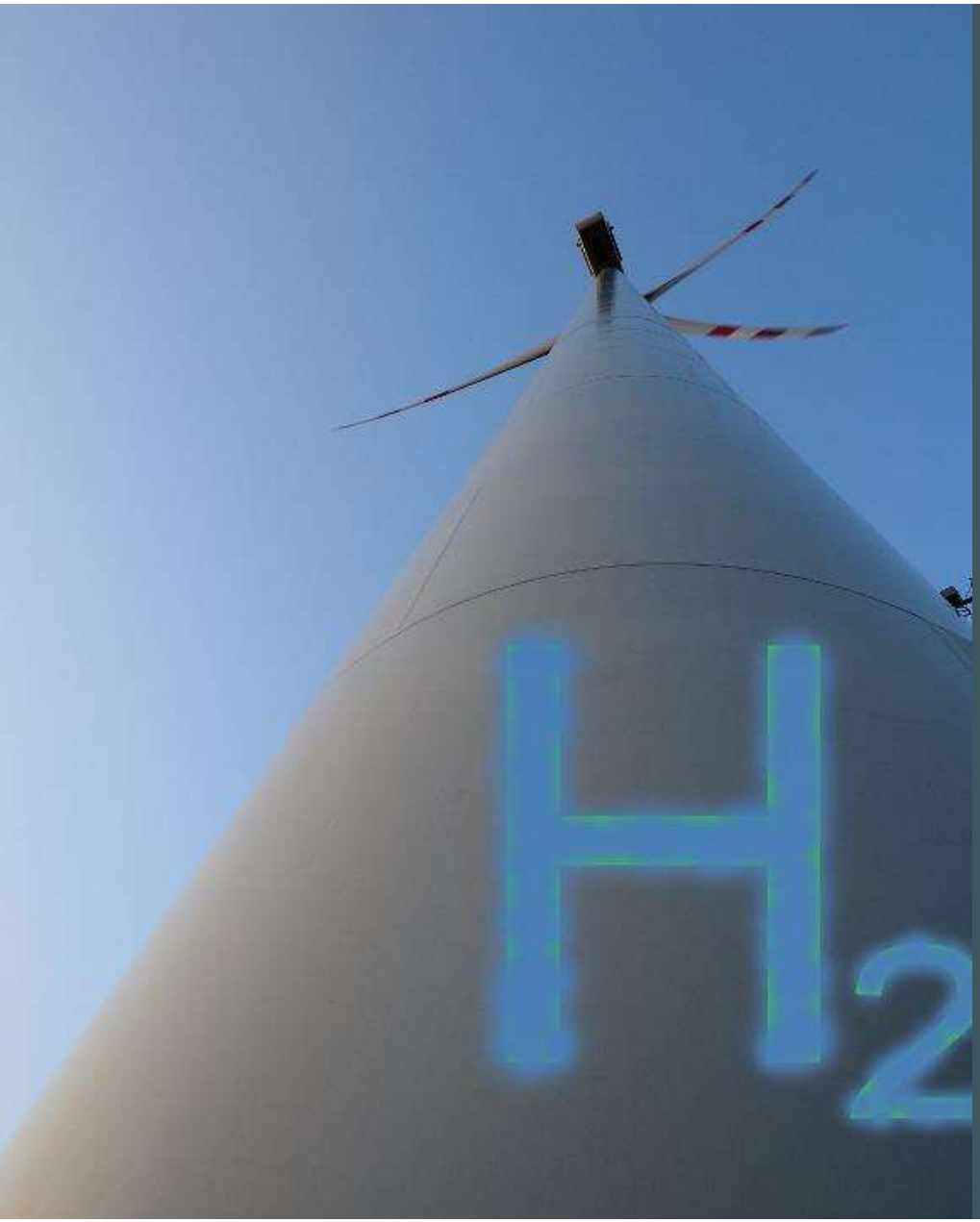


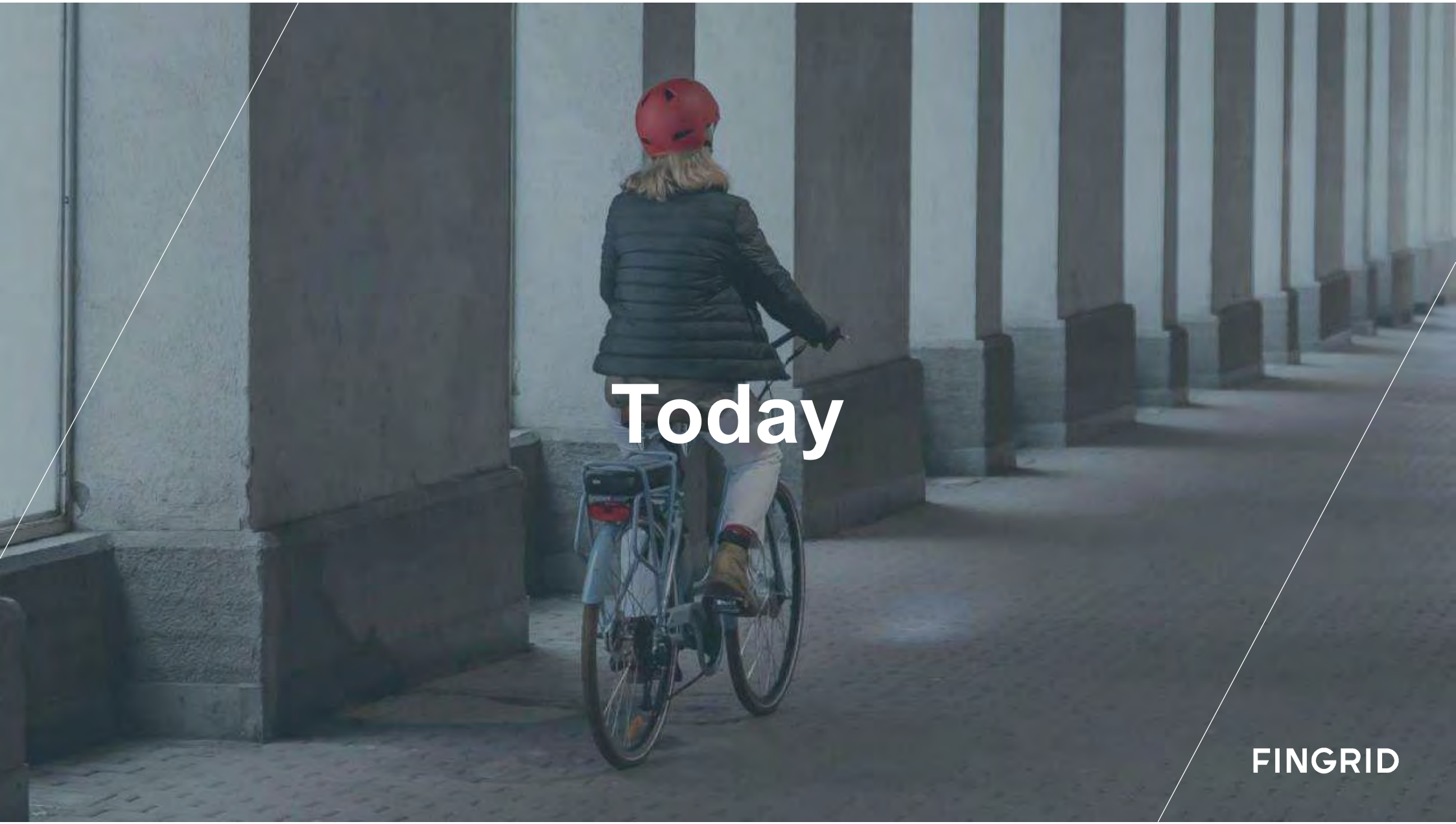
Oct 11th, 2023

Jukka Ruusunen
President and CEO, Fingrid Oyj

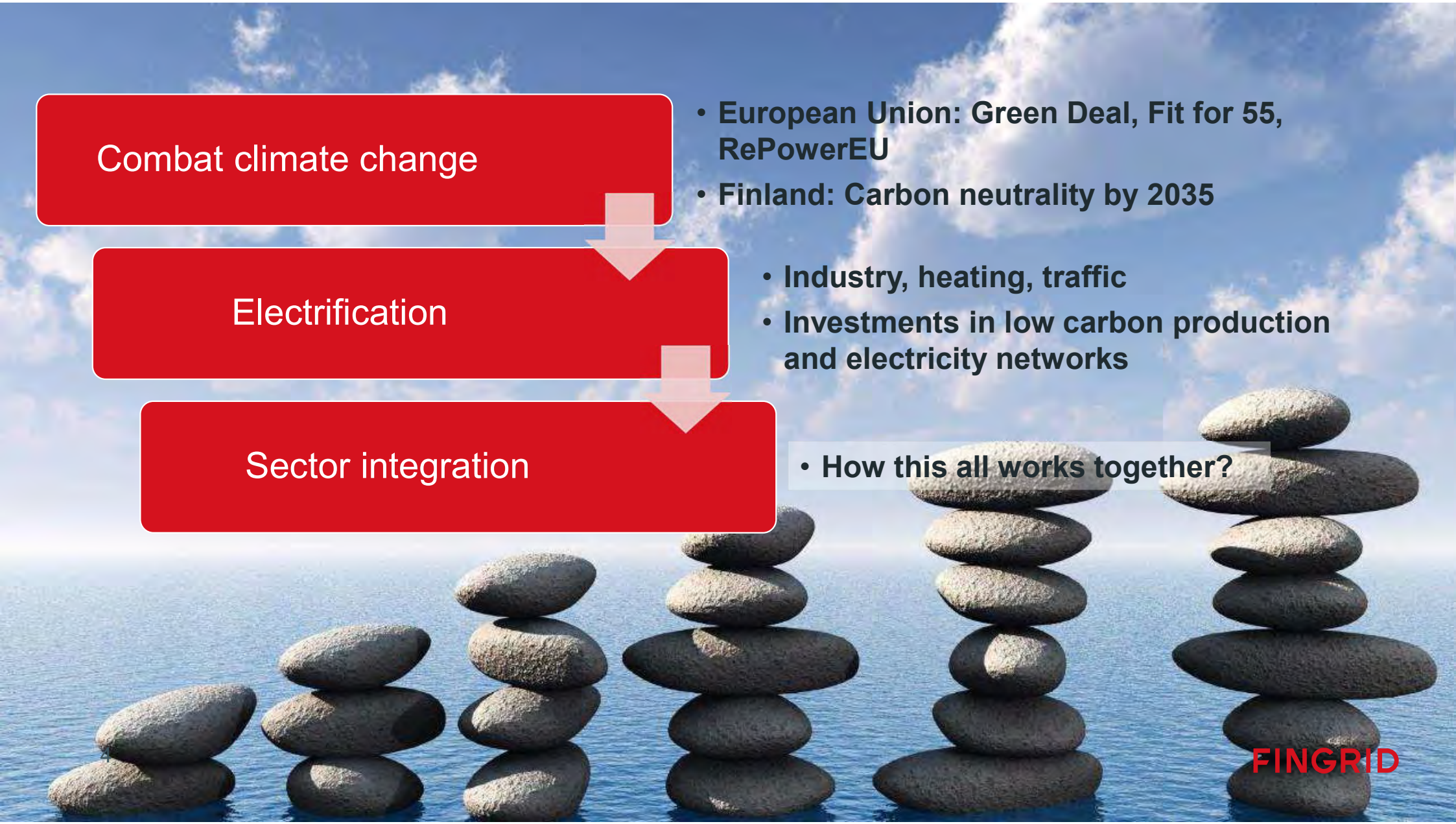
@RuusunenJukka

Modern Finnish electricity system

FINGRID


Today
FINGRID


Future
FINGRID


Combat climate change
Electrification
Sector integration
• European Union: Green Deal, Fit for 55, RePowerEU
• Finland: Carbon neutrality by 2035
• Industry, heating, traffic
• Investments in low carbon production and electricity networks
• How this all works together?

Finland has several competitive advantages in electricity!

- … is highly electrified
- … has clean and efficient electricity generation and excellent competitiveness of onshore wind power.
- … has strong grid and top-class electricity reliability
- … is part of the efficient European electricity markets

Finland can offer emission free and reliable electricity with a very competitive price!

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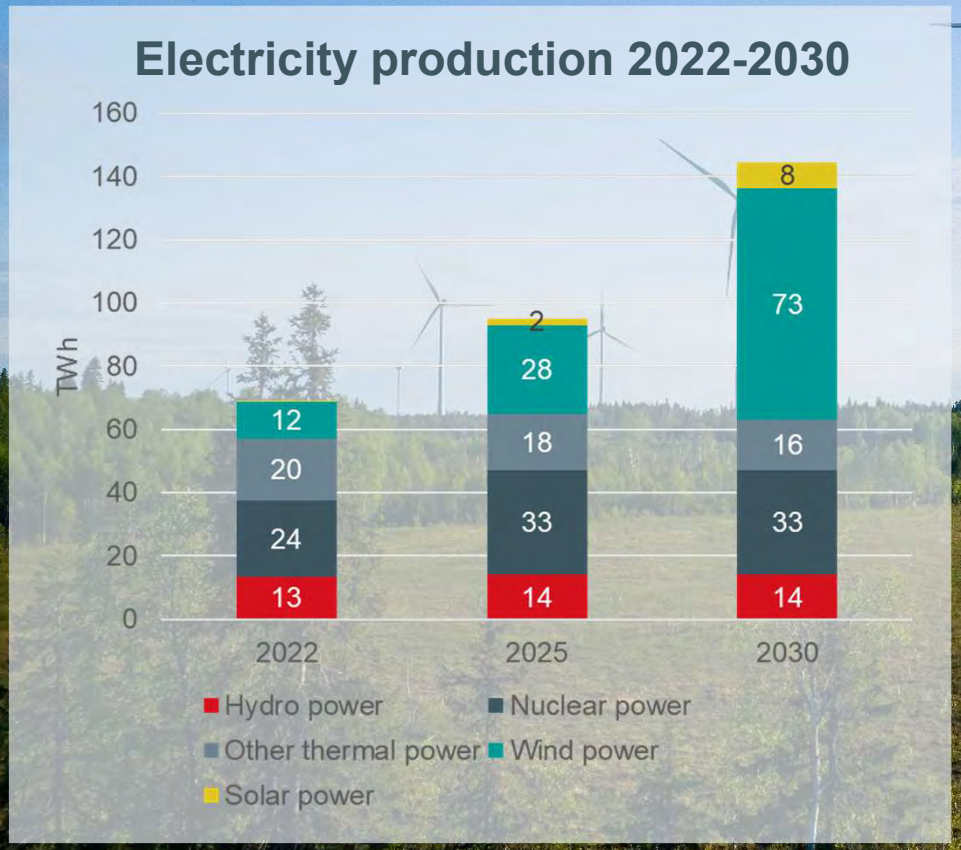
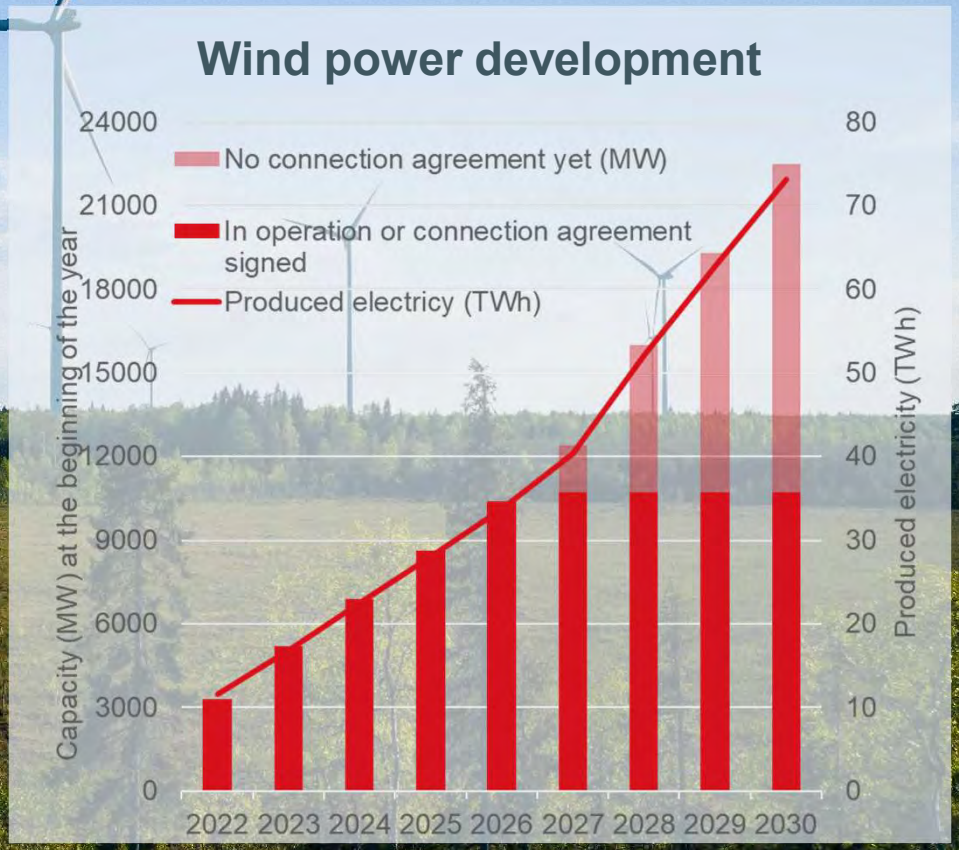
Finland can offer a lot of clean and affordable electricity!





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Industrial electrification is proceeding!

Green hydrogen

Microsoft | Stories Europe

Microsoft announces intent to build a new datacenter region in Finland, accelerating sustainable digital transformation and enabling large scale carbon-free district heating

Other news

SSAB has launched an extensive research project in Finland to replace fossil fuels with renewable energy in steelmaking

SSAB has launched an extensive research project, FFS – Towards Fossil-free Steel, in Finland. In the project, SSAB will work together with industrial and research partners to explore different solutions and alternatives to produce fossil-free steel and thus the ways to withdraw entirely from the use fossil energy.

SSAB Raahe site

Four-billion-euro investment planned into a green steel plant in Inkoo, Finland

Norwegian company Blastr Green Steel (Blastr) is planning to establish a green steel plant with an integrated hydrogen production facility in Inkoo, Finland. Blastr has entered into a Letter of Intent with Nordic energy company Fortum that provides Blastr exclusive rights to utilize an existing industrial site located in Inkoo. The four-billion-euro investment is expected to create up to 1,200 direct jobs in the operations phase. The production is planned to start by end of 2026.

3 May 2023

Neste moves forward in its renewable hydrogen project in Porvoo, Finland

Published in Releases and news under Sustainability
green hydrogen, renewable hydrogen

Neste Corporation, Press Release, 3 May 2023 at 10.00 a.m. (EET)

Lahteen suunnitellaan Suomen suurinta vihreän vedyn tuotantolaitosta, vaatii rutkasti lisää tuulivoimaa

Prosessin lopputuotteena olisi uusiutuva metaani, jota voitaisiin käyttää liikenteessä kuten biokaasua.

Jaa Kuuntele

Uutiset Tuoreimmat Venäjän hyökkäys Sää Kotimaa Ulkomaat Talous

Kokkolan suurteollisuusalueelle suunnitellaan vetyendästä. Kaikkiaan Suomeen niitä on suunnitteilla parikymmentä. Kuva: Raila Paavola / Yle

Energia

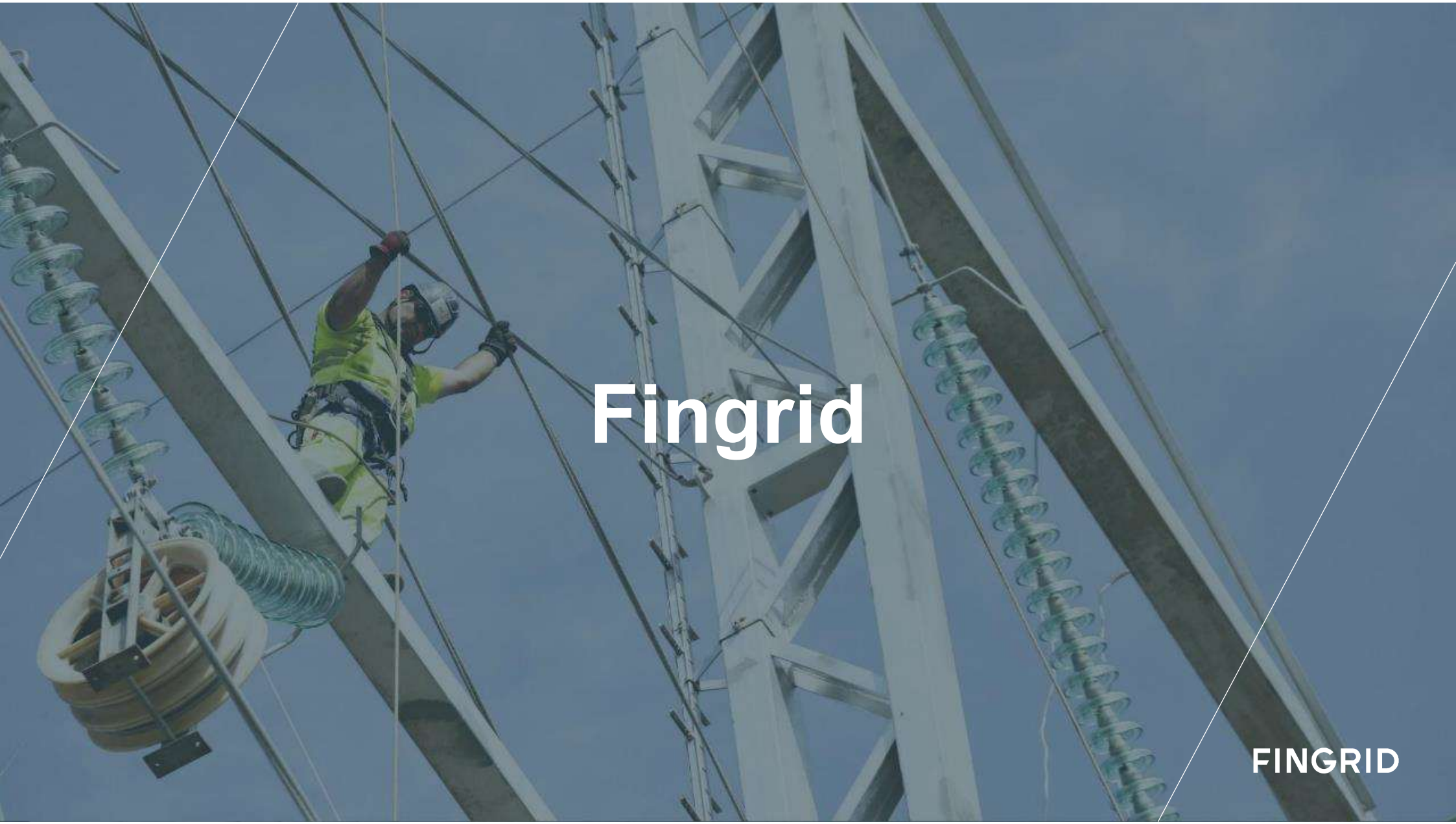
Kokkolaan suunnitteilla Suomen suurin vihreän vedyn hanke – vihreälle ammoniakille on maailmalla kysyntää

Kokkolan suurteollisuusalueelle on tulossa erittäin suuri, 300 megawatin vetytehdas. Yle seurasi tiedotustilaisuutta aiheesta.

SARI MÖLLER, IINA KLUUKERI

15.11. 09:00 • Päivitetty 15.11. 14:07

Jaa


Fingrid
FINGRID

Fingrid - foundation of the Finnish energy system

- We offer a strong and reliable grid where electricity can move freely.
- We help producers and consumers to enter the market and operate there – taking care of our customers.

Creating a competitive advantage for Finland!

We talk with our customers!

Microsoft's view of what is important for a TSO to address from a customer perspective:

1. **CLEAR COMMUNICATION**
   - Honest, open, and transparent communication between the TSO and customer.
   - Timely replies / call backs
   - Project updates and timeliness which can be relied on
2. **CUSTOMER ORIENTATION**
   - Listens and understands customer's business needs and can offer cost effective solutions that fit those needs.
   - Listen customers growth needs and shares own grid development views.
   - Fair contract models
3. **PROACTIVE GRID DEVELOPER**
   - TSO investing in their network to reduce capacity bottlenecks
   - TSO is working with their customers to ensure grid efficiency -> bring large energy consumers to high production areas, reduce transmission lines needed

"We are impressed by Fingrid's strong customer focus and appreciate their clear and timely communication. Their proactive approach to grid development is a leading example in Europe."

Patrik Öhlund
Director, Energy Markets EMEA

FINGRID

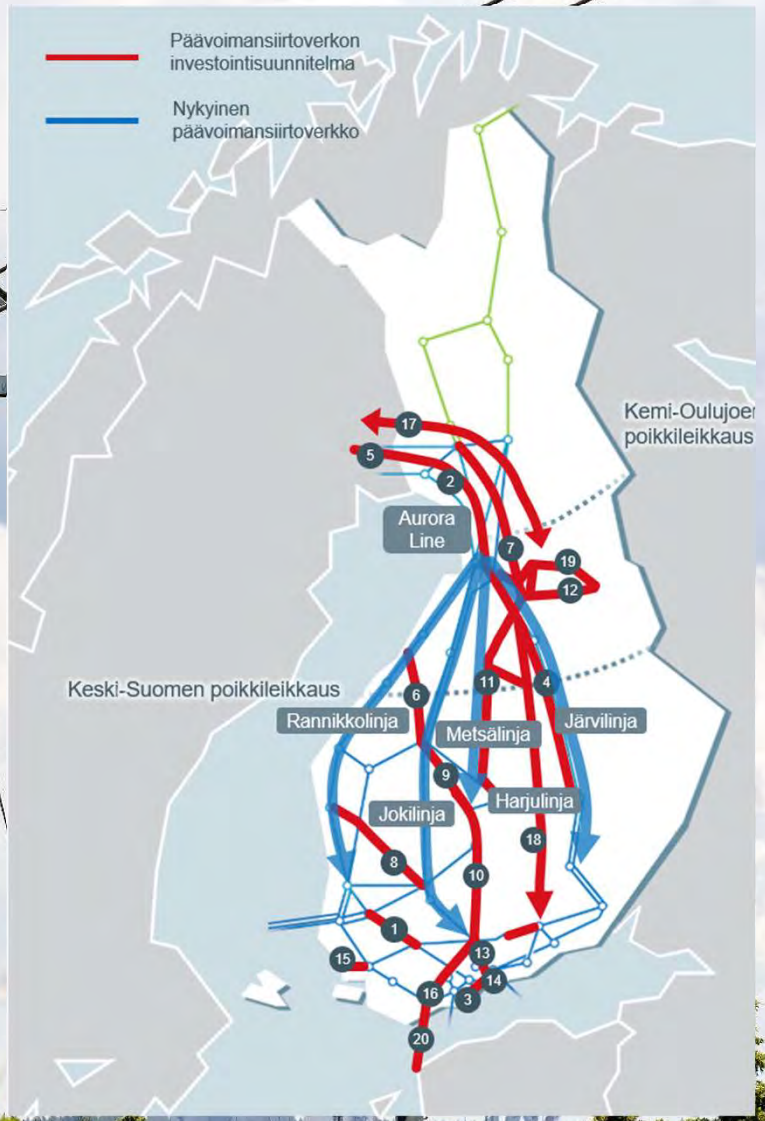

16 substations and 500 kilometers power lines completed 2022
2000 megawatts wind power connected 2022
Fingrid running hundred projects!
Reliable electricity grids are one of the most important national competitiveness factors in green transition industrial projects
FINGRID

Ten-year network development plan: four billion euros

HVDC | **Substation** | **Reserve Power** | **High Voltage Line**

2024 – 2033:
3700 km of 400 kV transmission lines
2300 km km of 110 kV transmission lines

About 200 substation projects (includes green field, extension and refurbishment projects)



Long term vision

FINGRID

Figure 1 Scenarios in the electricity system vision.

In all scenarios, transport, heating and industry will become electrified, and carbon neutrality targets will be met

Power to products

- Finland becomes significant exporter of P2X products.
- Wind and solar power grow significantly.
- The hydrogen needed for P2X processes is produced close to demand facilities, and there is no centralised hydrogen storage or network. This increases the strengthening needs of the electricity network and the need for flexibility in the electricity system.

Hydrogen from wind

- Hydrogen production grows in Finland and Finland becomes exporter of hydrogen.
- The hydrogen system acts as an energy storage facility, enabling very large-scale onshore wind power production. At the same time, the volume of conventional electricity production shrinks sharply.
- The change in production and consumption structure challenges technical functioning of electricity system and is reflected as a very high north-south energy transmission need.

Windy seas

- Electricity consumption grows when fossil-fueled energy is replaced by electricity and e-fuels.
- Offshore becomes the dominant form of production.
- The production of electricity is increasingly focused on the west coast, which challenges the transmission of electricity from the west coast to consumption concentrations.

Local power

- Electricity consumption increases, but more moderately than in the other scenarios.
- The growth in electricity production consists of several different technologies, including wind and solar and SMR nuclear power.
- The relatively higher share of production is located in southern Finland, close to consumption concentrations.

Figure 2 Electricity consumption under different scenarios.

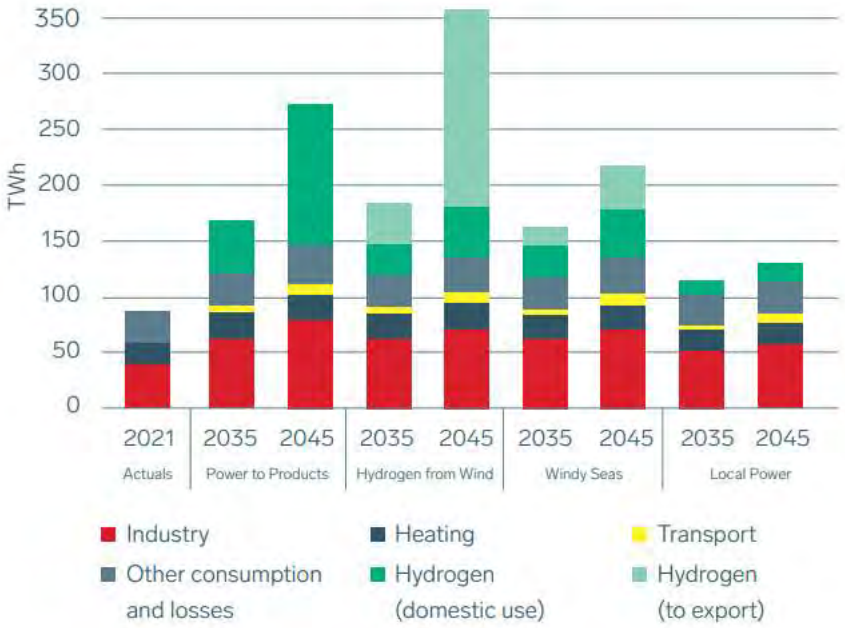
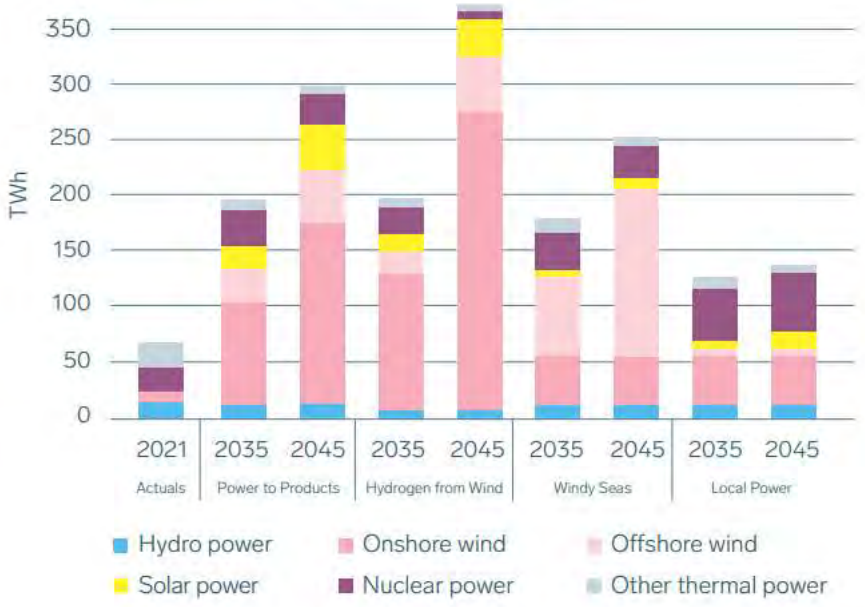


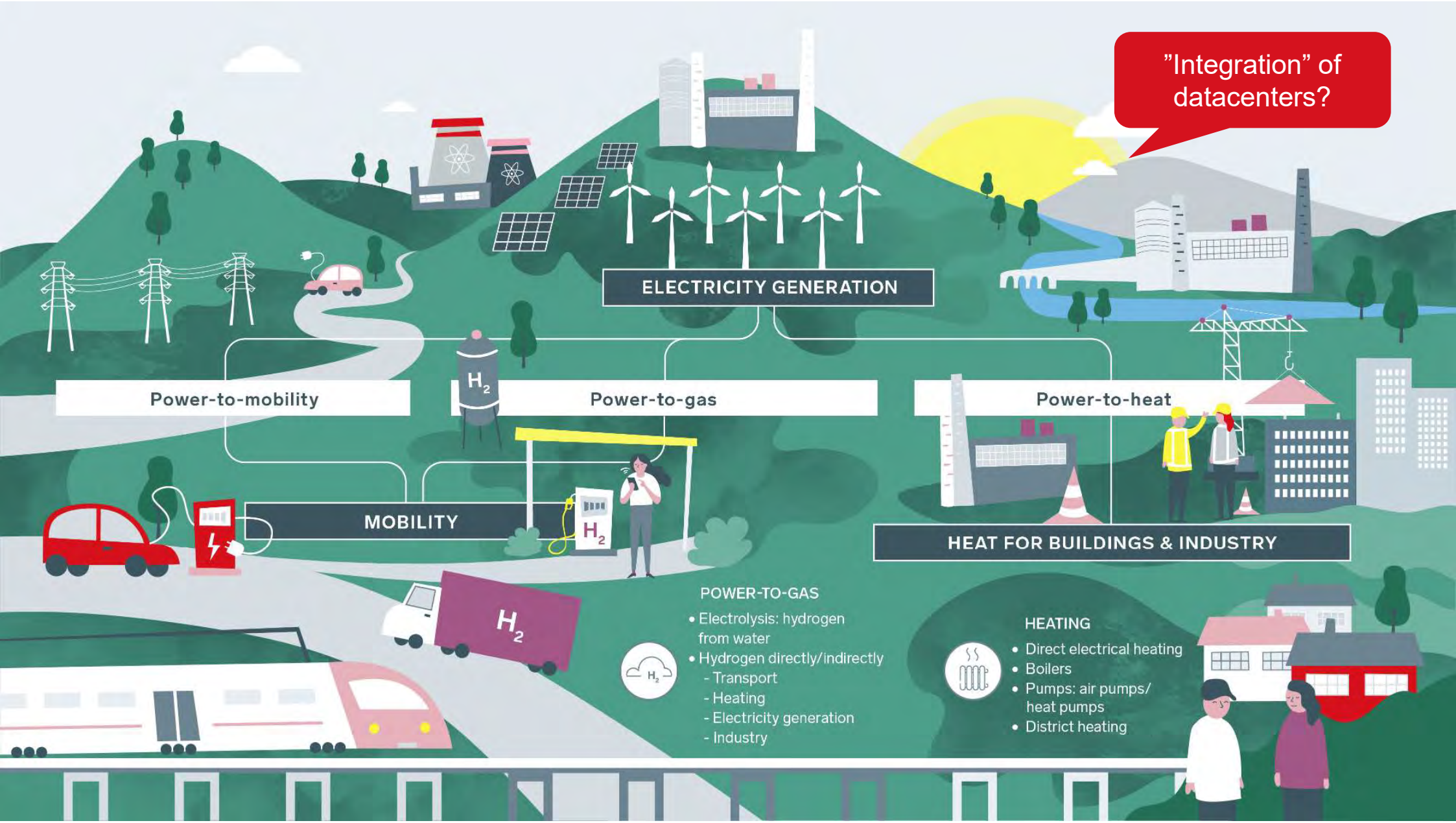
Figure 3 Electricity generation in different scenarios.



FINGRID

On our way to the modern energy system!

- Electrification of industry, heating, traffic leads us towards carbon neutrality
- Investments in **low carbon production** and **strong electricity networks** make **electrification** possible: carbon free, affordable and reliable electricity available
- New players entering the market. Finland is attractive for investors!


”Integration” of datacenters?
ELECTRICITY GENERATION
Power-to-mobility
Power-to-gas
Power-to-heat
MOBILITY
HEAT FOR BUILDINGS & INDUSTRY
POWER-TO-GAS
• Electrolysis: hydrogen from water
• Hydrogen directly/indirectly
- Transport
- Heating
- Electricity generation
- Industry
HEATING
• Direct electrical heating
• Boilers
• Pumps: air pumps/ heat pumps
• District heating

Thank you!

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