Current situation of renewable energy sector in Finland

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Photo Source: Jouko Parviainen

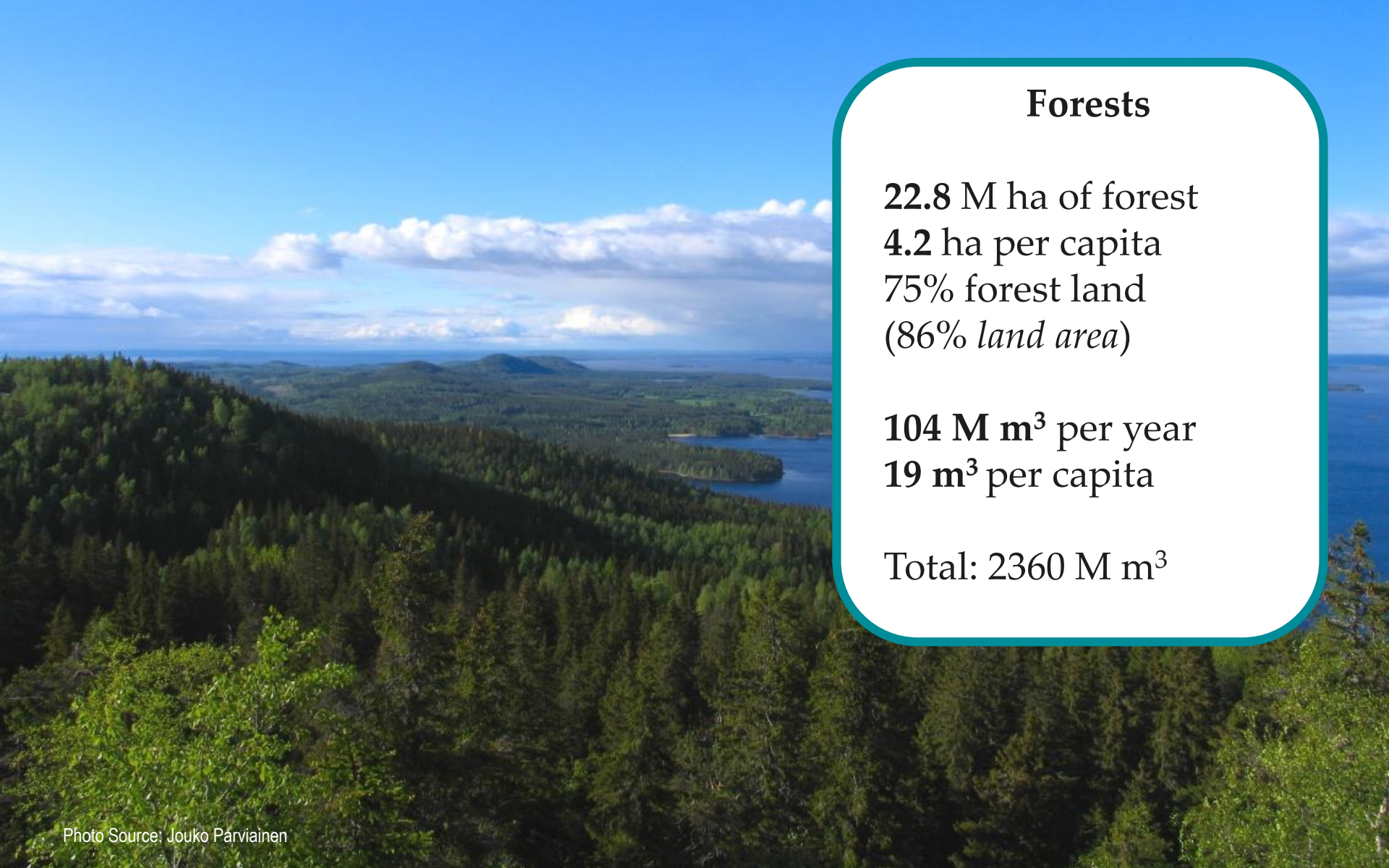


Photo Source: Jouko Parviainen

Forests

22.8 M ha of forest
4.2 ha per capita
75% forest land
(86% *land area*)

104 M m^3 per year
19 m^3 per capita

Total: 2360 M m^3

Photo Source: Jouko Parviainen

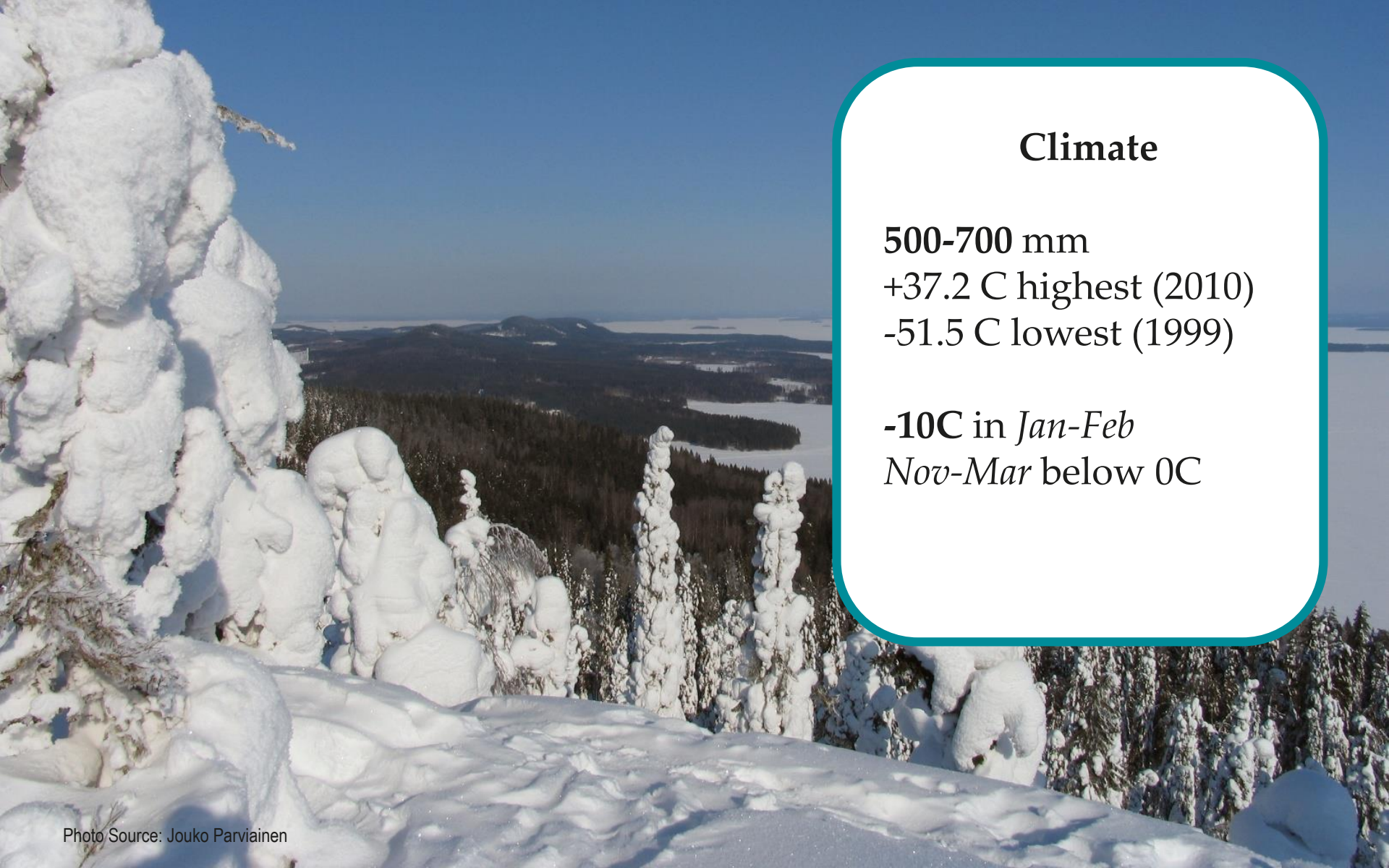


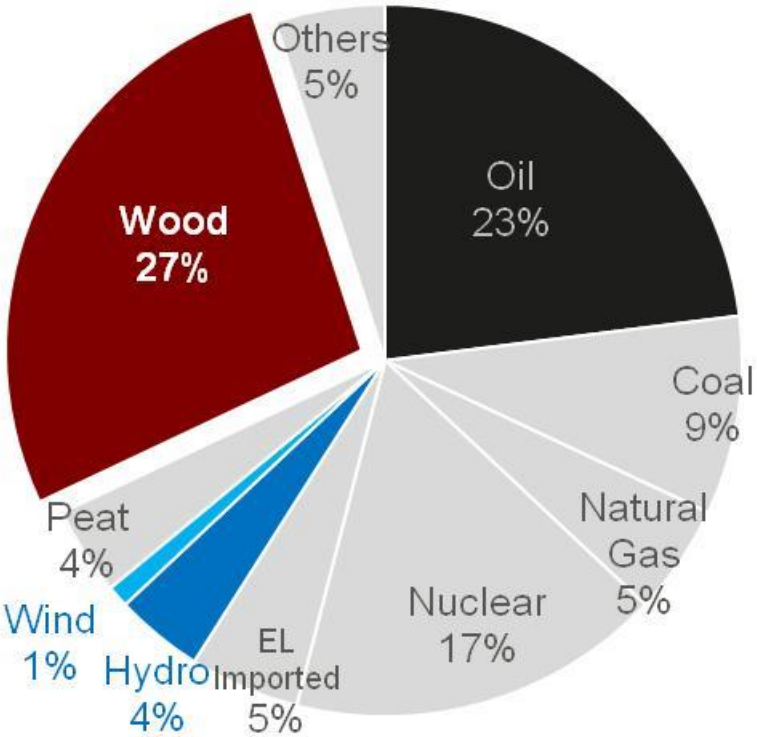
Photo Source: Jouko Parviainen

Climate

500-700 mm
+37.2 C highest (2010)
-51.5 C lowest (1999)

-10C in *Jan-Feb*
Nov-Mar below 0C

Energy consumption in Finland

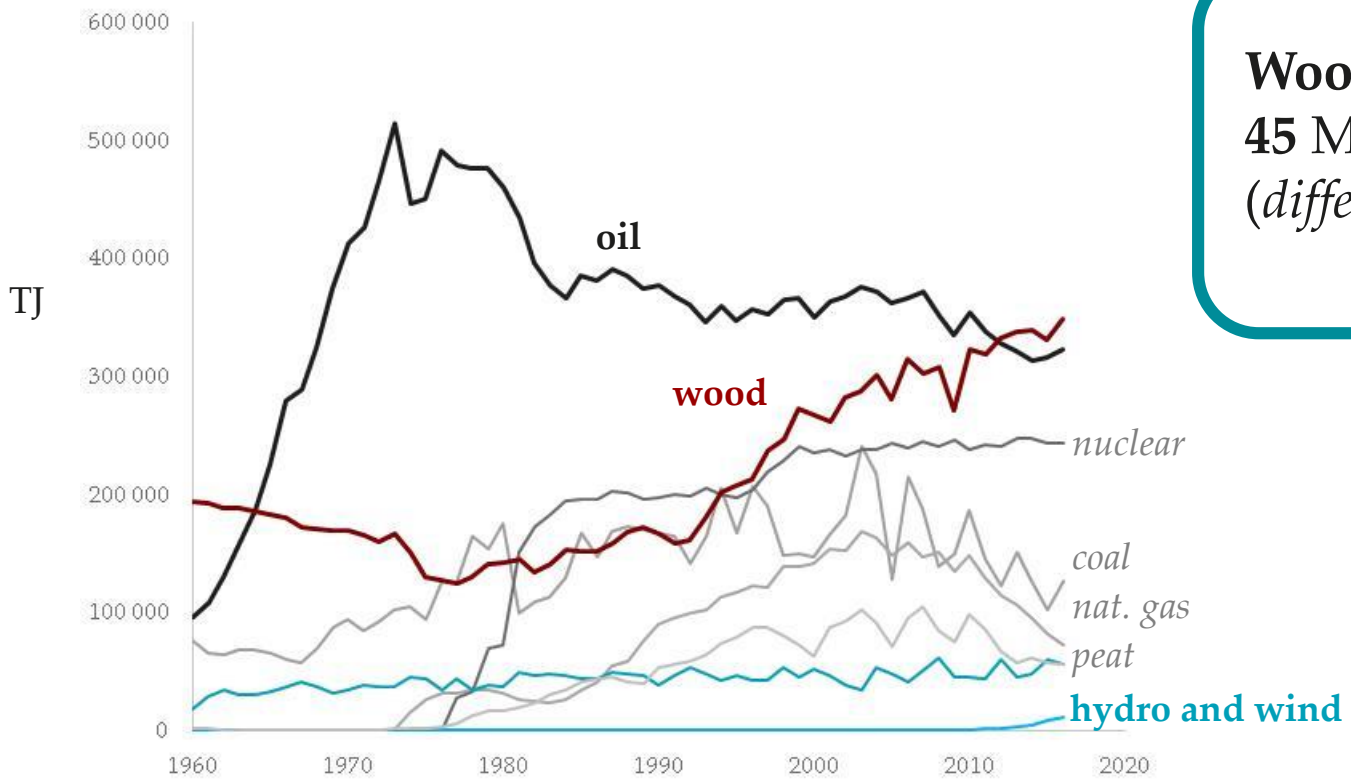


1.4 M TJ

Wood 0.35 M TJ
(*Hydro*)
(*Wind*)

Official Statistics of Finland (OSF): Energy supply and consumption [e-publication]. ISSN=1799-7976. Helsinki: Statistics Finland. http://www.stat.fi/til/ehk/index_en.html

Energy consumption in Finland



Wood
45 M m^3
(*different forms*)

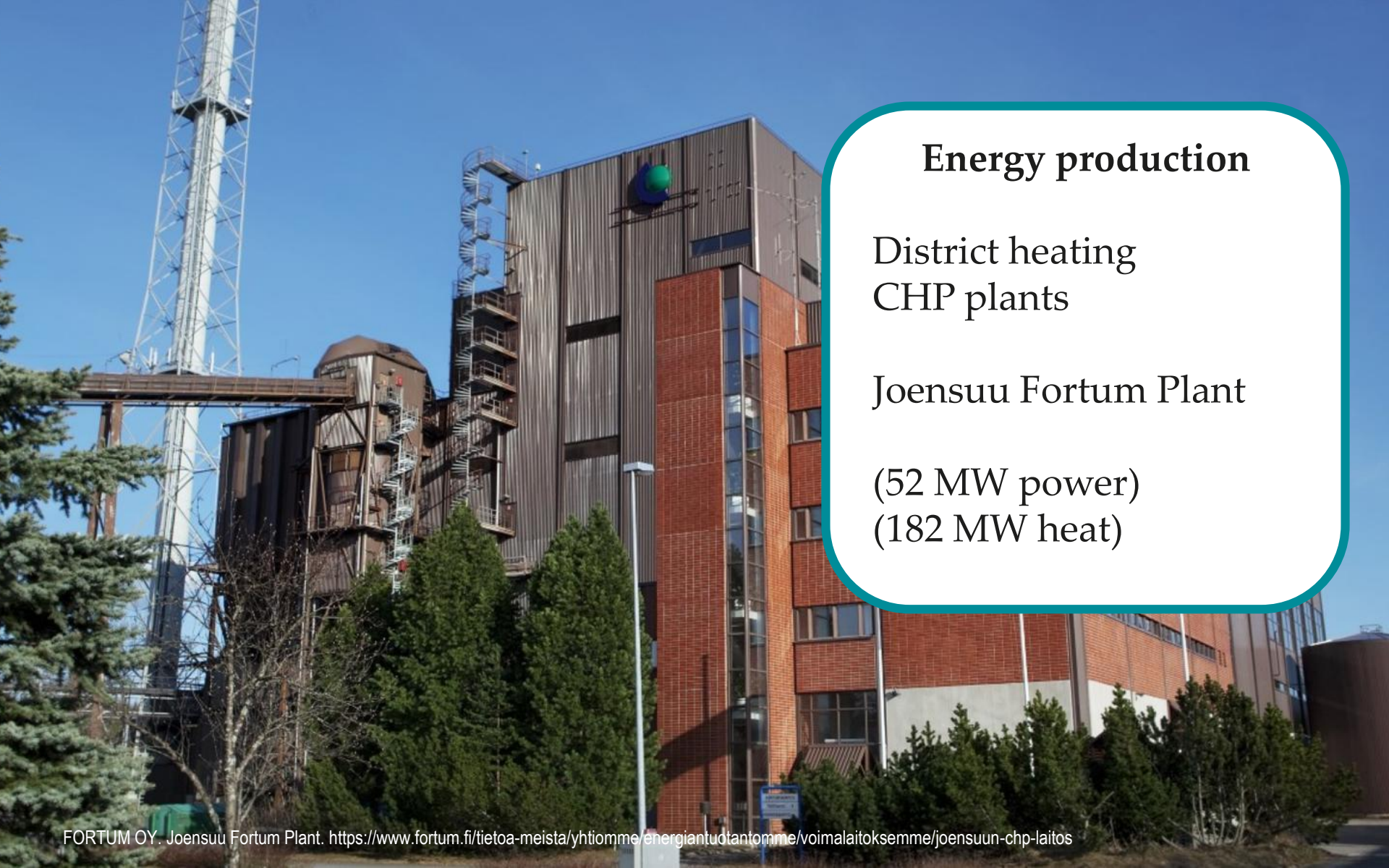
Official Statistics of Finland (OSF): Energy supply and consumption [e-publication]. ISSN=1799-7976. Helsinki: Statistics Finland. http://www.stat.fi/til/ehk/index_en.html

Wood biomass sources

Black liquor **21.1** M m^3
Bark 7 M m^3
Sawdust 2.1 M m^3
Other 1.1 M m^3

Pellets 0.6 M m^3

Chips **7.3** M m^3
Chopped wood **6 M** m^3



Energy production

District heating
CHP plants

Joensuu Fortum Plant

(52 MW power)
(182 MW heat)

FORTUM OY. Joensuu Fortum Plant. https://www.fortum.fi/tietoa-meista/yhtiomme/energiantuotantomme/voimalaitoksemme/joensuun-chp-laitos

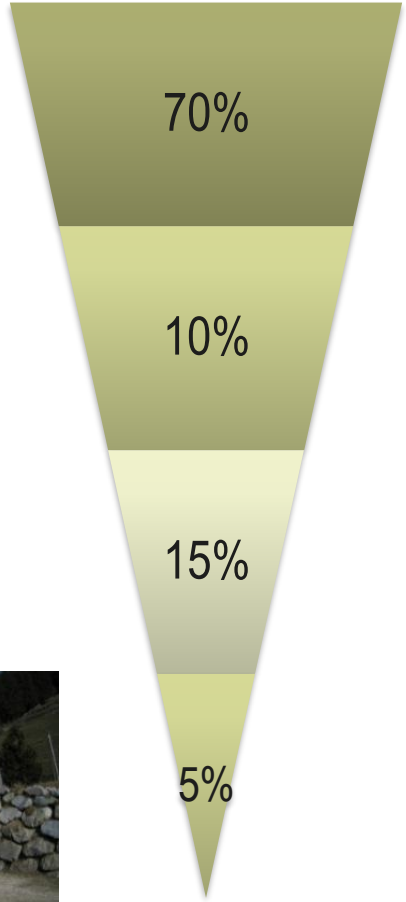
Heat production

Large scale
50 - 500 MW

Medium scale
1 - 50 MW

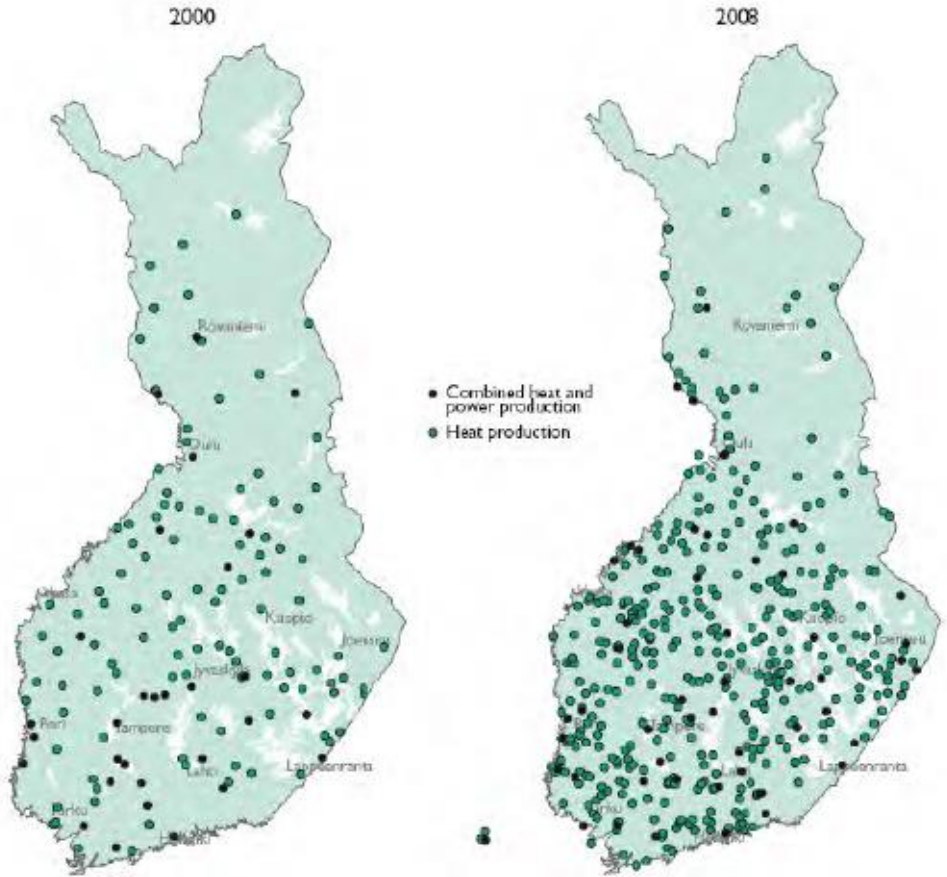
Domestic
5 - 20 kW

Small scale
5 - 20 kW



Data Source: Lauri Sikanen/Dominik Röser, LUKE

Heat production



Data Source: Lauri Sikanen/Dominik Röser, LUKE

Potentials – Logistics – Sustainable

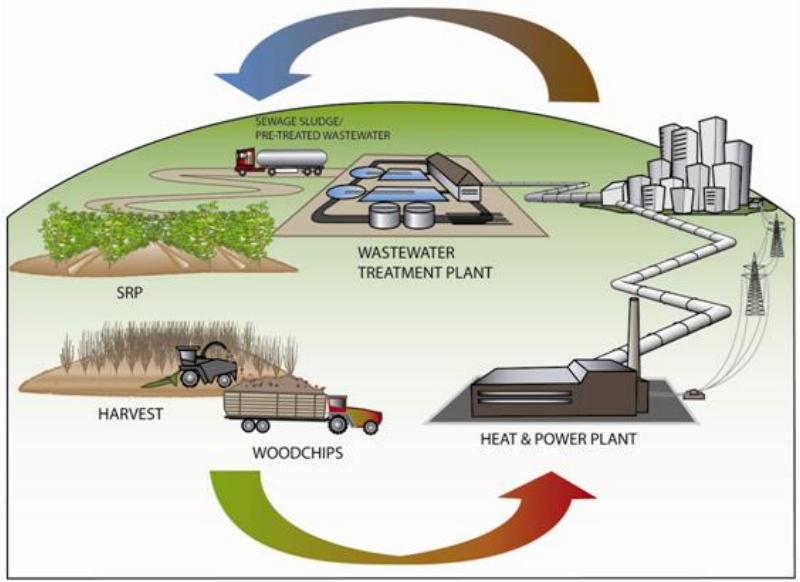
Research, expertise & know how
Available machinery
Adequate framework
Support schemes
Role of local initiatives

Wood biomass effectiveness

60% forest machinery in Europe: made in Finland

Photo Source: Jouko Parviainen

Combined multifunctional systems



The safe use of nutrient-rich residues of society (as municipal wastewater and sludge) to fertilise biomass plantations (willows and poplars) to produce energy

Source: Ioannis Dimitriou

Combined biomass Production

Wastewater plant
Bioenergy plant
Plantations

Source: Ioannis Dimitriou

Summary

Hydro *power has a limited potential for growth and* **wind** *power has not been developed to the full extent.* **Solar** *is limited.*

Wood fuels *are a established reality that generate remarkable business and local welfare.*

A consolidated energy industry *has expanded the number of stakeholders in the forest sector, and the forest industry is no longer a single player*

There are some issues, related to prices *(electricity) that causes challenge in the case of large investments (CHP-production)*

There is large expertise *in the development of wood supply for energy, making the availability reliable*

Future perspectives

Wind power *has a large unrealized potential that may be developed*

The production of **biofuels** *is increasingly promising and already a reality*

If the use of wood fuels continues increasing, new developements must be expected related to **production systems and logistics**

There is potential for **multifunctional** *systems that combine biomass production and other services related to water and soil, particularly in agriculture*

Larger plants will change the **competition** *of wood resources in the future*

Future increase of wood for traditional pulping and sawing increases wood energy production, but there are **risks** *too related to this*

Thanks!

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