

The northern way to a free industrious Europe

Connect a million ways of hydrogen with Finland

H₂cluster
FINLAND

The world offers us unlimited clean energy to replace fossils.

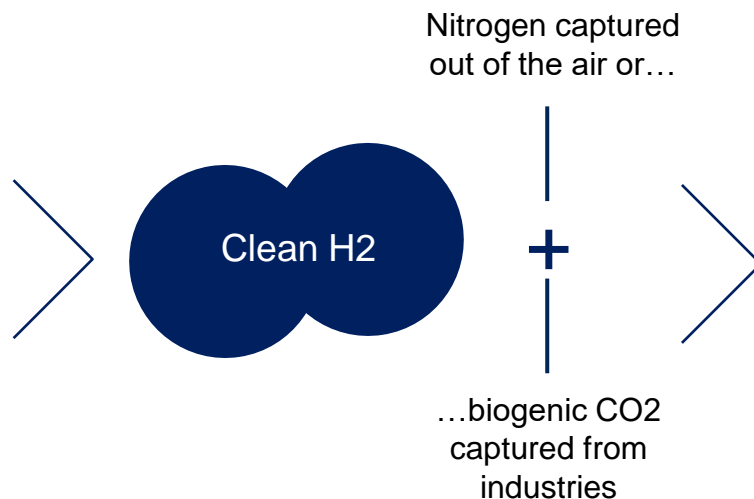
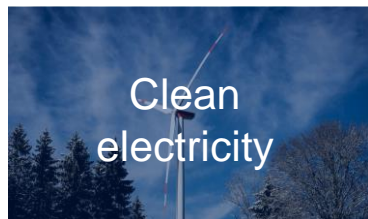
If only we could store and use it where and when it is needed.

▶ Wind or sunlight cannot be stored in a tank, but hydrogen can.

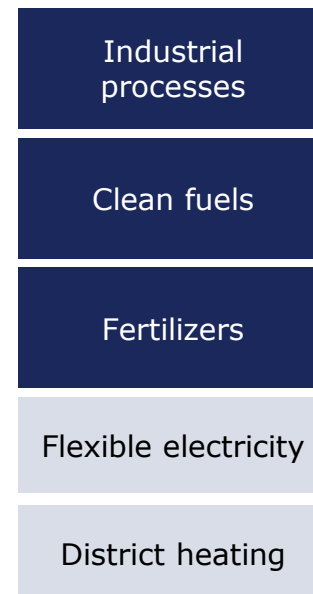
Clean hydrogen is the key to a carbon-neutral world

Hydrogen makes renewable energy usable flexibly and enables replacing fossils in society's most critical industries.

Finland has in abundance what is needed to create it



Finland is heavy on all the sectors that use it



All carbon circulated
Emissions are not added to the atmosphere but captured from it.

Three reasons why Finland is the natural starting point for Europe's H2-empowered value chains

1

Abundant clean resources

The exceptional ramp-up potential in cheap clean renewable electricity and a steady supply of biogenic CO2 enable Finland to produce a significant share of Europe's hydrogen and value-add products at a competitive price.



2

Connecting critical industries

Finland's economy is focused on industries with high relevance for hydrogen, combining an agile approach between use-cases and extraordinary sector coupling opportunities in a collaborative ecosystem.



3

Stability and security

This is a stable high-tech society committed to securing a free industrious Europe and pioneering carbon neutrality. Infrastructure for electricity and hydrogen is highly connected and innovative.





1

Abundant clean resources

And there's
more of
where that
came from

This is what cost-efficient clean electricity and biogenic CO₂ look like

Finland has **exceptional conditions for ramping up cost-efficient onshore wind power**, with capacity reaching approximately 23,000 MW by the end of the decade.

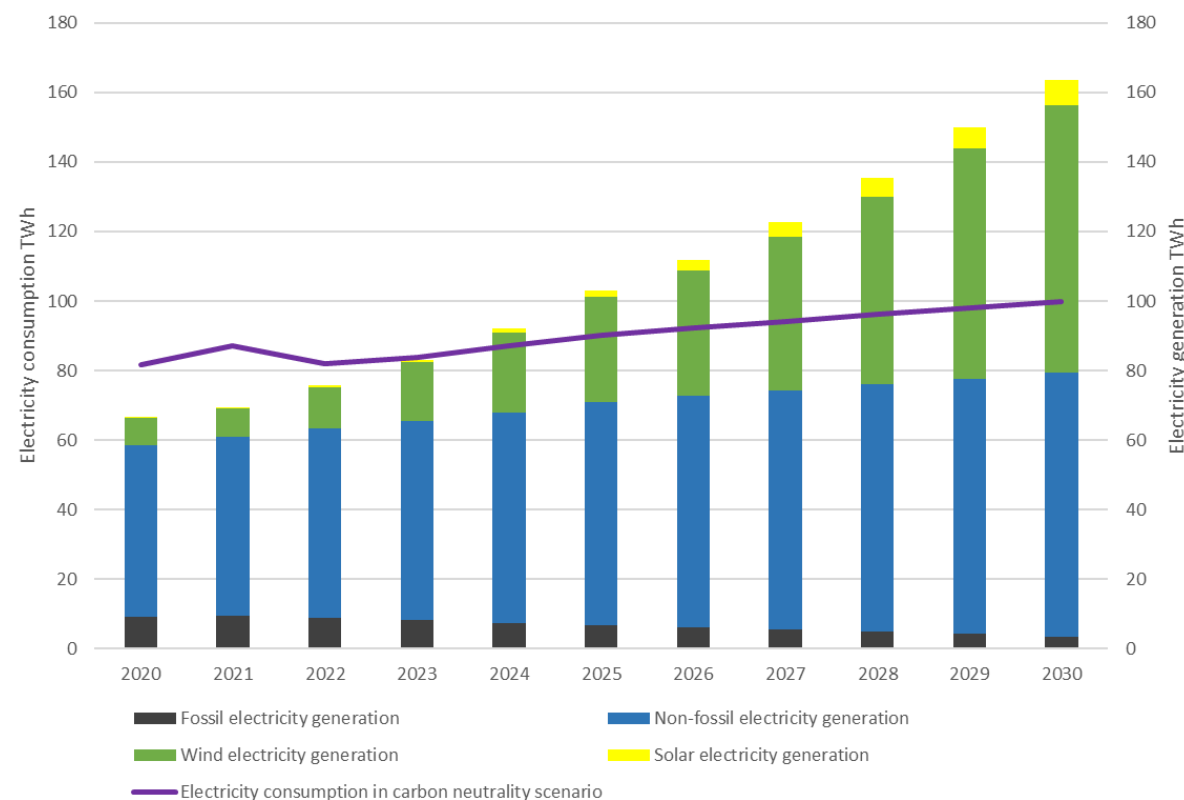
Finnish forests grow 103.5 million cubic meters annually, enabling a vast forest industry. This industry secures a **steady supply of biogenic carbon** to be combined with clean hydrogen for fertilizers, synthetic fuels and chemicals.

Finland produces clean and cost-efficient electricity with vast expansion outlooks

Electricity to be carbon neutral by 2030

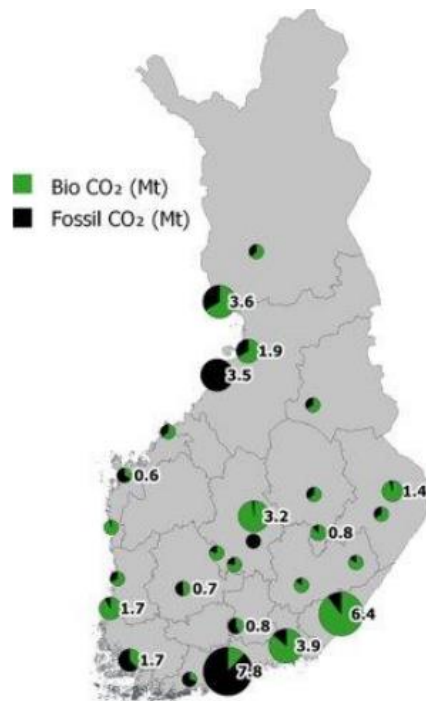
- ▶ Finland produces some of **the cheapest electricity in Europe**
- ▶ In 2023, **94% of electricity was produced CO₂ neutrally** and 52% with renewable energy sources.
- ▶ **Exceptional conditions for cost-efficient onshore wind power**, with capacity reaching approximately 23,000 MW by the end of the decade.
- ▶ The mix is complemented by **rapidly growing solar power**, currently projected to reach 7,000 MW by 2030
- ▶ The projected **electricity surplus enables Finland to account for 14% of Europe's hydrogen demand by 2045.**
- ▶ Supported by **a reliable, innovative electricity grid.**

Green electrification in Finland



28 Mt of biogenic CO₂ are generated annually in Finland, enabling extensive P2X and synthetic fuel industries

- ▶ As a leader in renewable fuels (including aviation) and maritime technology, Finland is perfectly positioned to develop large scale synthetic fuels solutions
- ▶ Achieving Finland's target to become carbon neutral by 2035 will require capturing carbon dioxide produced by industries
- ▶ The first P2X projects are already operational.



Source and image: Bioenergia ry;
LUT, Hygcel-project



Hydrogen projects in Finland*

First projects to be commissioned during year 2024. Most of the produced hydrogen will be refined into E-fuels or other products and utilised in industry.

>45

hydrogen projects planned or already under construction in Finland

~25 B€

investments

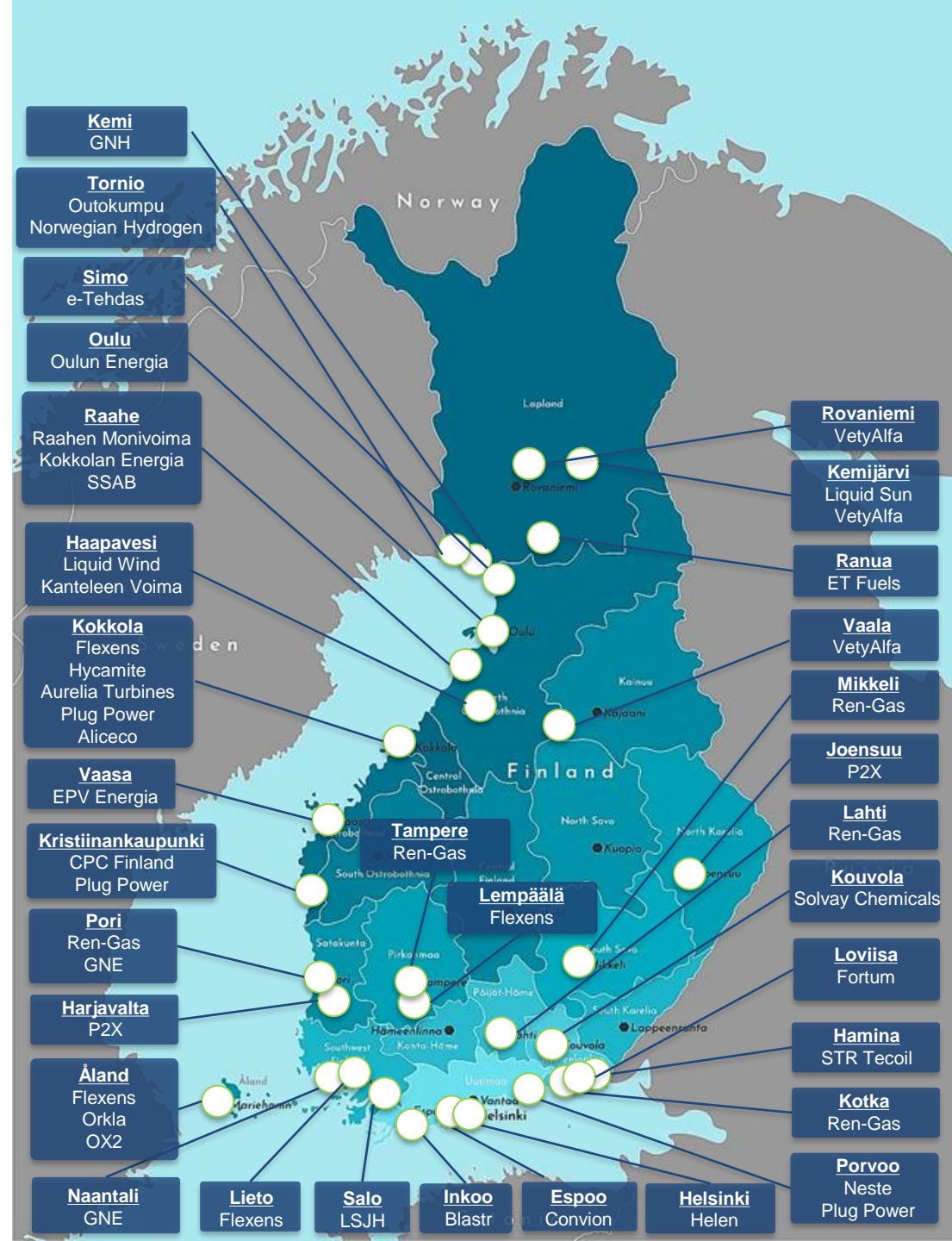
>10 000 MW

power

>1 300 000 t/a

annual H2 production of planned projects

The Nordic Hydrogen Route is an initiative to build a cross-border hydrogen infrastructure in the Bothnian Bay region and an open hydrogen market by 2030. The project has been approved by the European Parliament and the Council for PCI status. Construction will begin 2026.



The Baltic Sea region emerges as Europe's leading hydrogen valley

- ▶ National and international hydrogen infrastructure is essential for:
 - establishing markets for hydrogen
 - derisking hydrogen production and value chain investments
 - creating access to H2 storages and for unlocking further build-out of renewable electricity.
 - ▶ Finland's national transmission system operator has been mandated to develop this infrastructure.
 - all three projects have been awarded EU's Project of Common European Interest (PCI) status
 - all projects apply for CEF (Connecting Europe Facility) funding for the next phase of project development
 - national infrastructure to be operational in the early 2030's.
- Three international cross-border infrastructure projects will create one of the most competitive hydrogen markets.

The Baltic Sea region is emerging as a leading region due to significant RES-potential, storage capabilities, and proximity to key markets.



Connect a million ways of hydrogen with Finland

Finland is the natural starting point for Europe's most critical H₂-empowered value chains

1 Abundant clean resources

Clean cheap electricity with vast ramp up potential Onshore wind

Biogenic CO₂ Balance clean H₂, methanol, and ammonia H₂O

2 Connecting critical industries

Steel, fuels, maritime, chemicals, forest... Sector coupling

Nordic Hydrogen Route Technology & services Creative side streams

3 Stability and security

Carbon neutral by 2035 Low-risk investment environment

Strong innovative grid Comprehensive approach to energy security

Target

Finland produces at least 10% of Europe's clean hydrogen by 2030 at a competitive price

Vision
Europe's leading hydrogen ecosystem

Mission
Secure a free industrious Europe

Finland by 2035

Carbon neutral
100,000 new jobs
€33B added value to the economy

H₂ Projects in Finland*

▶ 10000 MW power

▶ 1.300.000 t/a planned annual H₂ production

▶ 25 B€ investments

Hydrogen is freedom

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