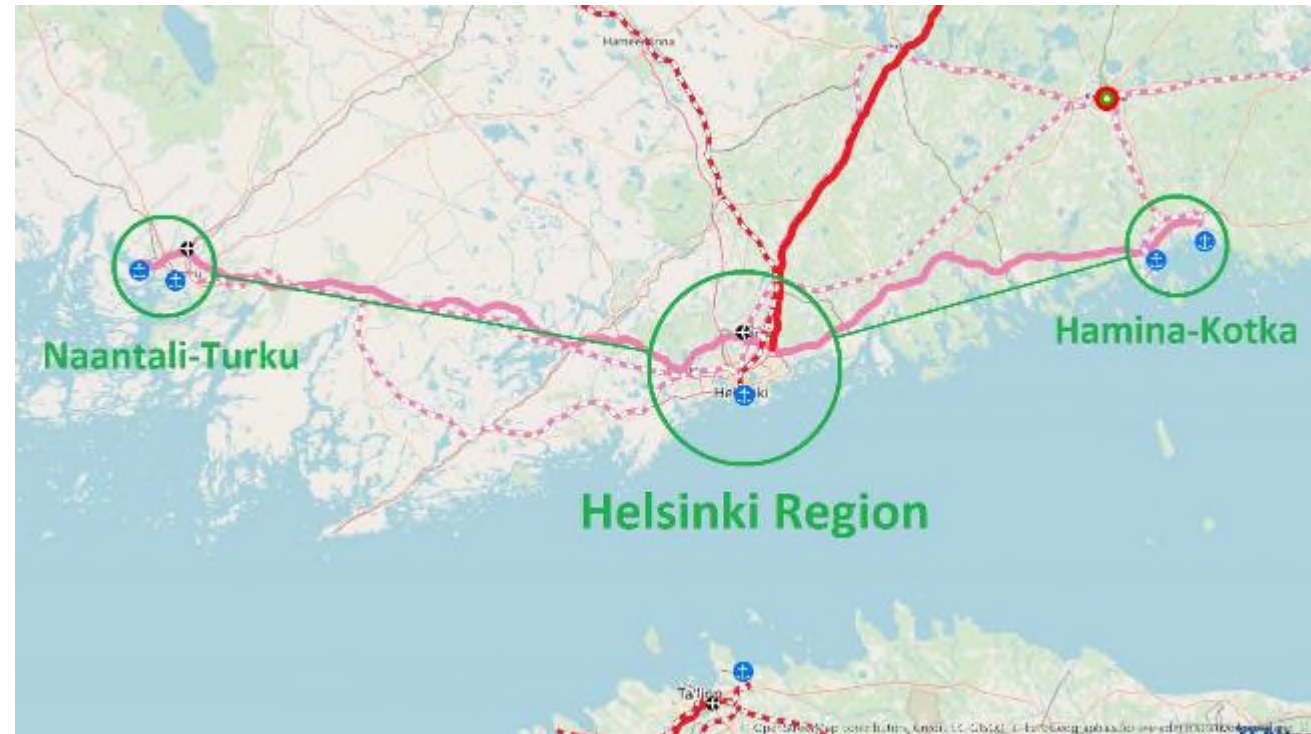
CLIC Innovation: Building Finland's hydrogen highway - An initiative for heavy-duty vehicle refueling



Regional pilot implementation plans

Background and objectives for the HRS regional pilot

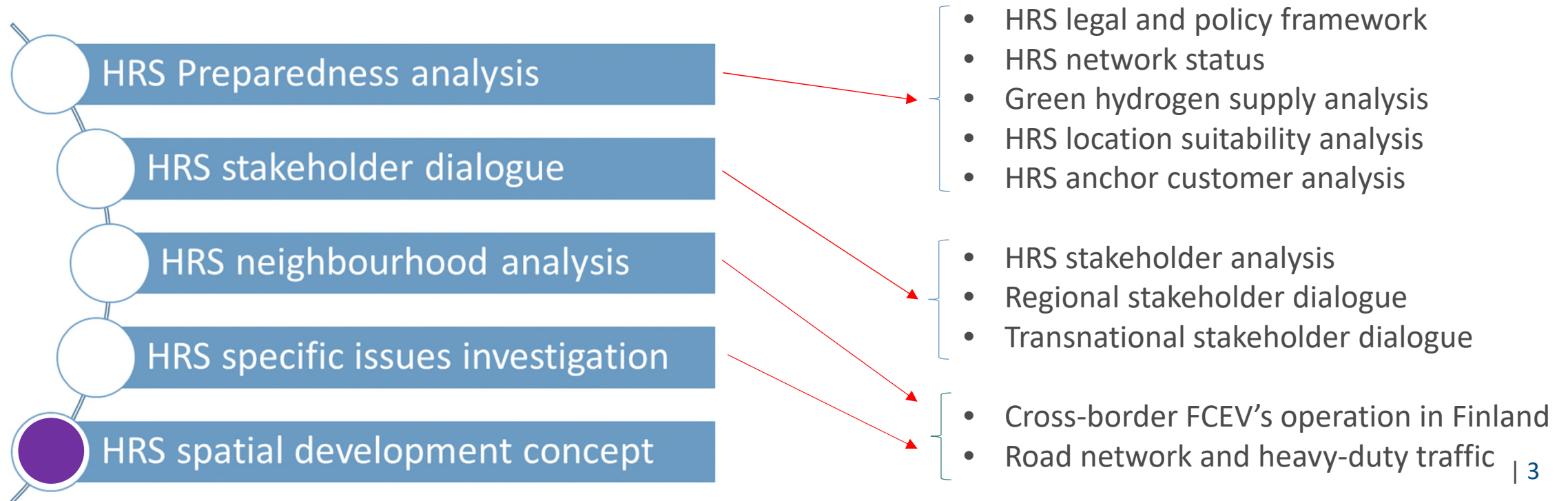
- The greatest motivation in implementing the pilot is the possibility to enhance the implementation of **low emission heavy road traffic** in Finland, promote the regional **hydrogen economy** and provide tools for local authorities and municipalities to achieve Finland's **carbon neutrality** goals.
- The main focus of Finnish HRS pilot is on **Helsinki region**, the urban node in the crossroad of E18 and E75 TEN-T corridors.
- Regional pilot is in Helsinki area. **Connected pilots** – in Turku and Kotka regions.



Regional pilot implementation plans

The outcome of Helsinki Region pilot

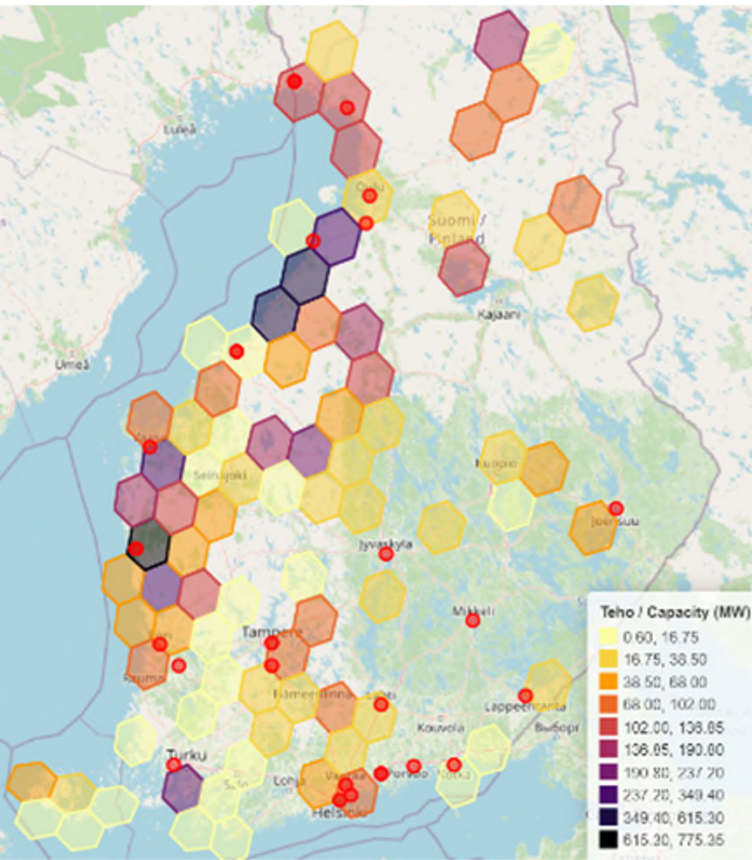
- HRS Spatial Development Concept for Helsinki Region and Southern Finland is structured, including the following steps and topics:



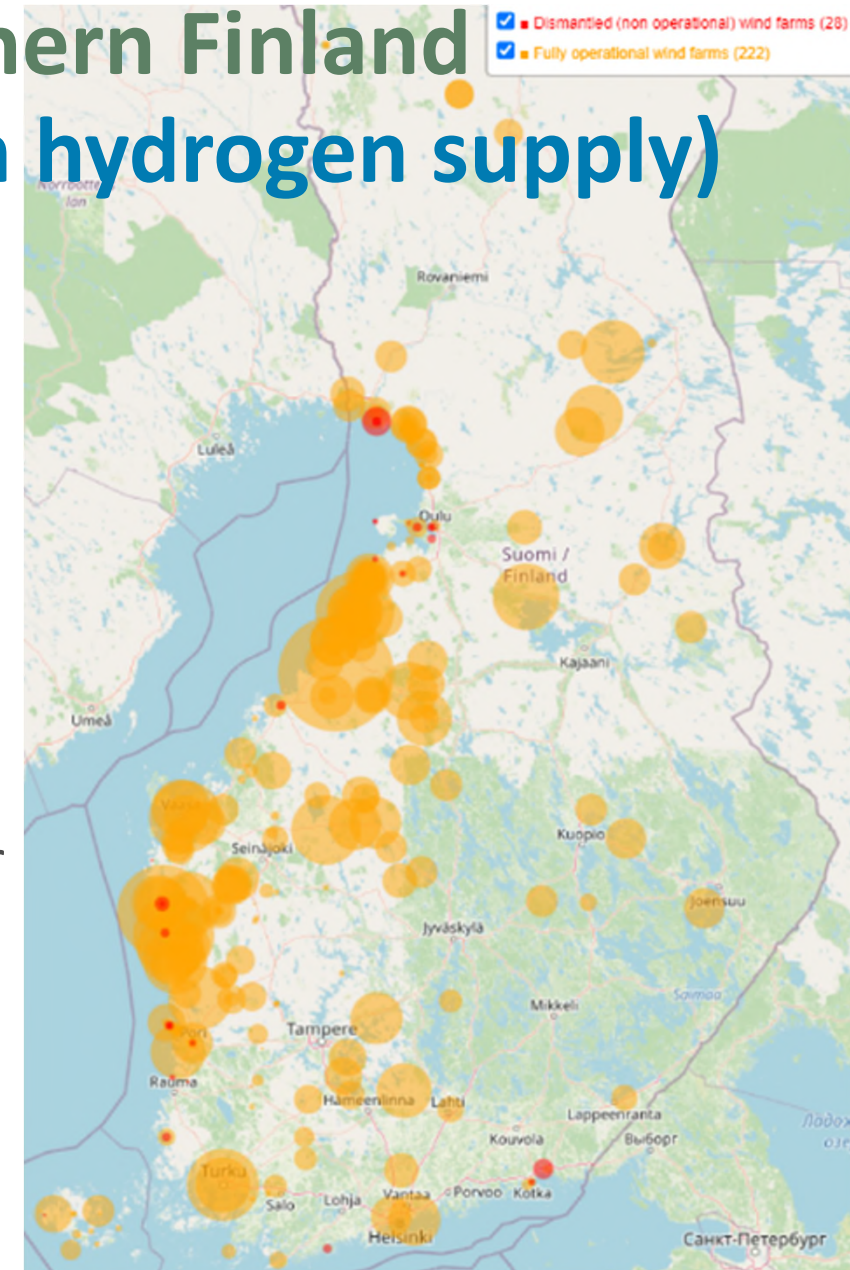
Pilot status in Helsinki Region and Southern Finland

Summary: Preparedness analysis (green hydrogen supply)

- **Wind power** - most relevant and dynamically growing renewable energy source
- 7,3 GW installed wind capacity (222 farms / 1660 windmills)



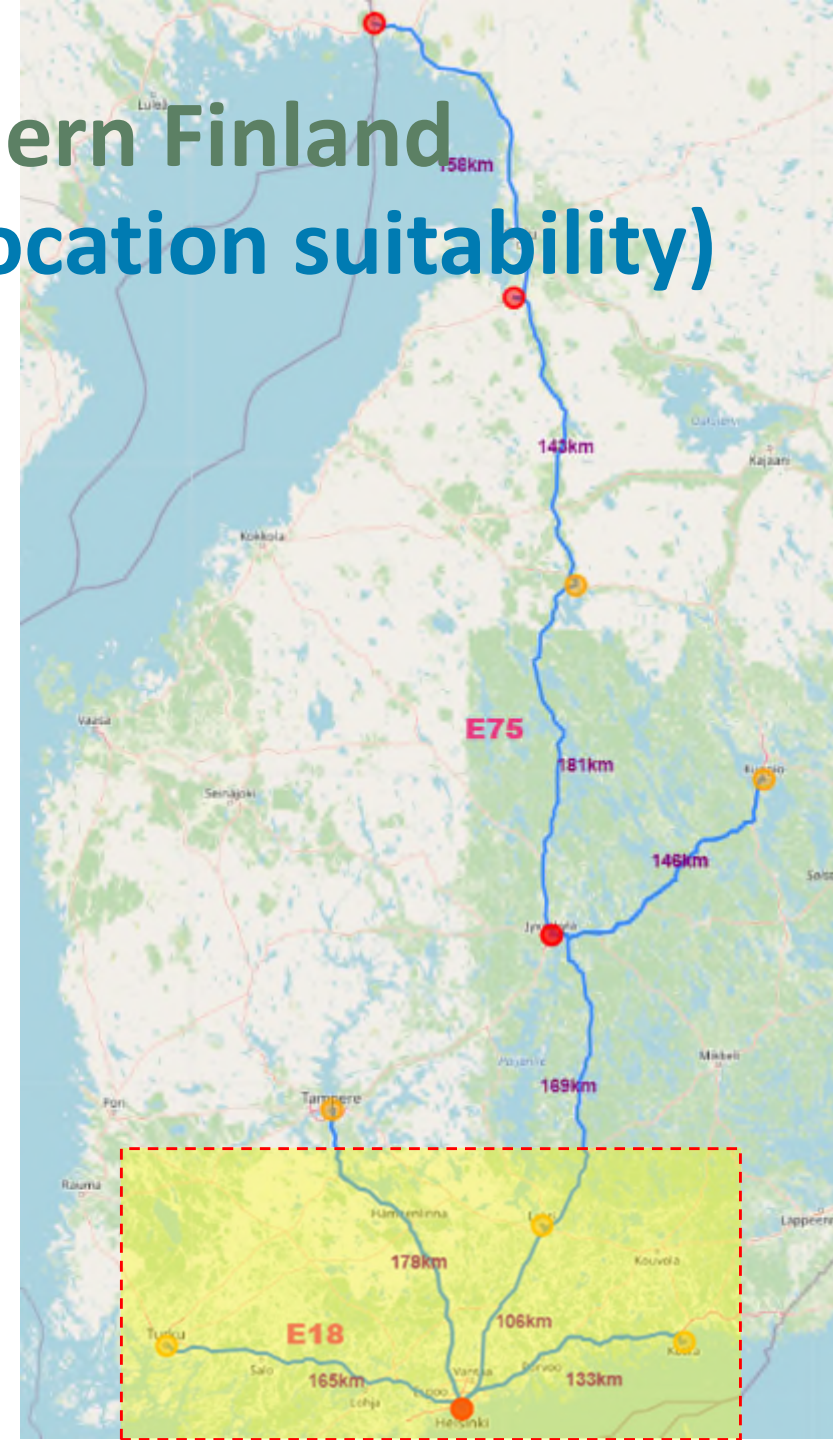
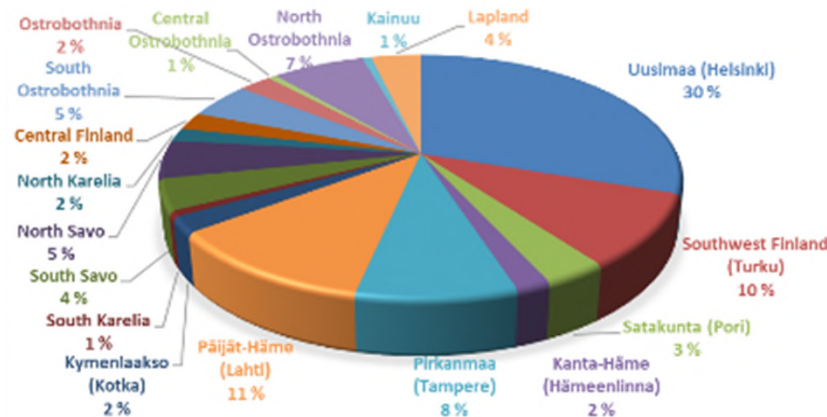
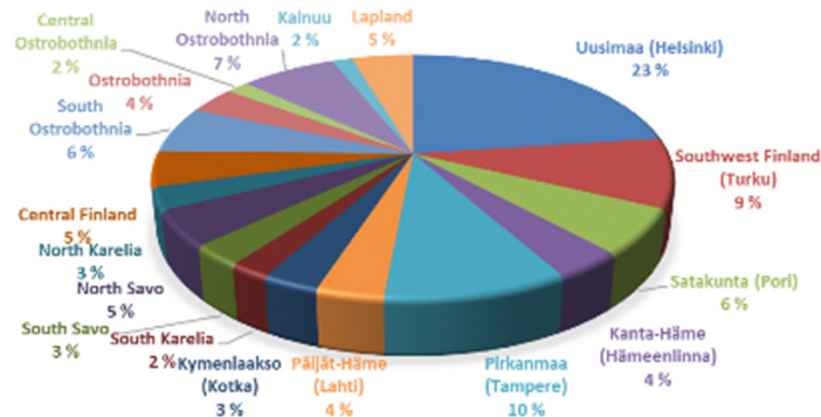
- **Wind farms** concentrated in western Finland, near the Baltic Sea and the Gulf of Bothnia coastline
- Close to **energy-intensive industry** (steel, pulp & paper, refineries, etc.)
- **Green hydrogen investments** – near renewable supply, mostly mapped in Western and Southern Finland
- **Green hydrogen exchange:** The Nordic-Baltic Hydrogen Corridor
- Expected to transport 2.7 Mt/a of renewable hydrogen by 2040



Pilot status in Helsinki Region and Southern Finland

Summary: Preparedness analysis (HRS location suitability)

- **AFIR requirements** – min. 1 HRS in urban nodes and max. 200km along TEN-T core road network (E75/E18)
- 10 HRS can fulfill AFIR minimum requirements
- **Semiradial structure** starting from the capital Helsinki
- **Southern Finland** concentrate the largest maritime ports and the biggest existing truck / bus fleet (58% / 67% respectively)
- Finnish pilot: focusing on **Helsinki region** with connected pilots along E18 axis - Kotka and Turku

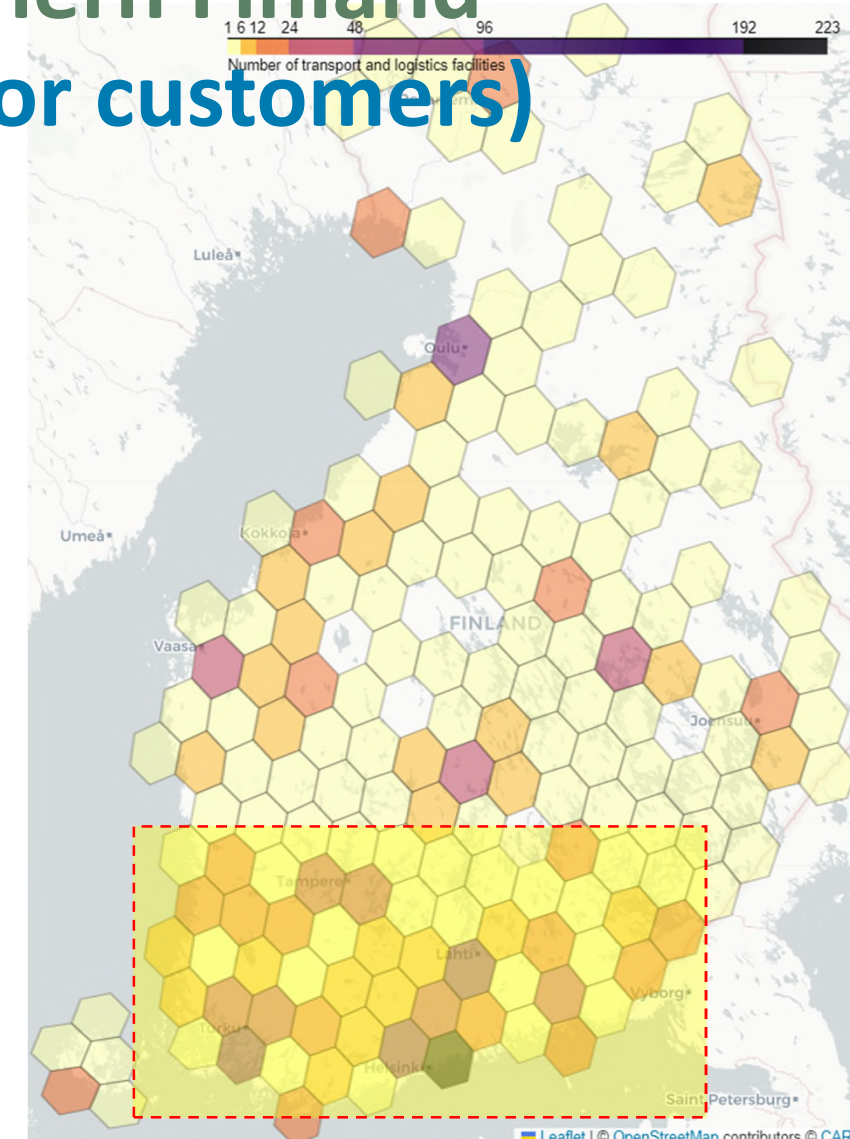


Pilot status in Helsinki Region and Southern Finland

Summary: Preparedness analysis (anchor customers)

- **Transport, logistics and storage** facilities - concentrated in Southern and Western Finland, more specifically near large urban and industrial centres
- **Potential anchor customers** - trucks, buses, vans and cars
- **Clean share of heavy-duty vehicles** represents only 0,9% of truck fleet and 6,6% of bus fleet (mostly driven by BEV)
- For vans and cars these figures are 1,4% and 8,6% (BEV/PHEV)
- Calculation of **potential hydrogen demand**: 50 kt/year
- Needed **100+ standard HRS** (output 1t/day)

Concept	Trucks	Buses	Vans	Cars
Fleet, vehicles	90 000	11 000	300 000	3 000 000
Mileage, million km per year	3 300	575	5 300	40 000
Avg. annual mileage, km/vehicle.year	36 667	52 273	17 667	13 333
Avg. hydrogen consumption kg per 100km	10	8	5	1
Hydrogen demand, kt/year	330	46	265	400
Assuming 5% of the fleet, kt/year	16.5	2.3	13.3	20

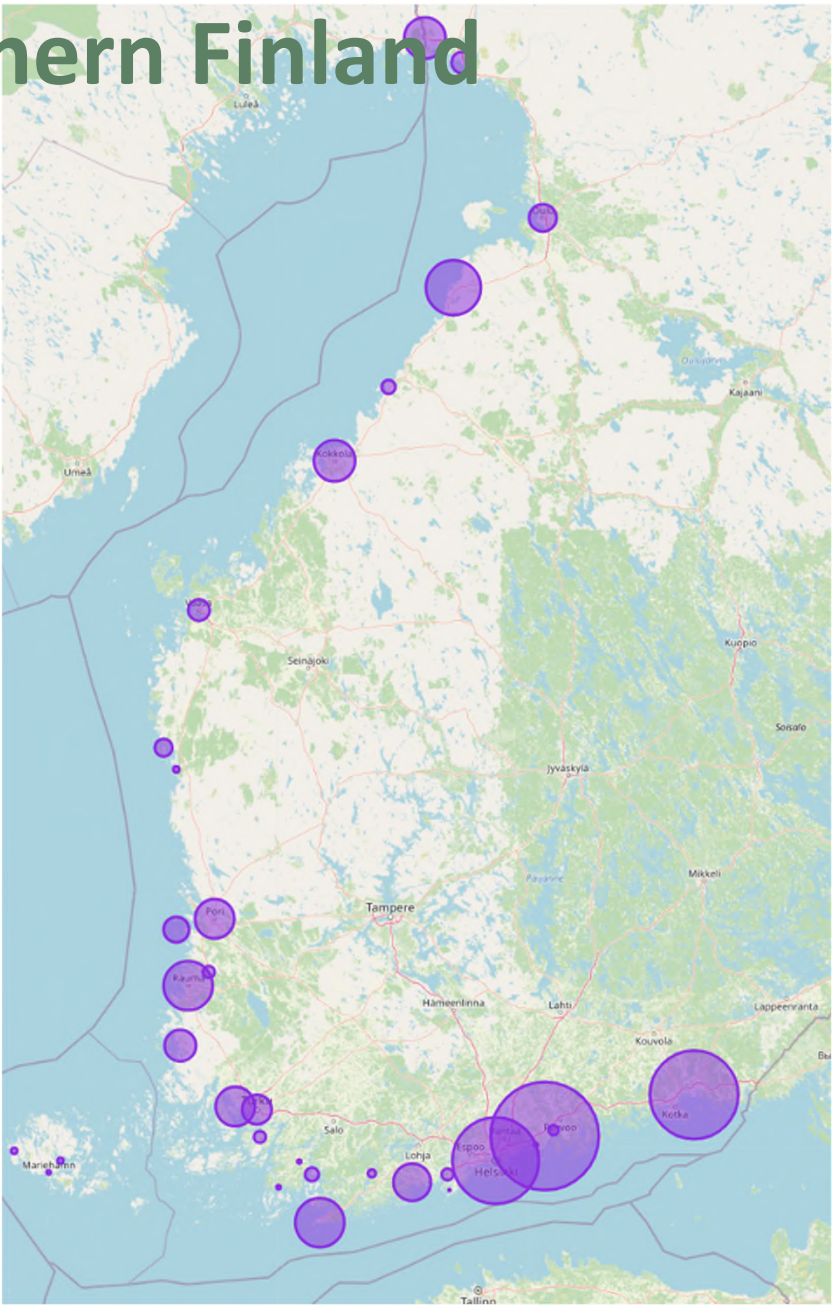


Pilot status in Helsinki Region and Southern Finland

Summary: Neighbourhood analysis

- **Finland’s major seaports** are concentrated in Southern and Western Finland: Sköldvik (Helsinki region), Hamina-Kotka, Helsinki, Hanko and Turku-Naantali.
- **International exchange of goods** (import and export) – concentrated also in Southern Finland.
- Helsinki region, Varsinais-Suomi (Turku) and Pirkanmaa (Tampere) account for 70% and 50% of Finnish export and import
- **Specific issues investigation:** Road network structure and heavy-duty traffic, Finnish border entry points.
- **HRS network interconnection:** Sweden – Stockholm/Arlanda and Sandviken HRS connected with Turku, Umeå HRS in connection with Vaasa. Estonia – Tallinn, connected with Helsinki.

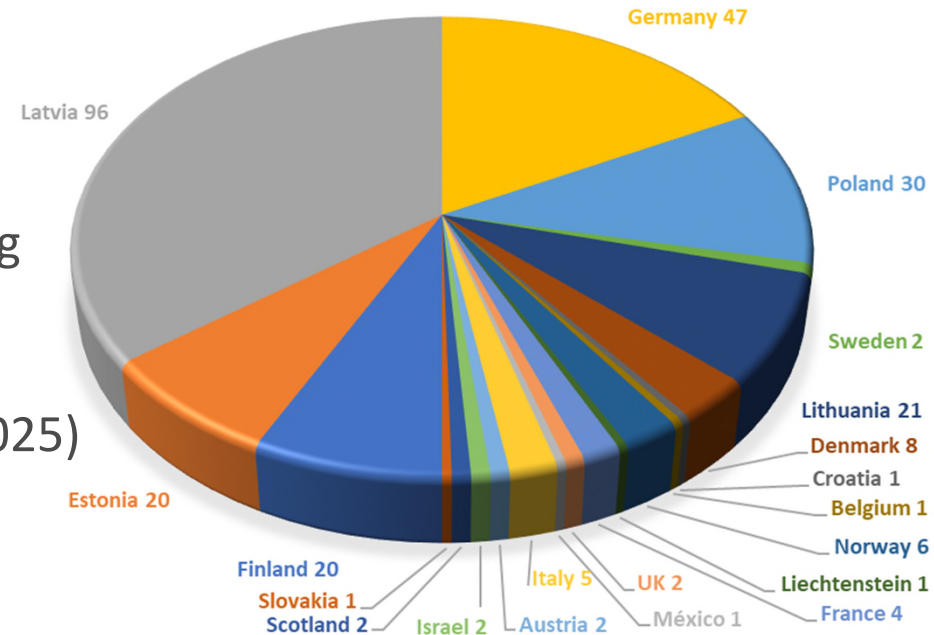
Country	HRS location	Operator	Phase	Pressure, bar
Sweden	Stockholm / Arlanda	Hynion	Operating	700
Sweden	Sandviken	Hynion	Operating	700
Sweden	Umeå	OAZER AB	Operating	700
Estonia	Tallinn	Alexela	Implementation	Probably 700



Pilot status in Helsinki Region and Southern Finland

Summary: Stakeholder dialogue

- **Transnational:**
 - HyTruck Breakfast Briefings – a professional community reaching near 300 subscribers and 50+ participants from 20 countries
 - First transnational Workshop in Riga, Latvia (9 October 2024)
 - Second transnational Workshop in Vilnius, Lithuania (10 April 2025)
 - Upcoming HyTruck Partner meeting, study visit and final Conference in Helsinki (11 – 12 November 2025)
- **National and regional:**
 - Identified 150+ stakeholders from 80+ companies and organizations
- **Regional stakeholder dialogue:**
 - First HyTruck Workshop (18 June 2024)
 - Second HyTruck Workshop (28 November 2024)
 - Webinar “Building a Hydrogen Refuelling Network in Finland: Regional Insights & Collaboration Opportunities” (14 May 2025)



**HyTruck Breakfast Briefings -
A transnational open forum**



Pilot status in Helsinki Region and Southern Finland

Summary: Spatial development concept

Alignment with EU Regulations

- The developments align with the Alternative Fuels Infrastructure Regulation (AFIR), RED III and TEN-T regulation.
- Finland aims to meet EU renewable fuel targets, supporting its ambitious plans for carbon neutrality by 2035.

Strategic Network Planning

- Vireon Hydrogen is planning a network of five HRS from Helsinki to Tornio, supported by an EU grant.
- HRS network expansion, starting with pilot projects in high-traffic areas and urban nodes, incorporating monitoring phases to guide further development.

Regional Development

- Helsinki Region and Southern Finland: Several green hydrogen refueling stations for heavy-duty transport are planned:
- 3H2 Helsinki Hydrogen Hub (Vuosaari) as a cooperation between Helen Oy and Vireon Hydrogen.
- Jyväskylä: Expected to host Finland's first AFIR-compliant HRS in 2025, serving municipal bus fleet.

Renewable Energy Integration

- Hydrogen production is planned to utilize green electricity from renewable sources, such as solar and wind power.

Cross-Border Collaboration

- Finland is participating in cross-border hydrogen infrastructure projects in the Baltic Sea Region, including:
- Nordic-Baltic Hydrogen Corridor, Baltic Sea Hydrogen Collector, and Nordic Hydrogen Route (Gasgrid).

Challenges and Future Actions

- Addressing operational challenges, including proximity of hydrogen production to refueling stations and pricing issues.
- Phased approach, implementing initial pilot projects and securing financial support for HRS development & off-takers.
- Ongoing stakeholder engagement and promoting public awareness of hydrogen as a sustainable fuel.

Thank you!

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