

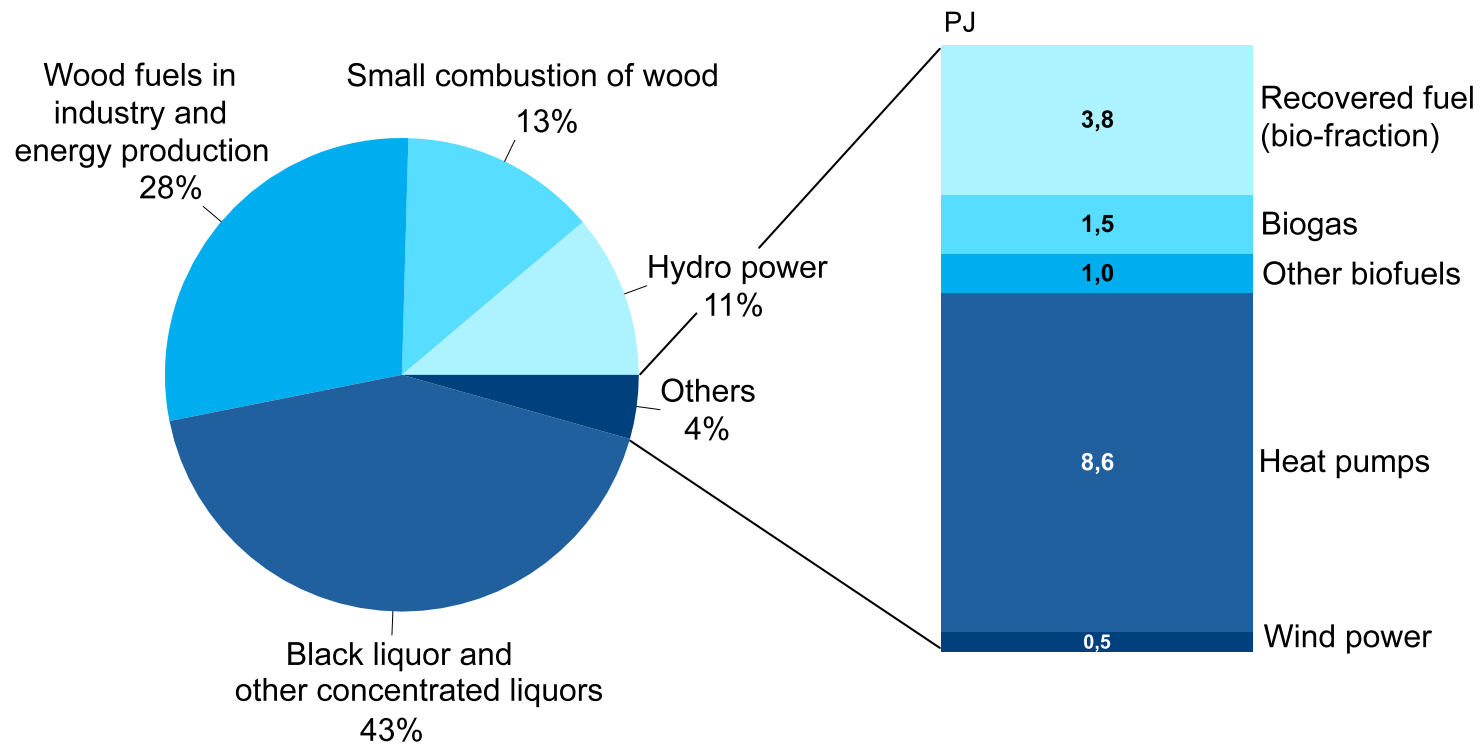
Promotion of Renewable Energy in Finland

Lithuanian delegation visit to Finland

Head of Renewable Energy Division, Petteri Kuuva



Consumption of Renewable Energy Sources 2006



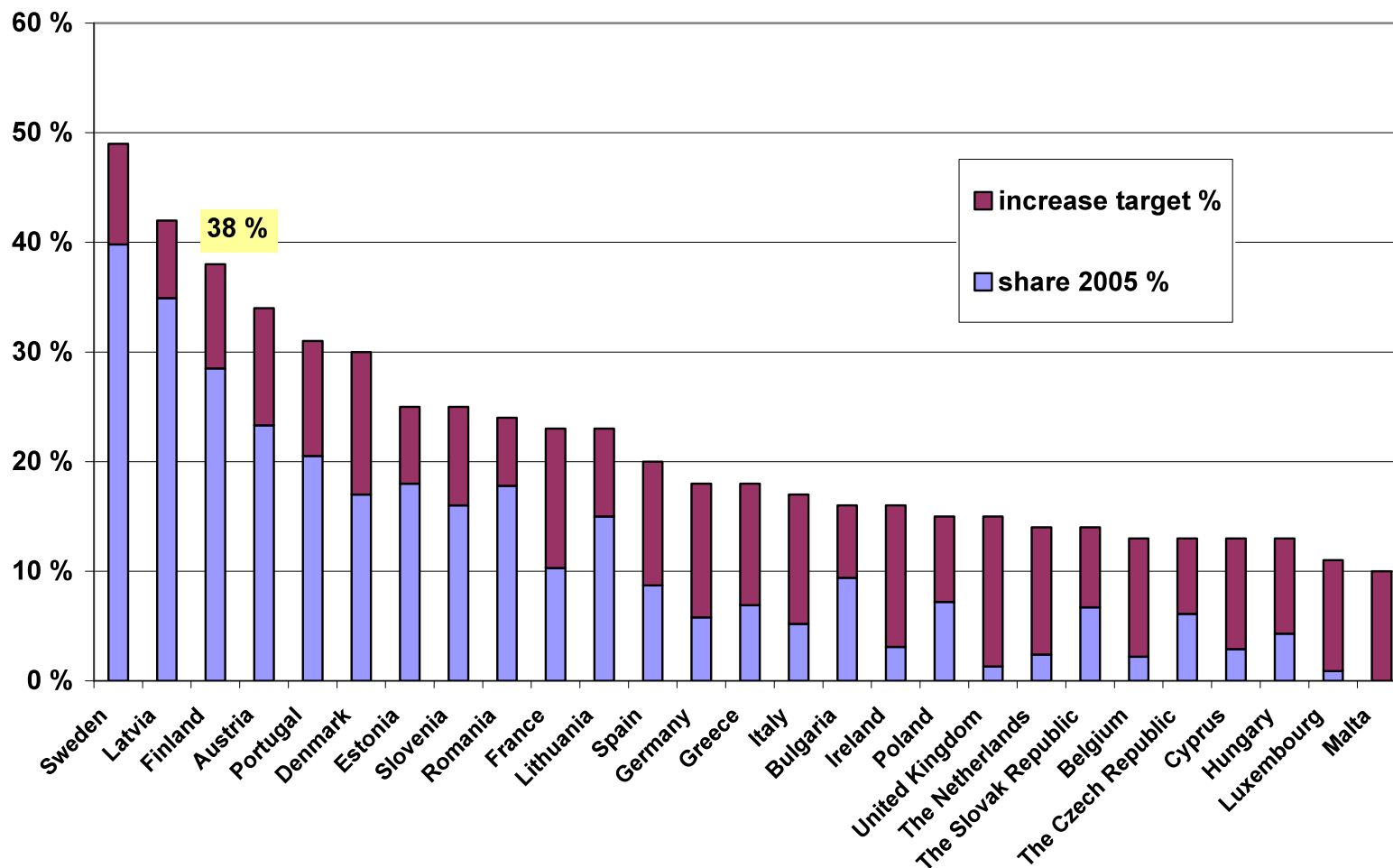


Finland, the Number One in Bioenergy

- **the third** in use of **renewable energy sources** in European Union
- **the first** in use of **bioenergy** among the states of the industrialised world (**relatively**)
- **the first** in use of **bioelectricity** in EU (**absolute and relatively**)
- Forest industry uses 70% of biomass-based fuels and produces 90% of electricity produced by biomass.



Renewable energy share in 2005 and the increase target for 2020, % of final consumption



National Climate and Energy Strategy

- Share of renewable energy 38 per cent from Final Energy Consumption in 2020
- Emissions from Non-ETS Sector -16 % (compared to 2005)
- Present policy measures are insufficient to meet the targets, new measures are needed (baseline -> targets)
- Energy Efficiency and Energy Conservation have a key role
 - Important in order to reach the targets
 - In 2020 final energy consumption 310 TWh (-37 TWh from baseline), electricity consumption 98 TWh (-5 TWh)
- The use of renewable sources is significantly increased
 - **Forest chips have the biggest role (2-3 –times more use)**
 - Wind power (6 TWh) and heat pumps (5 TWh) are also important
 - The future of forest industry is crucial (70 % of renewable sources from bi-products of the forest industry)
- Supply of domestic energy sources is increased from 32 % to 36 %



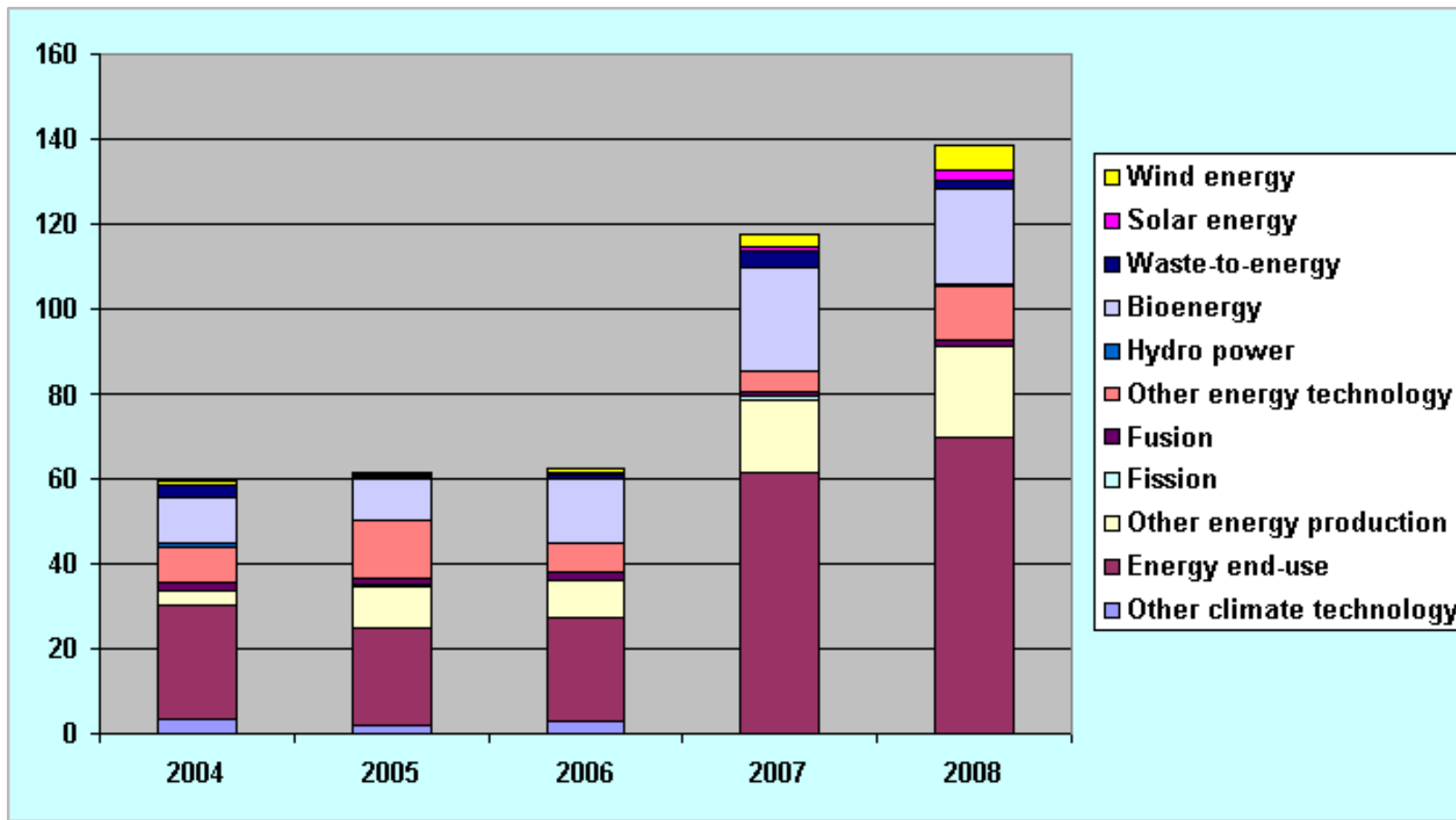
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Measures

- Research & development of new technologies (15-20 M€/a)
- Support for energy wood harvesting and chipping (6 M€/a)
- Subsidies for investments in electricity and district heat production (100 M€/a in 2009) (max. 40 %, normally 10-30 %)
- Support for RES-E through energy taxation system (10 M€/a)(wind and forest chips 6,9 €/MWh, recycled fuels 2,5 €/MWh, others 4,2 €/MWh)
- Subsidies for RES-heating systems of residential buildings (7 M€/a in 2006-2007)
- Information activities (1 M€/a)
- Feed-in tariffs for RES-E production under preparation



Funding of Energy and Climate Change Technology R&D, 2004 – 2008, M€

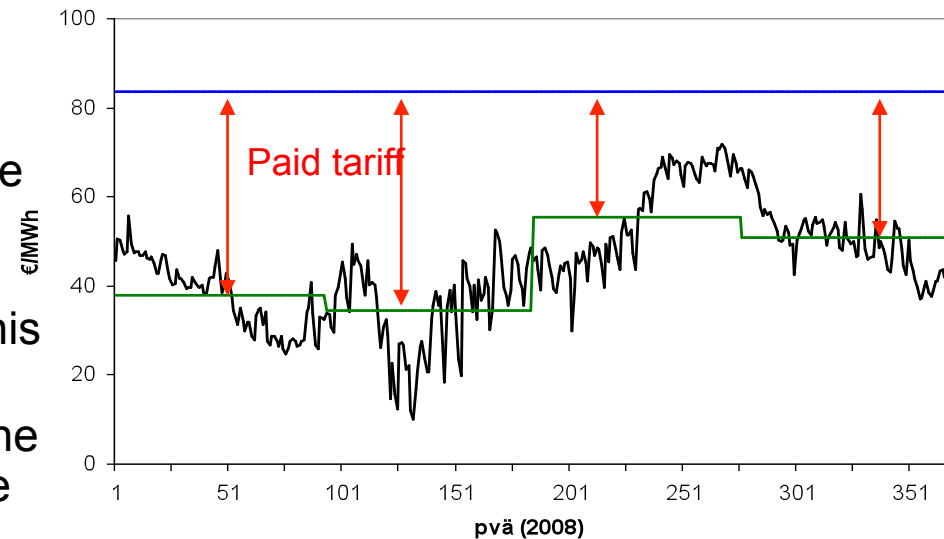


Source Tekes



Feed-in System: Model proposed by the Working Group

- **Market based guaranteed price**
 - Includes features of guaranteed price and premium price models
 - Model is market based but it also guarantees a steady income for the wind power producer
 - Producer sell the power to the market and he is responsible for his power balances
 - Producer is paid a tariff, which is the difference between the target price and the spot market price (last 3 months average)
 - Model gives an incentive to produce power during hours when power is more expensive than in average



How tariff level is defined?

- Tariff is defined in the legislation administratively, later possibly based on tendering
- Target price for wind power is 83.5 €/MWh and the tariff is paid for 12 years
- Producer is paid a tariff, which is the difference between the target price and the spot market price (E.g. tariff is 33.5 €/MWh, if spot price is 50 €/MWh)
- **During the first 2-3 years the tariff level is 90.2 €/MWh**
- Tariff level (target price) for an individual investment will not be changed during the 12 year period
- Parameters for defining the target level:
 - Investment cost 1400 €/kW
 - Load factor 2400 h/year
 - Technical life-time 20 years
 - O&M costs 28 €/kW, year
 - Balance costs 2 €/MWh
 - Own capital 30 %, ROR 10 %
 - Interest rate for foreign c. 5 %
 - Depreciation period 15 years
 - Loan period 12 years
 - Feed-in tariff period 12 years



How the system functions?

- **Financing of the system**
 - Based of fees collected from the electricity end-users
 - Possible exemptions for energy intensive industry?
 - WG proposed how this could be done
- **Roles for different actors**
 - The system is operated by Fingrid (national TSO) or its subsidiary company (collecting of the fees and payments to the producers)
 - Energy Market Authority is responsible for information dissemination, advising, follow-up/reporting of the system and supervision



Impacts of the system for Wind Power

- Impacts of the 6 TWh wind power target
 - About $\frac{1}{4}$ of the RES needed for the 38% target
 - According to the VTT wind power reduces emissions in the Nordic power system 0.62 t/CO₂/MWh
 - Less need to buy EU-ETS allowances
- Costs of the system
 - Annual cost 200 million € (6 TWh wind power and spot price of electricity 50 €/MWh)
 - Distributed to the total electricity end-use 2.2 €/MWh i.e. for a small flat 4.40 €/year and for a household with electricity space heating (L1) 39.60 €/year
- Total investments for wind power 3,5 billion € of which domestic investments 1.9-2.5 billion €

