

Renewable energy in Finland

Thailand PTT and media delegation

5.8.2019



Työ- ja elinkeinoministeriö
Arbets- och näringsministeriet

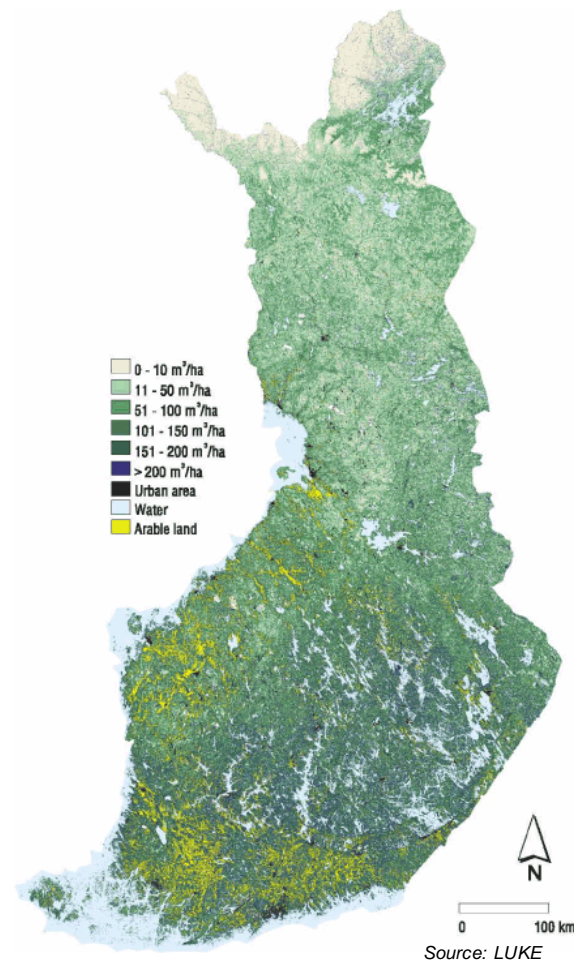
Agenda



- Energy and climate targets
- Renewable energy in Finland
- Renewable energy policies

Few facts about Finland

- Sparsely populated and long distances, long and cold winters, 72 % forest coverage
- Energy intensive (70 MWh/capita)
- Energy dependency below EU-28 (about 45 %) and decreasing
- Wood fuels are the most important energy source (27 %)





Energy and climate targets

EU 2020 targets for Finland

- renewable energy at least 38 % of final consumption
- emissions in non-emission trading sector to be reduced by 16 % from 2005 level
- indicative energy efficiency target, final consumption not more than 310 TWh

Government Programme of Prime Minister Juha Sipilä

By 2030:

- renewable energy to be increased to more than 50 per cent
- self-sufficiency in energy to be increased to more than 55 per cent
- use of fossil oil for the domestic needs will be cut by half
- coal no longer to be used in energy production
- share of renewable transport fuels increased to 30 per cent

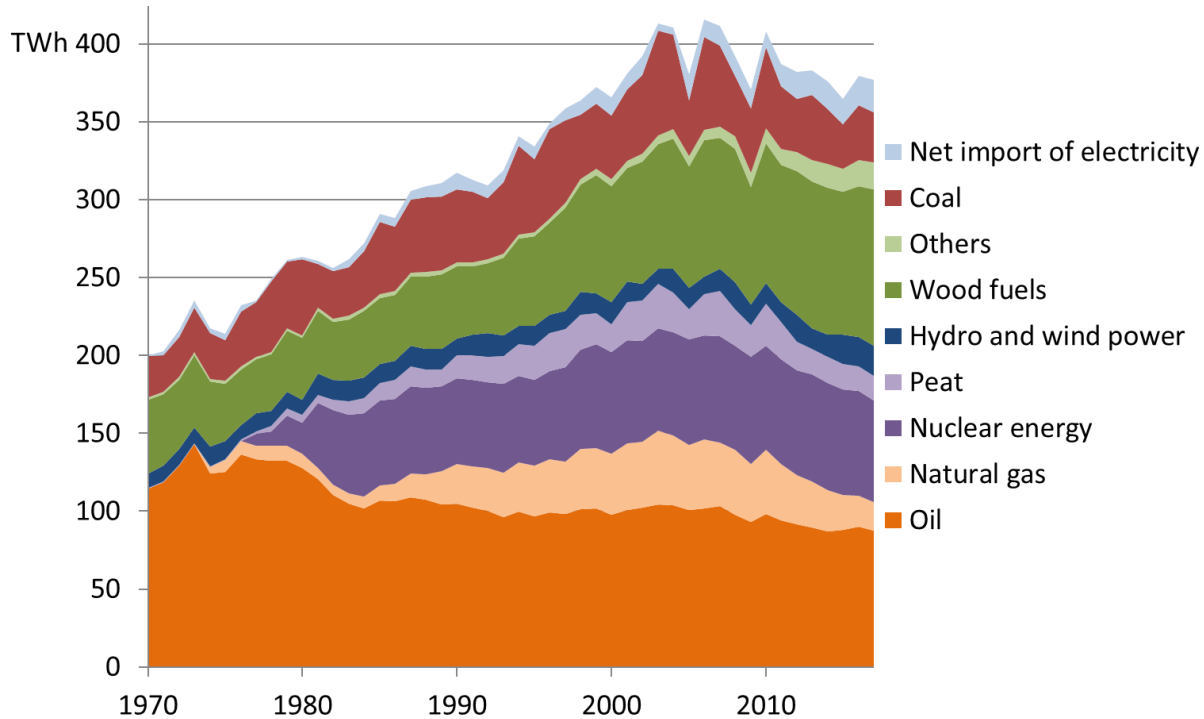
Energy and climate targets **NEW**



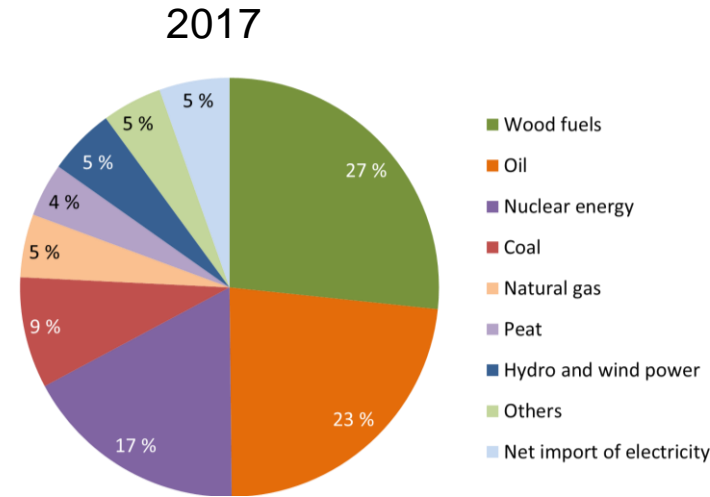
Government Programme of Prime Minister Antti Rinne (2019)

- **Carbon neutrality by 2035**
- **First fossil fuel free welfare country**
 - Power and heat production almost totally carbon free by the end of 2030's

Total energy consumption in Finland 1970–2017

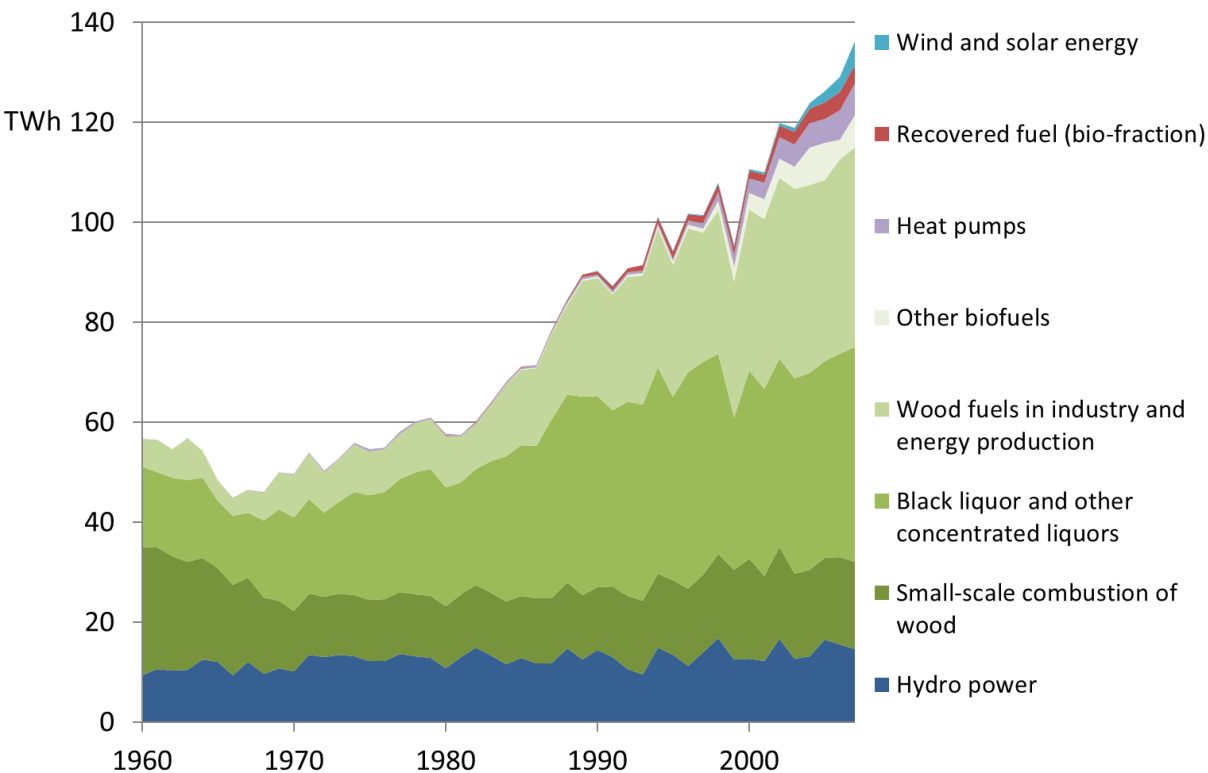


Source: Statistics Finland



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Renewable energy in Finland 1970 – 2017



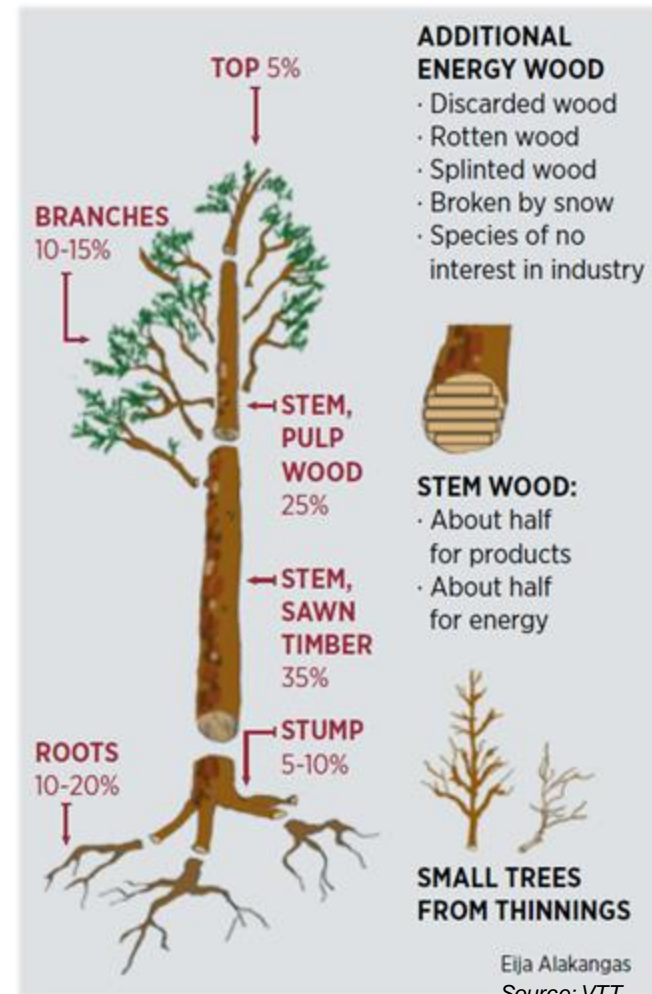
- 80 % of renewables are wood fuels
- Wood fuels > 100 TWh/a
 - Mostly used in forest industry

Source: Statistics Finland

Sustainable bioenergy

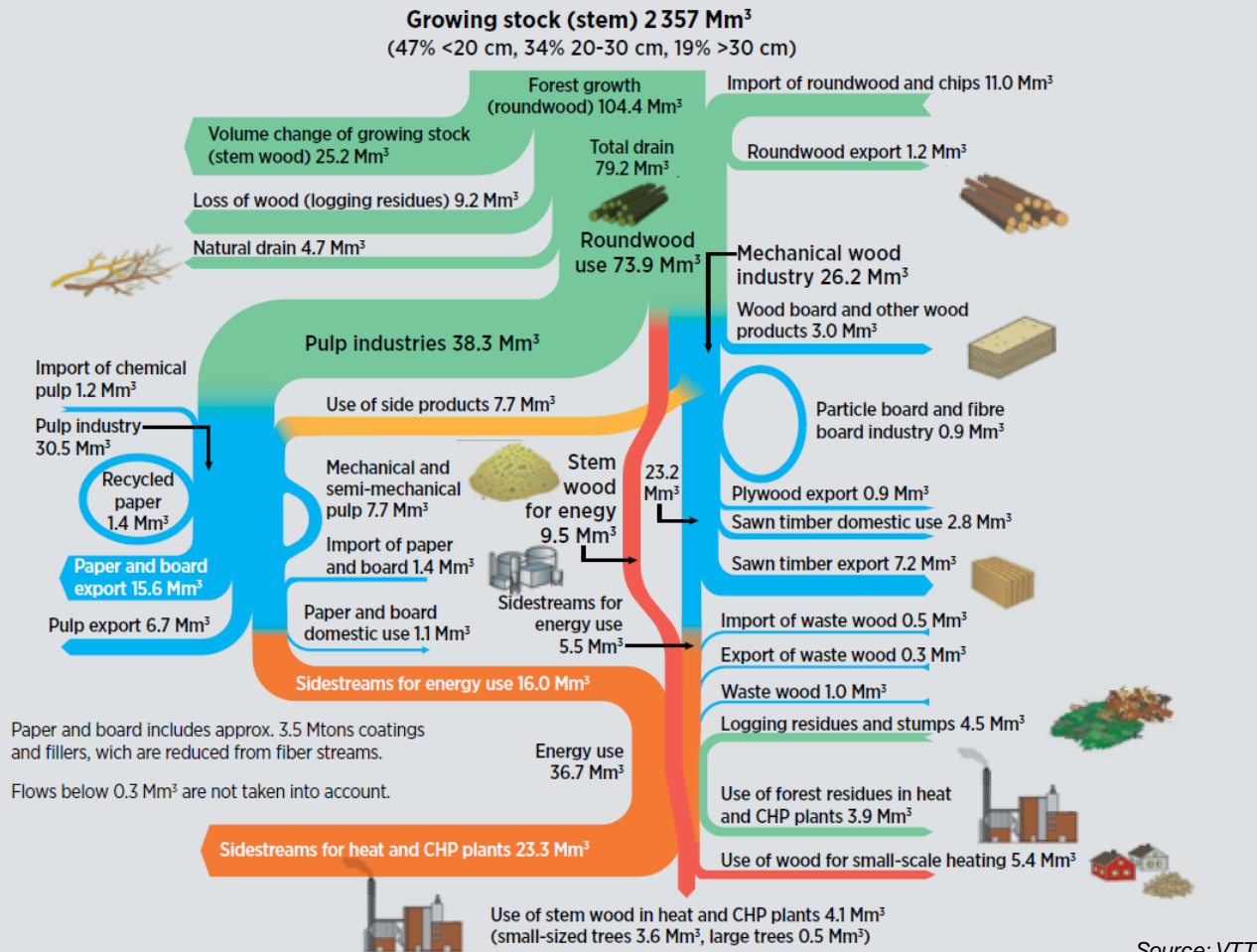
Harvesting of industrial roundwood and energy wood

- **Efficient and cost-effective supply chains**
- **~60 % of a typical tree is stemwood**
 - 35 % lumber production
 - 25 % pulp production
 - → rest to energy production or left to forest
- **Stemwood is much more valuable than energy wood**
 - Parts of wood that cannot be cost-efficiently processed to other products goes to energy production



Wood flows in Finland (2013)

- Roundwood
- Wood products
- Energy from sidestreams
- Energy from stem wood

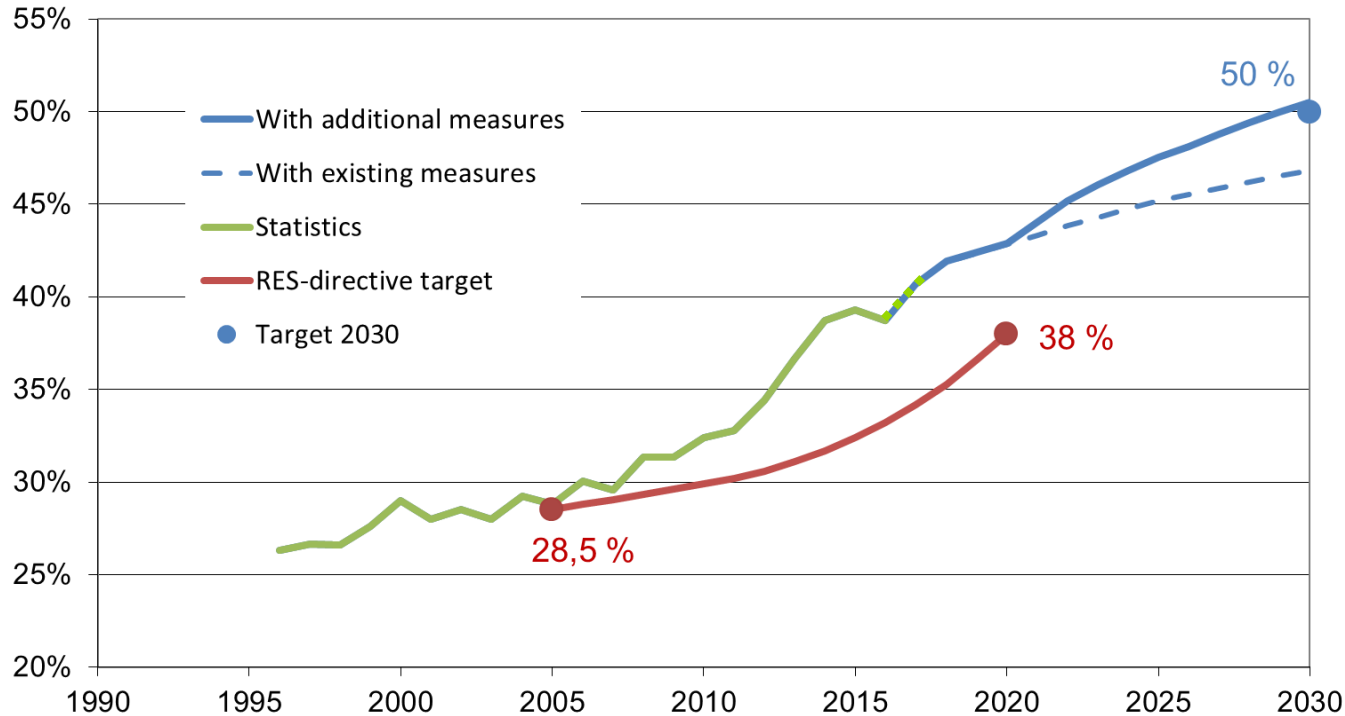


Source: VTT

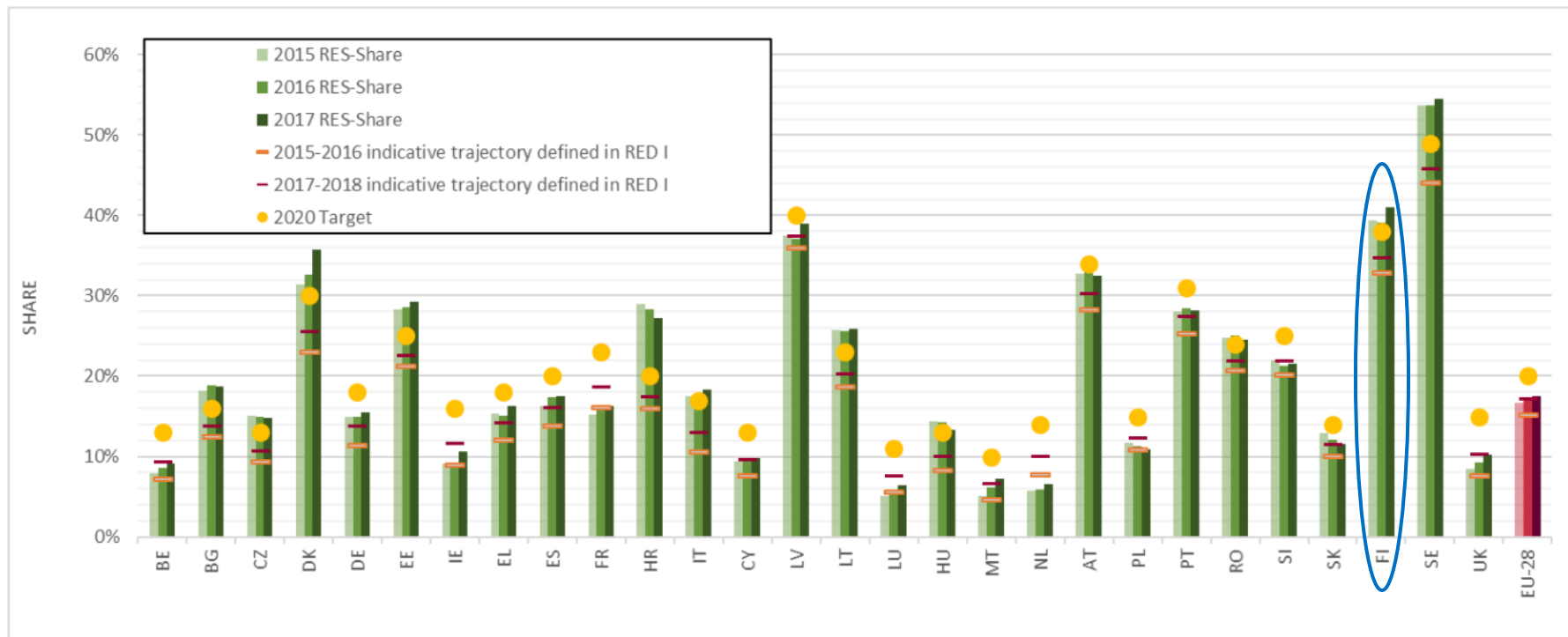


Share of renewable energy in Finland

Renewable energy, share of final consumption



EU's renewable energy targets 2020



Renewable energy in transportation



- **Finnish target for biofuels 20 % in 2020**
 - Double counting for advanced biofuels
 - Increased to 30 % by 2030 (no double counting)
- **Production capacity 535 ktoe (~6 TWh)**
 - Neste refinery in Porvoo (renewable diesel: vegetable oil, wastes, etc.)
 - UPM Kymmene refinery in Lappeenranta (renewable diesel: tall oil)
 - St1 small scale refineries (bioethanol: sawdust and wastes)
- **Extensive R&D in wood based biofuels**
- **In addition increasing biomethane capacity**
- **The amount of electric cars still low (~20 000, incl plug-in hybrids), but increasing**
 - Charging infrastructure increasing

Renewable energy policies (heat and power)



- **EU ETS**
- **Energy taxation** (for fossil fuels)
 - Based on energy content and CO₂ (except for peat)
- **Operating aid** for forest chips in CHP production
 - Fuel switch (coal, peat → forest chips)
 - Aid level depends on EU ETS price and level of peat tax
- **Feed-in premium scheme** for wind power, biogas and small scale CHP (*phased out*)
- New feed-in premium scheme (**auction**) for all renewable energy technologies
- **Investment aid** for small scale production and new energy technology projects
- Grants and soft loans for **R&D**



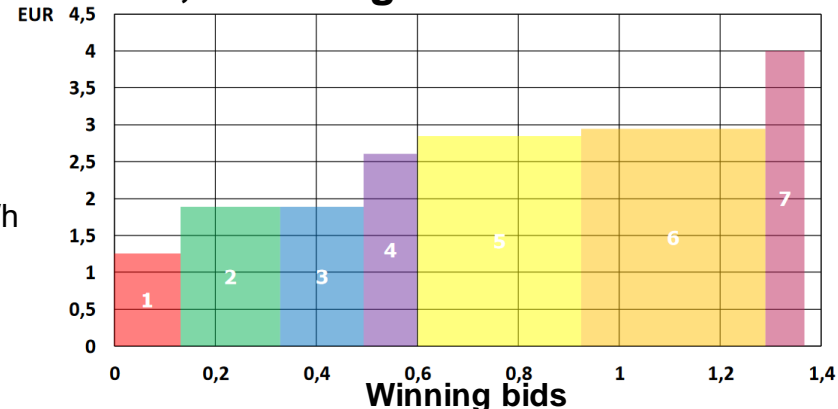
Auction scheme (feed-in premium)

• Renewable electricity

- Technology neutral
- Premium is paid up to 12 years
- Aid will not be paid, if market price of electricity > reference price (30 €/MWh) + premium
- Building guarantee and penalty for underproduction
- One auction round for 1,4 TWh/a worth of production

• Energy Authority held the auction in the end of 2018, awarding decisions in March 2019

- 26 bids (only wind power)
- 7 winning bids, in total of 1,36 TWh/a
- Average bid (premium) of winning bids 2,49 €/MWh
- Lowest bid 1,27 €/MWh and highest winning bid 3,97 €/MWh





Policy instruments in transport

• Fuel taxation

- Taxes for all fuels in transport
- Based on energy content and CO₂
 - Lower taxes for biofuels

• Quota system

- Distribution obligation for transport biofuels
 - 20 % by 2020 (incl. double counting)
 - 30 % by 2030

• Investment aid

- New technology biorefineries
- Biogas installations producing biomethane from waste and residues
- Alternative fuels infrastructure (biogas filling stations and electric car charging)

• Purchase subsidy for electric cars (2 000 €) and conversion subsidy (gas and flexifuel)

