

The data centre boom in Finland and its grid implications

Workshop of the IRTF Research Group
“Sustainability and the Internet”

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Four topics

1. **Current status of data centres and the electric grid**
2. **Data centre growth**
3. **Energy production growth**
4. **Putting it together**

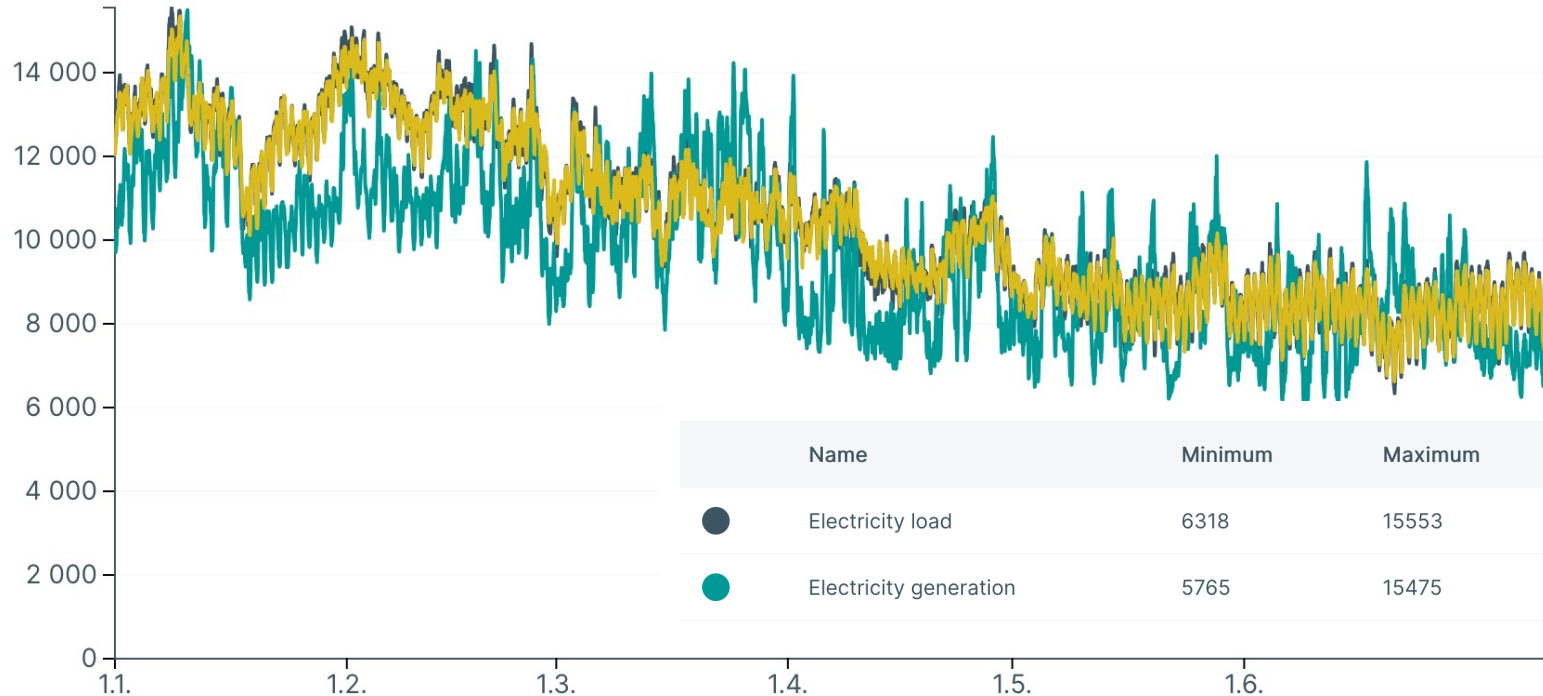
Just data, you make your own judgement

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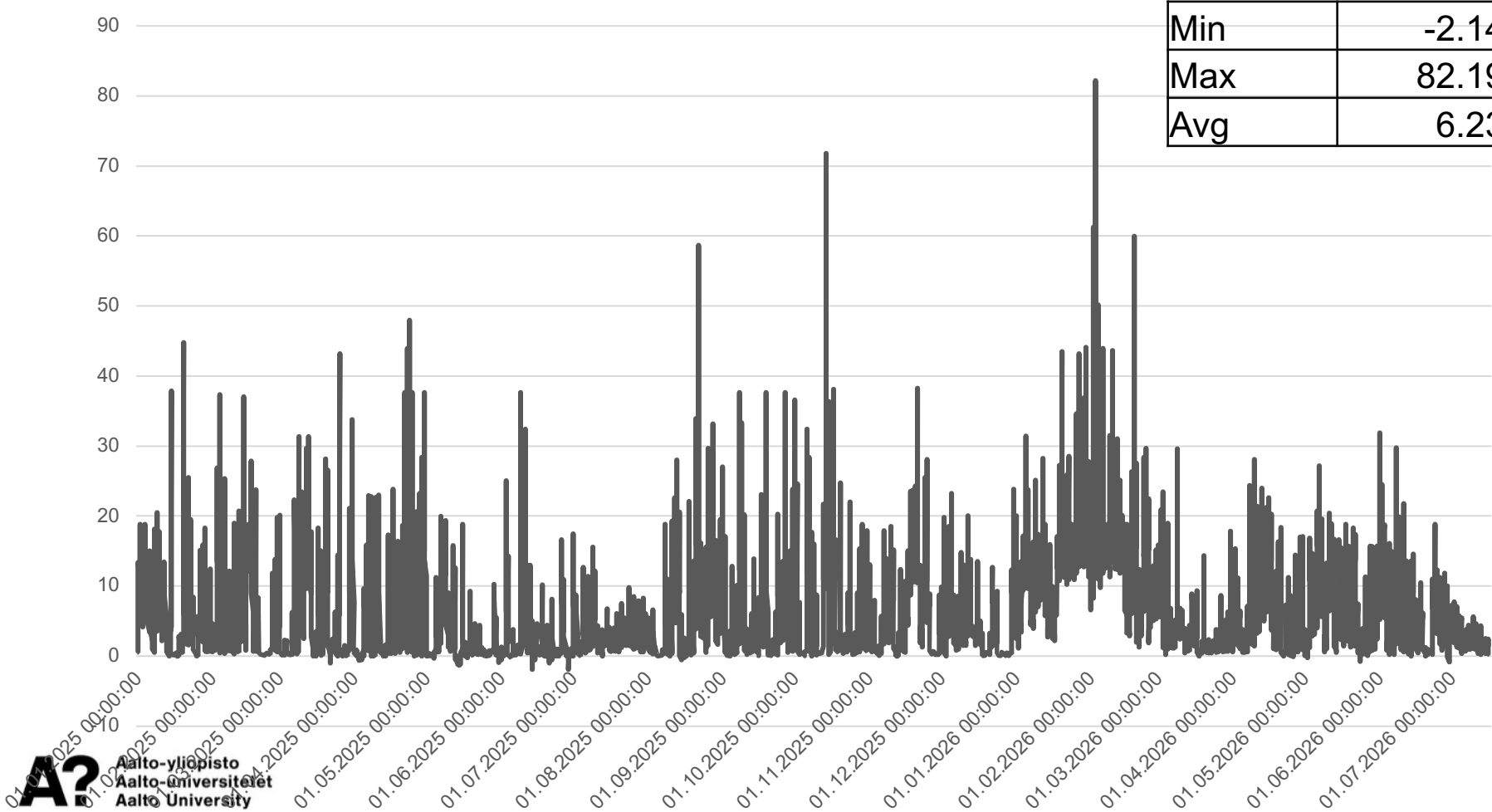
Consumption 2026

Voit tarkastella arvoja tarkemmin rullaamalla hiirtä kuvaajan päällä

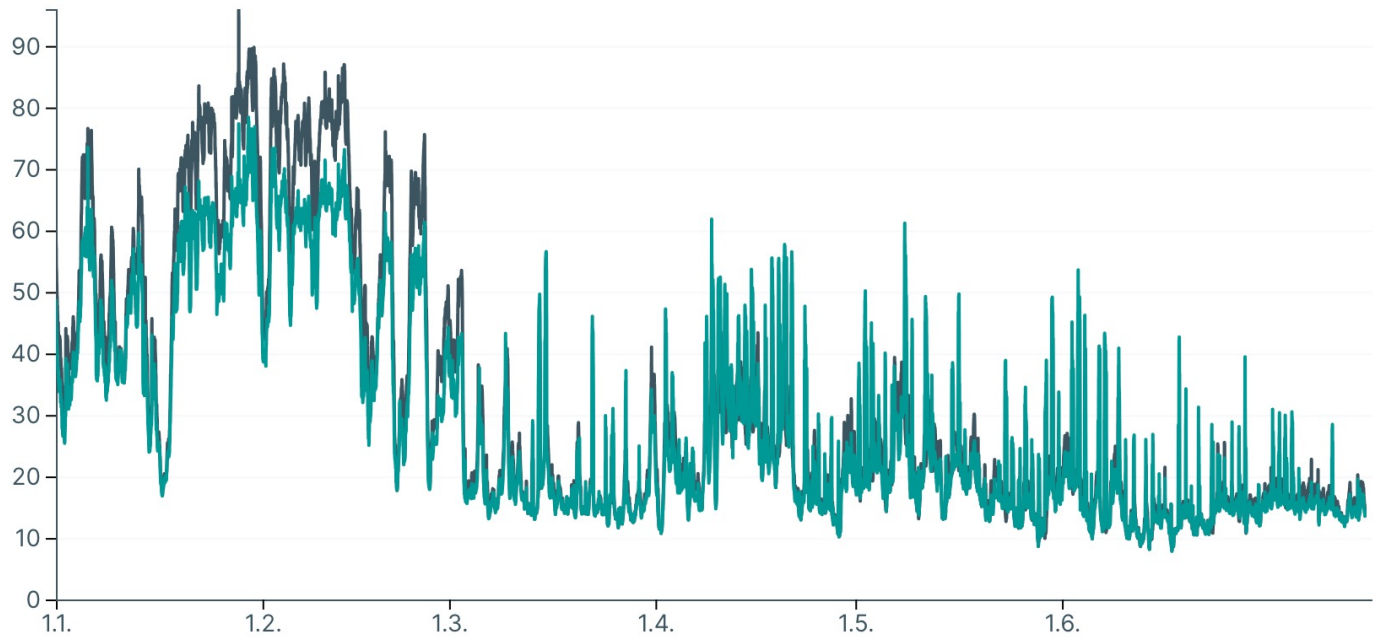


Price cnt/kWh 2025-2026 (+taxes)

Min	-2.14
Max	82.19
Avg	6.23

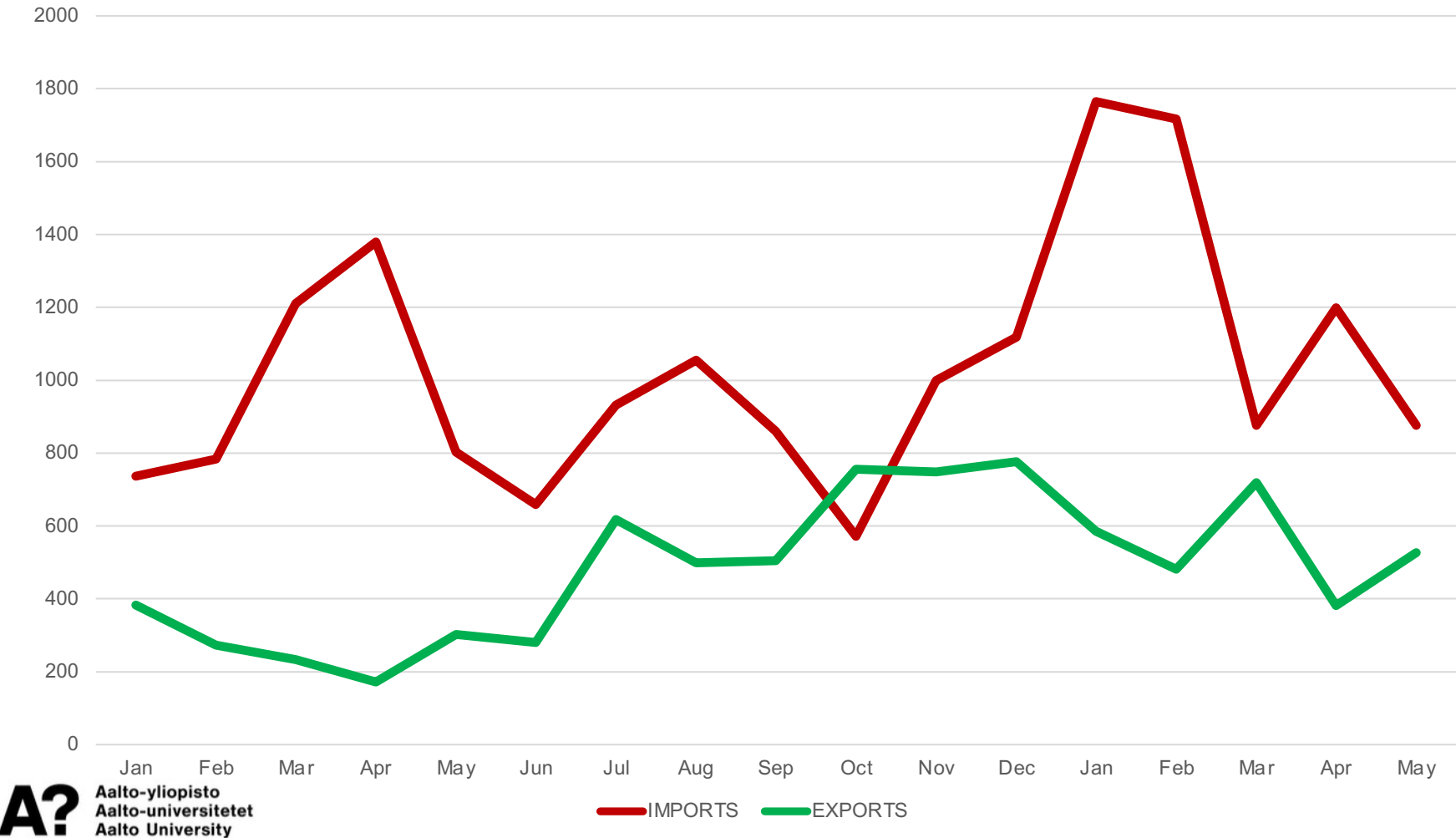


Emissions 2026

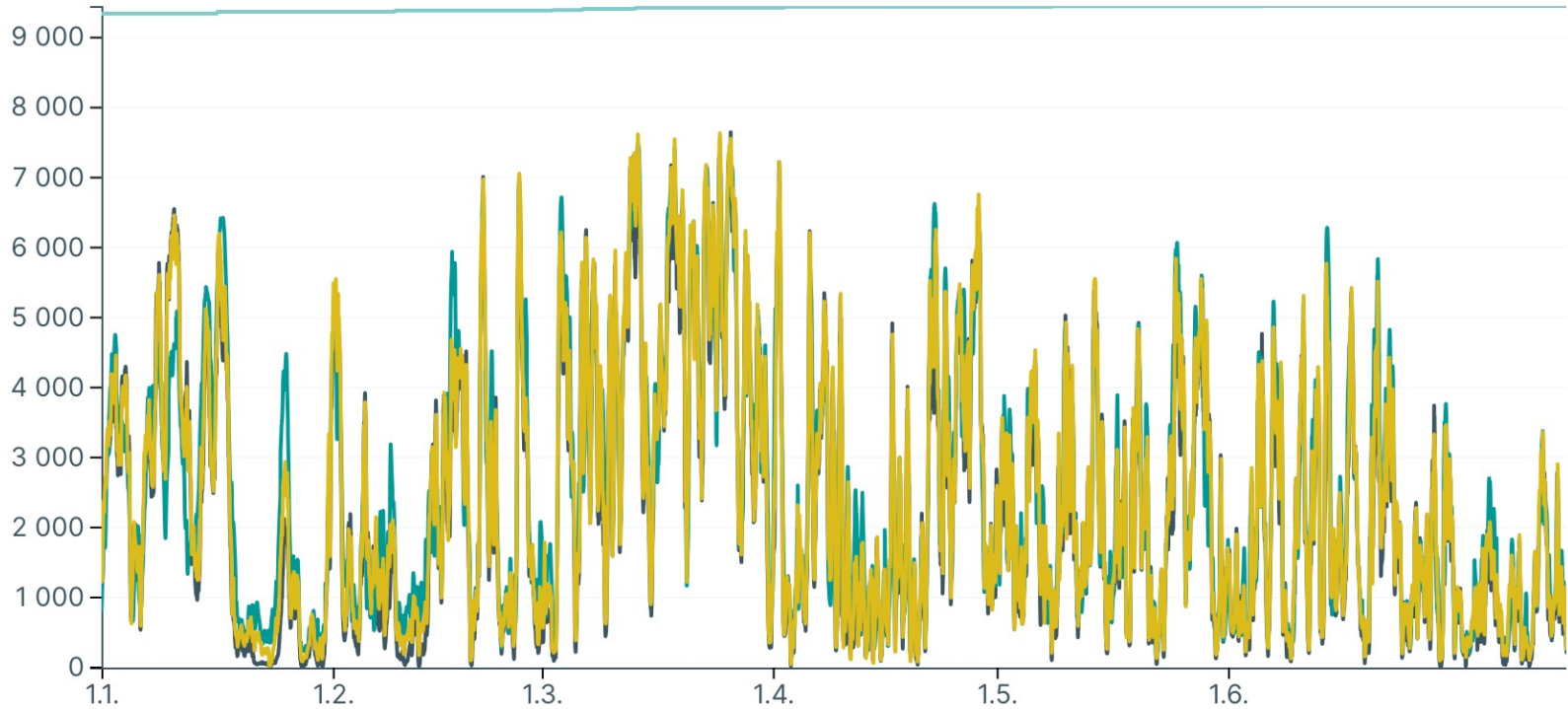


Name		Minimum	Maximum	Average
	Emission factor of electricity production in Finland	8	96	31 gCO2/kWh
	Emission factor for electricity consumed in Finland	8	78	29 gCO2/kWh

Electricity import export 2025-2026 (GWh)



Wind power production 2026



Min: -14MWh
Avg: 2241MWh (24%)

Max: 7635MWh
Installed: 9405 MWh

Current data center capacity

285 MW

(out of which Google is 50%)

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Data centre investments in Finland

Data from 15.6.2026

A"

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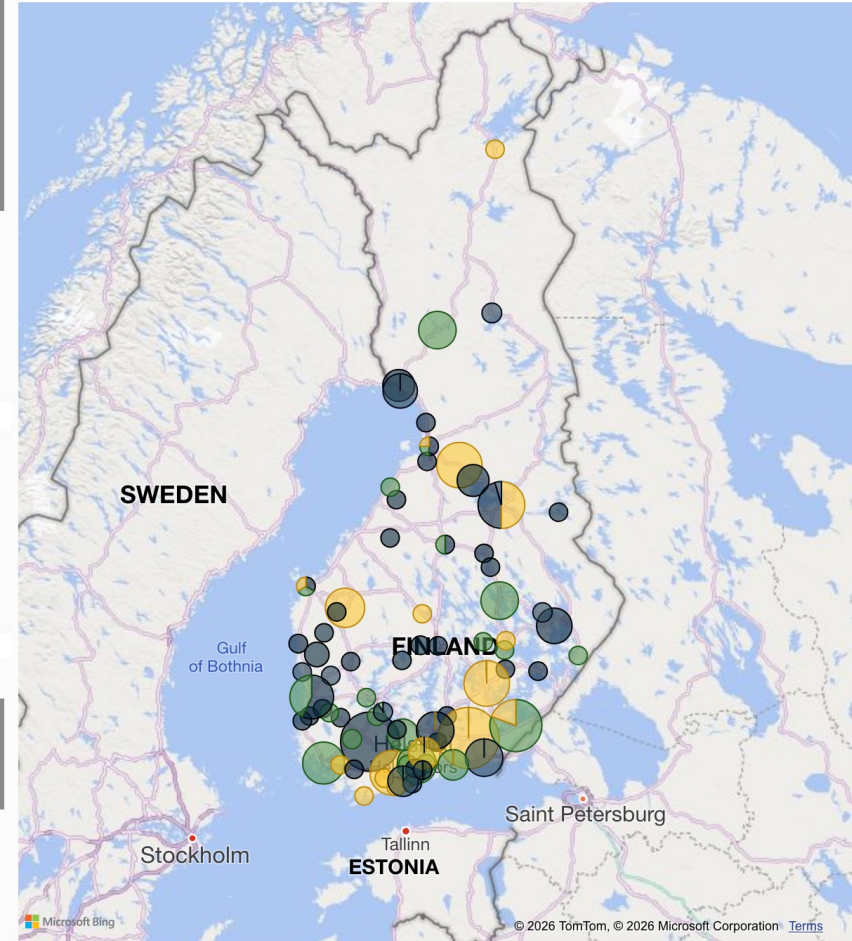
- Theme
- ☐ Batteries
 - ☐ Biochar
 - ☐ Bioenergy
 - ☐ Biogas
 - ☐ Bioproducts
 - ☐ Biorefinery
 - ☐ Carbon capture and processi...
 - ☐ Circular economy
 - ☒ Data center
 - ☐ Electric mobility
 - ☐ Electricity storage
 - ☐ Heat pumps
 - ☐ Heat storage
 - ☐ Heating
 - ☐ Hydrogen
 - ☐ Hydropower
 - ☐ Logistics terminals
 - ☐ Metals

- Phase
- ☒ 0. Feasibility study
 - ☒ 1. Planning
 - ☒ 2. Investment decision
 - ☒ 3. Start of operations
 - ☐ 5. Discontinued

- County
- ☐ Select all
 - ☐ Åland
 - ☐ Central Finland
 - ☐ Central Ostrobothnia
 - ☐ Kainuu
 - ☐ Kanta-Häme
 - ☐ Kymenlaakso
 - ☐ Lapland
 - ☐ North Karelia

Investments by municipalities

Phase ● 0. Feasibility study ● 1. Planning ● 2. Investment decision ● 3. Start of operati...



Statistics of projects

- Total planned: 7777 MW
 - Investment decision done or start of operations known (by the end of 2027): 2446 MW
 - Planning (by end of 2029): 3310 MW
 - Feasibility study: 2020MW
-
- Vs 10000MW all current consumption
 - $7777 / 285 = 27x$ increase 😊 or ☹️

Data centres vs electric cars

- Biggest data center project planned currently: 560MW
- $560\text{MW} \times 24 \times 365 = 4905600 \text{ MWh}$
- Electric car: $20 \text{ kWh}/100\text{km} = 3\text{MWh}/\text{y}$ (if driven 15'000km/y)
- $4905600 / 3 = 1'635'200$ electric cars worth of consumption

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Prediction of electricity production

Projected development of electricity production (TWh)

FINGRID

Fingrid estimate, September 2025.

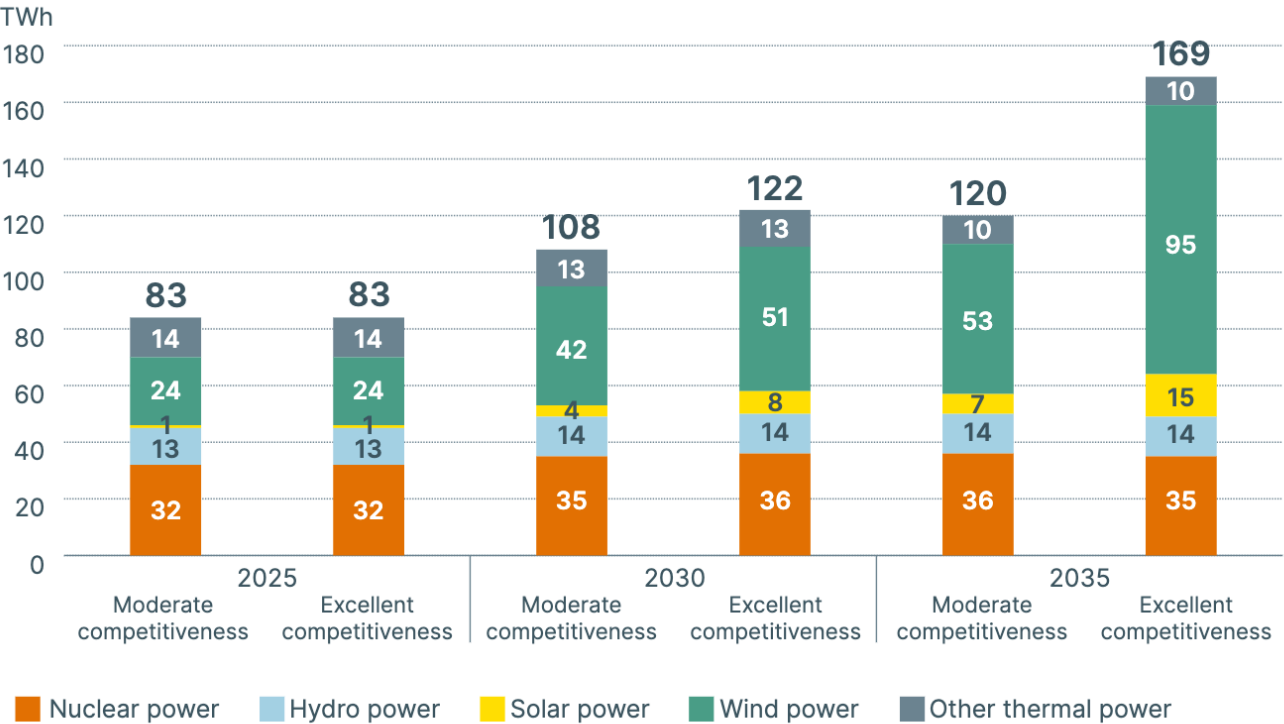


FIGURE 2 Forecasted development of electricity production in Finland from 2025 to 2035.

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One hyperscaler's view May 2026

Q: "Can you drop your consumption if the national power grid has challenges delivering enough electricity ?

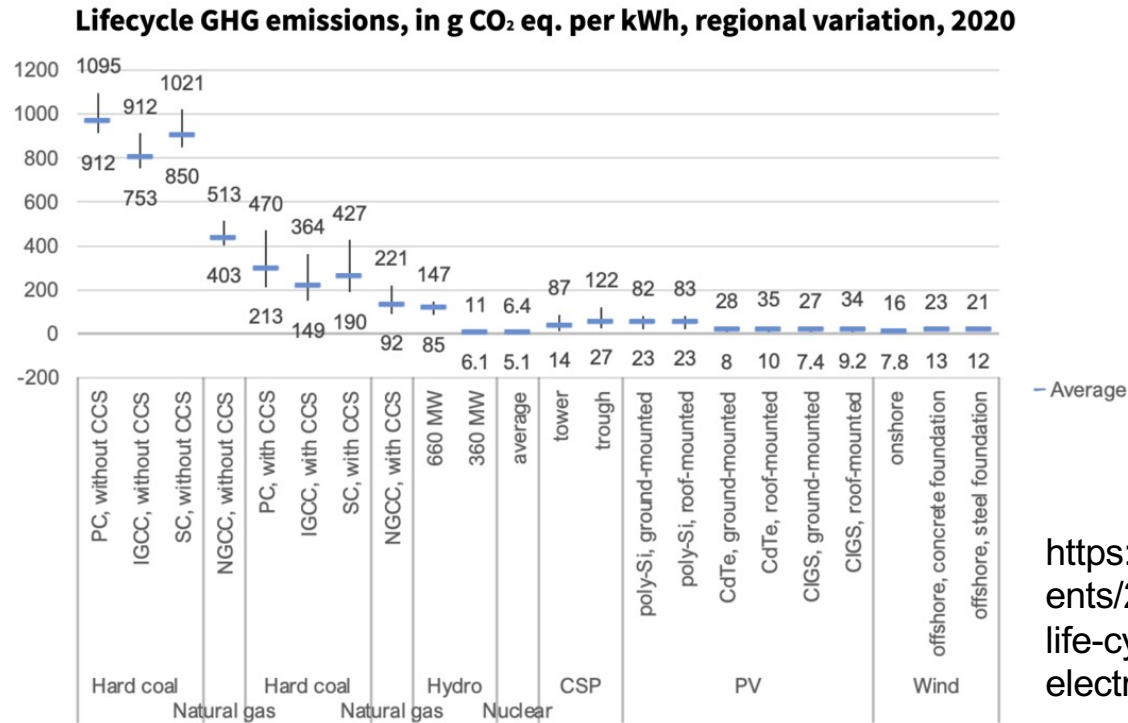
A: "We don't have the incentive to do that"

Summary

- **Finland relies on Sweden to provide the missing electricity**
 - And powers parts of Estonia
 - Transmission capacity fully used from Sweden (6-7y for a new one)
- **Consumption can grow 20-50% from DCs by the end of 2020's**
- **How quickly can production grow ?**
- **How do we cover the days with little-to-no wind ?**
 - Where is the regulating power production (gas) ?
- **Finnish Parliament is pushing data centres towards BYOP**
- **Mobile networks are power proportional, and some parts can be shut down based on low load and battery backup exists for some hours**
 - Can data centres do that, too ?

UNECE - Integrated Life-cycle Assessment of Electricity Sources

Figure 1 Lifecycle greenhouse gas emission ranges for the assessed technologies



<https://unece.org/documents/2022/08/integrated-life-cycle-assessment-electricity-sources>