Nuclear energy in Finland

12.8.2024

Finnish Energy

We represent Finnish energy

Personnel

45

Finnish Energy

14

Adato Energia Oy

The energy sector employs

about **40,000**

people

276

members

52

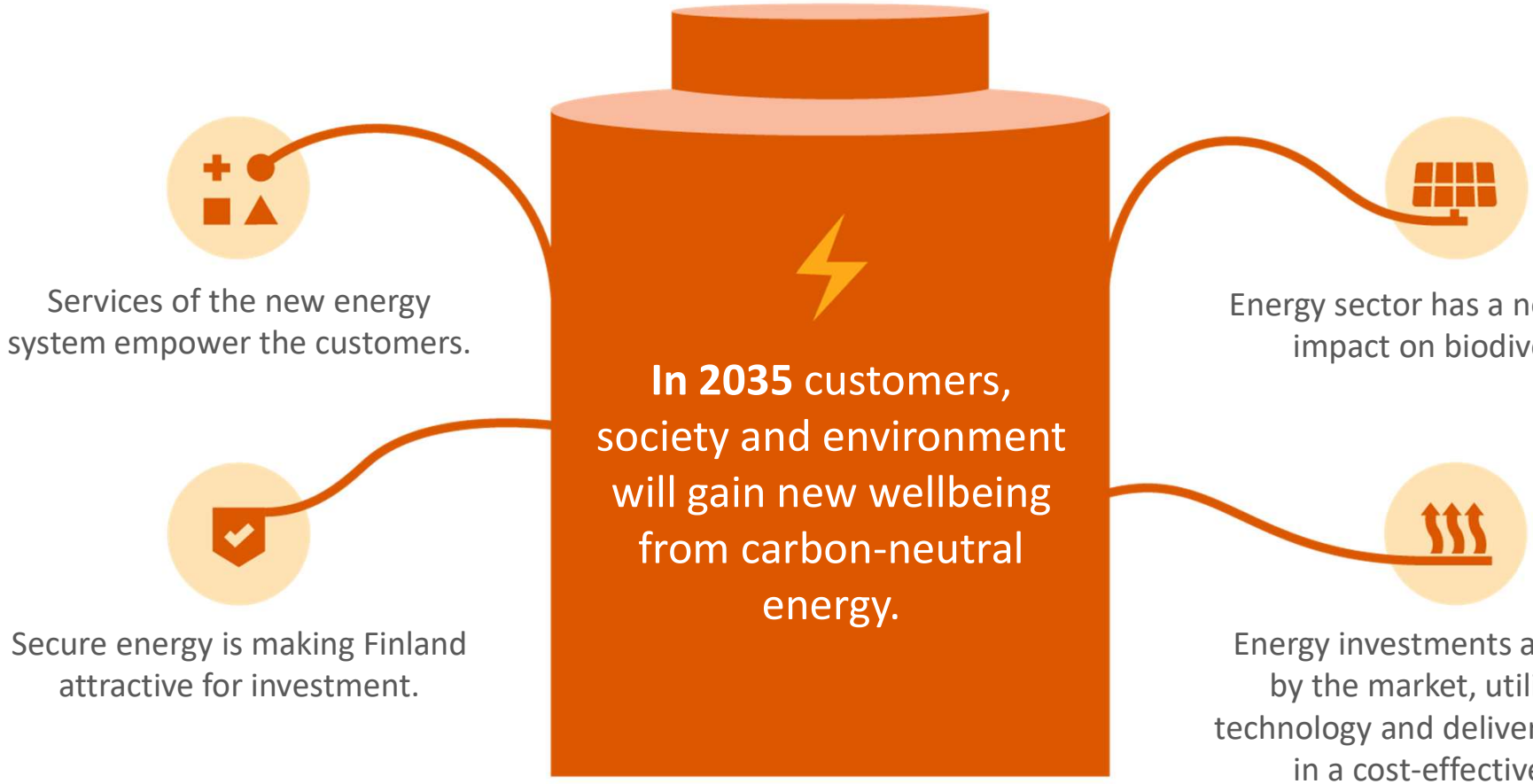
cooperation members

Over EUR **3.5** billion

in annual investments

about **40** %

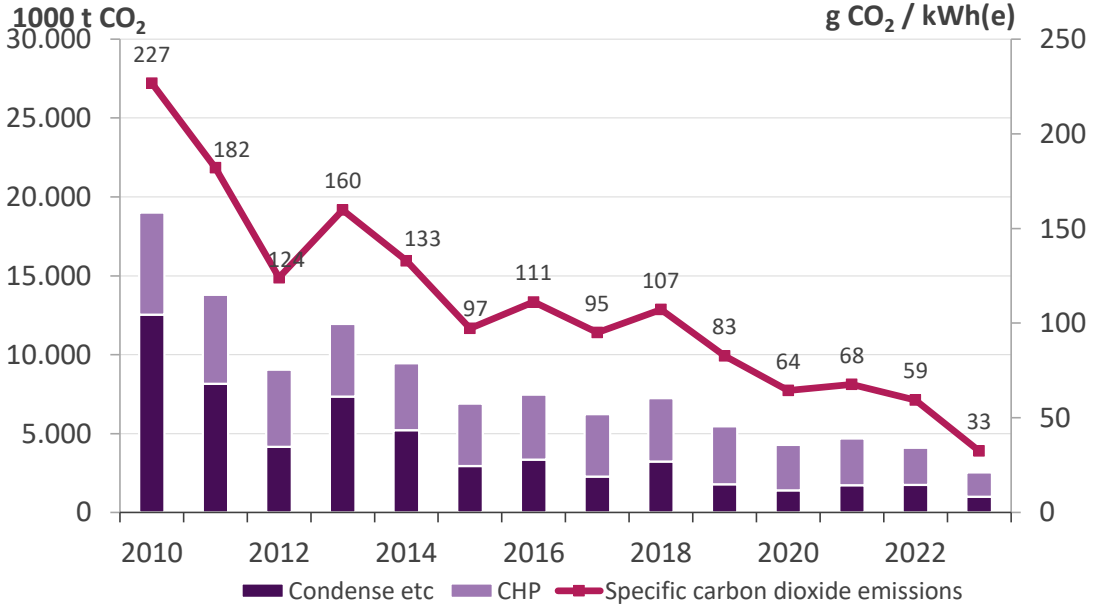
of all investments by industry

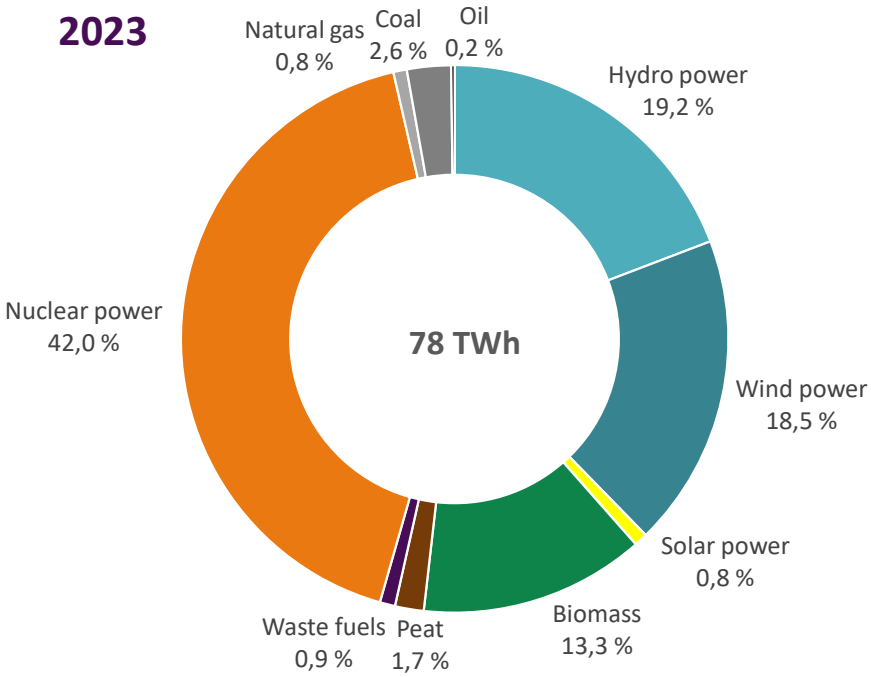


Together we will lead society towards a sustainable future.

Finland’s electricity system is already clean

The share of CO2-neutral electricity is already 94 %





Source: Finnish Energy

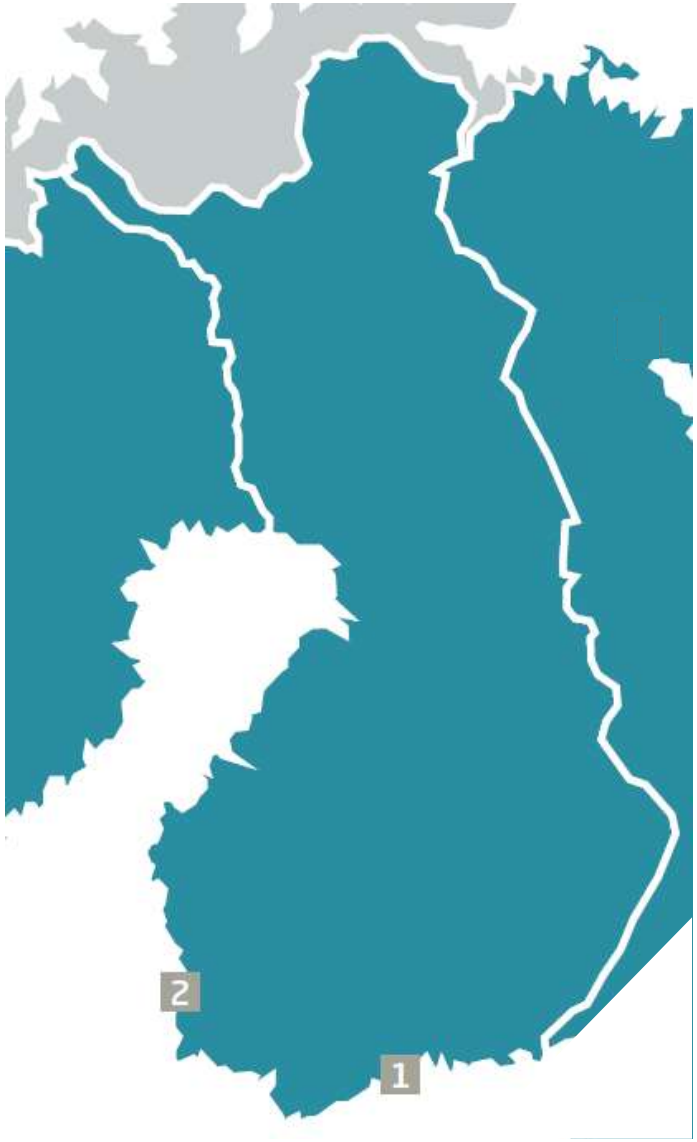
Nuclear power plants in Finland

1. **Loviisa, Fortum**

- Two VVER pressurized water reactors in Loviisa
- Loviisa 1 started electricity production in 1977 and Loviisa 2 in 1981.
- 507 MWe & 507 MWe

2. **Olkiluoto, TVO**

- Three reactors in Eurajoki
- Olkiluoto 1 and Olkiluoto 2 are boiling water reactors. Olkiluoto 3 is EPR, pressurized water reactor.
- Olkiluoto 1 started electricity production in 1978 and Olkiluoto 2 in 1980, Olkiluoto 3 in 2021.
- 890 MWe (Olkiluoto 1), 890 MWe (Olkiluoto 2) and 1600 MWe (Olkiluoto 3)



ROADMAP

TOWARDS CARBON-NEUTRAL ENERGY

New energy system

- Sector integration of energy
- Cooperation with the customer
- Enabling energy networks
- Developing expertise

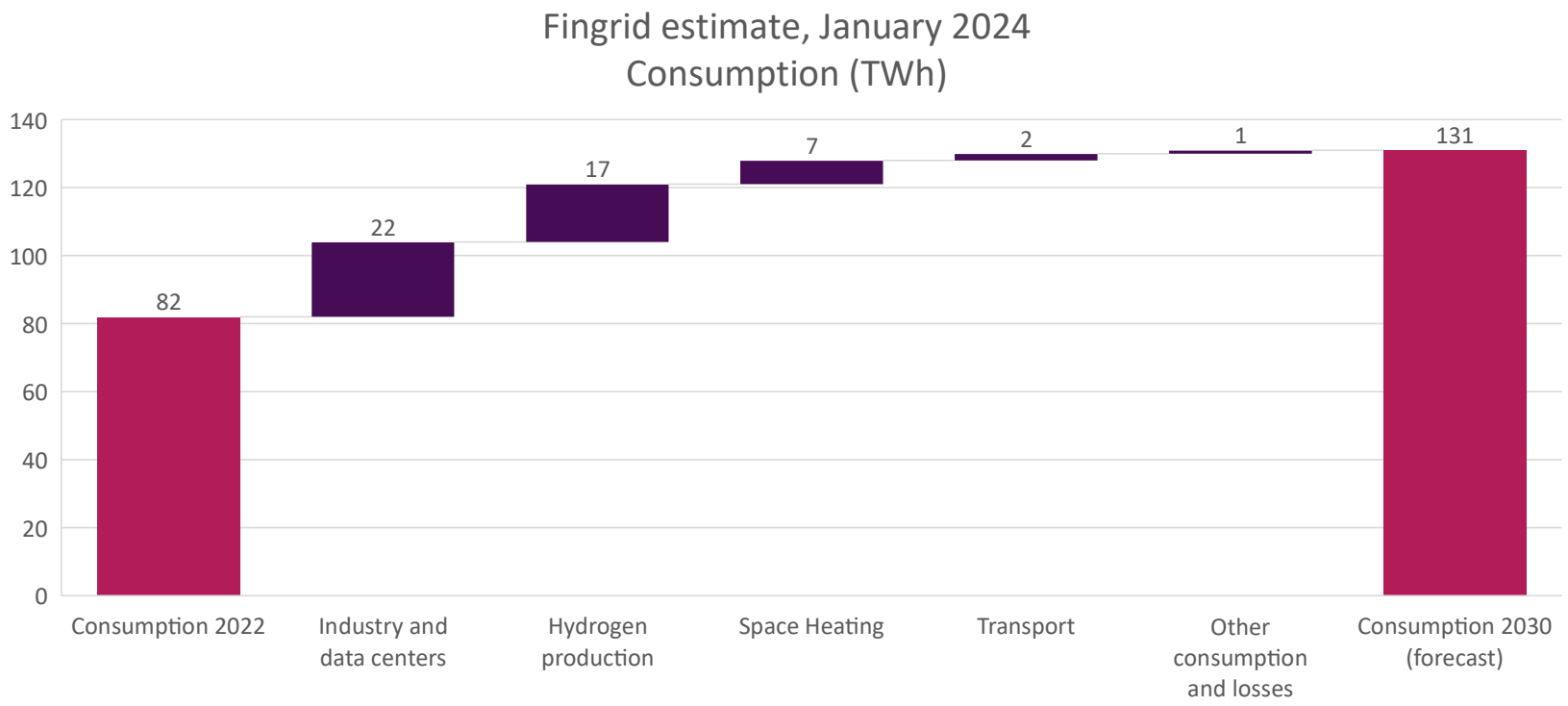
Cleaner energy

- Emission-free electricity
- Integrating district heat
- Facilitating circular economy
- Domestic bioeconomy
- Cleaner gas

Energy as a solution

- Electrifying industry
- Cleaner traffic
- Sustainable heating solutions

Growth drivers of electricity consumption in the 2020s



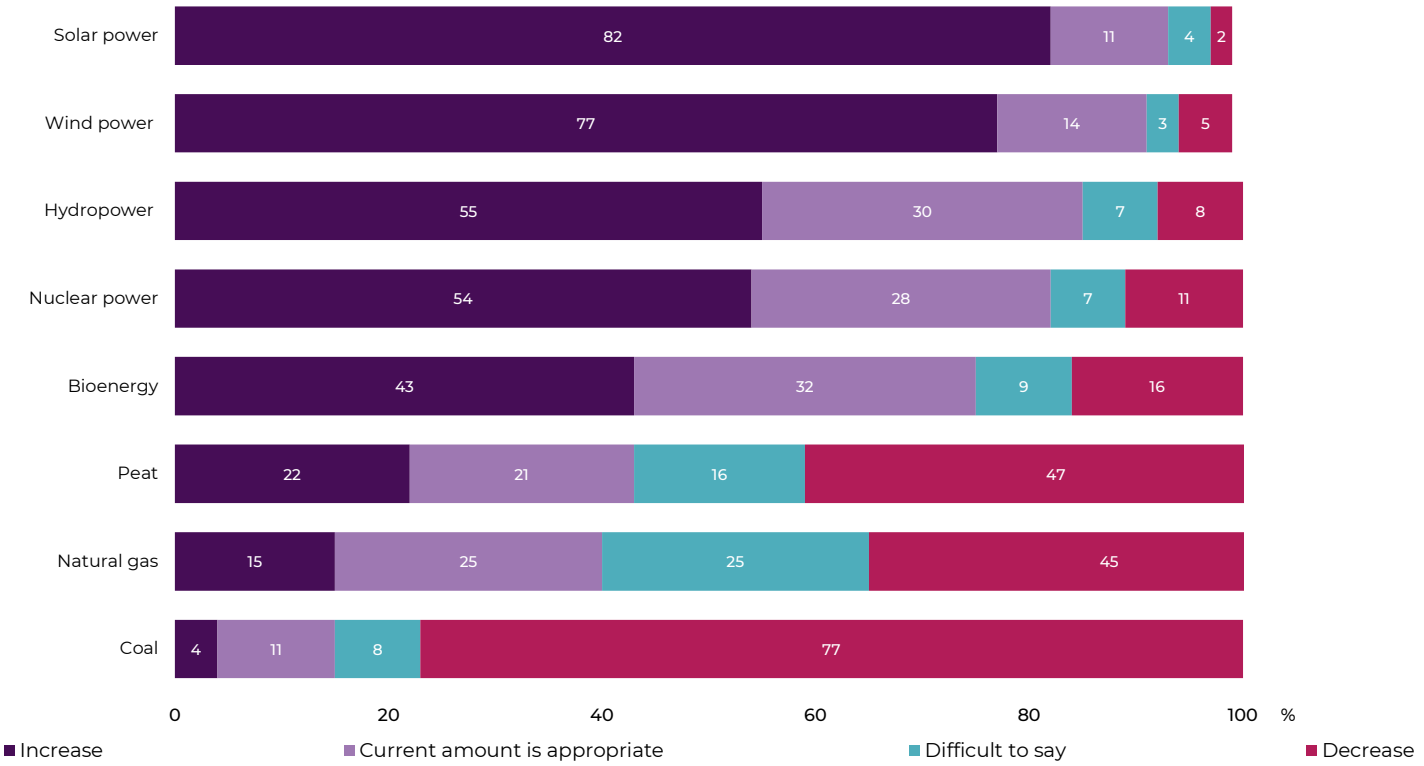
Finnish Energy

Source: Fingrid, Prospects for future electricity production and consumption

Finnish Energy opinion poll: Development of electricity production

”Which direction should our electricity generation be developed in regard to the following energy options?"

All respondents, n=1000



Source: Finnish Energy

Energiateollisuus

Many SMR concepts have FOAK estimates in the end of 2020s / beginning of 2030s

Company	Reactor capacity	Reactor type	First of a Kind (FOAK) estimate
UK SMR/Rolls Royce	1358 MWt/470 Mwe	Light water	2030
BWRX-300/GE Hitachi	870 MWt/300 MWe	Light water	2028
Nuward	2×540 MWt/2×170 MWe	Light water	2033
VOYGR/NuScale	4, 6 or 12×250 MWt/77 MWe	Light water	2029
Xe-100/X-Energy	200 MWt/80 MWe (x4)	Helium/Graphite	2027
MMR/USNC	15 MWt/5MWe (x2)	Helium/Graphite	2020s
Steady Energy LDR-50	50 MWth	Light water	2020s

Onkalo – final disposal of spent nuclear fuel to begin in Finland

- Finland is the first country in the world where the challenge of spent nuclear fuel disposal has been solved. Spent fuel will be disposed of in the bedrock at a depth of approximately 430 metres and isolated from the organic environment by multiple safety solutions called release barriers.
- The release barriers include the fuel's physical state, the disposal canister, the bentonite buffer, the backfilling of the tunnels and the stable, almost two billion years old bedrock. The barriers prevent the spent nuclear fuel from coming into contact with the organic environment or people under any circumstances. The failure of one barrier must not jeopardise the performance of the isolation. It must withstand any potential geological changes, such as future ice ages.

Government Programme of Finland

- Finland needs more nuclear power. With regard to permit applications for nuclear power plants, the Government pledges to accept all applications for decisions-in-principle that meet the necessary criteria, provided that the applicants' background is acceptable from the point of view of national security.
- The Government will promote financing solutions for nuclear power projects.
- The Government will reform the Nuclear Energy Act and the regulations. The reform will enable nuclear energy projects to run smoothly and support Finland's competitiveness as a target for investments. The reform will facilitate the construction of small modular reactors (SMRs).
- The Government will promote opportunities to build nuclear power plants near industrial plants so that waste heat and steam can be utilised.
- The Government will also promote the use of SMRs to produce district heating.
- The Government will promote the use of a type-approval procedure, in particular for licensing SMRs. At the EU level, Finland will play an active role in preparing regulation that promotes the deployment of type-approved SMRs.
- The Government will advocate for nuclear power at the EU level. Finland will advocate for a technology-neutral approach in the EU's 2040 climate package and will work to improve the favourable classification of nuclear power in EU regulation (including the taxonomy, fuel classifications and the definition of green hydrogen).

Source: https://valtioneuvosto.fi/en/governments/government-programme#/7/1

Finland is a forerunner in the energy sector

Finnish Energy