

# The feed-in tariff system for wind power and biogas in Finland

Nordic Energy Post Copenhagen 21.01.2010

Juha Kiviluoma

VTT Technical Research Centre of Finland

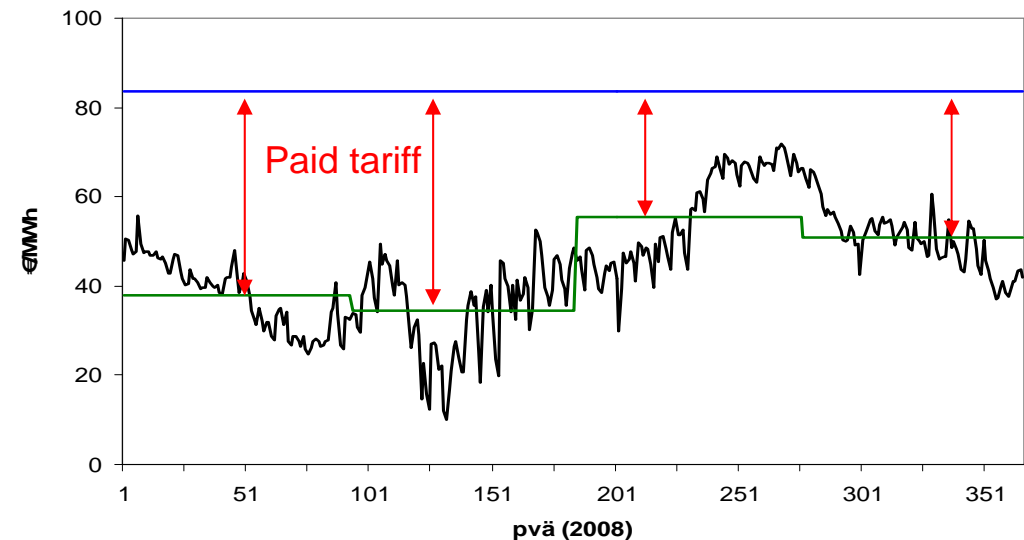
Several slides from the Ministry of Employment and the Economy/Petteri Kuuva

## Background for Finland

- EU directive: Share of renewable energy up to 38% by 2020
- EU commission: Greenhouse gases down 20% by 2020 compared to 1990
- National Climate and Energy Strategy:
  - Forest chips have the biggest role (from 4 milj. m<sup>3</sup> -> 12 milj. m<sup>3</sup>)
  - 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)
- These targets are not likely to be met without intervention
  - A government working group was set to propose a feed-in tariff system for wind power and biogas
  - A final report by the working group was published 25.9.2009
  - Objective: A tariff that would induce enough capacity to meet the target for wind power
    - Cost effective and market based

## Feed-in System: Model proposed by the Working Group

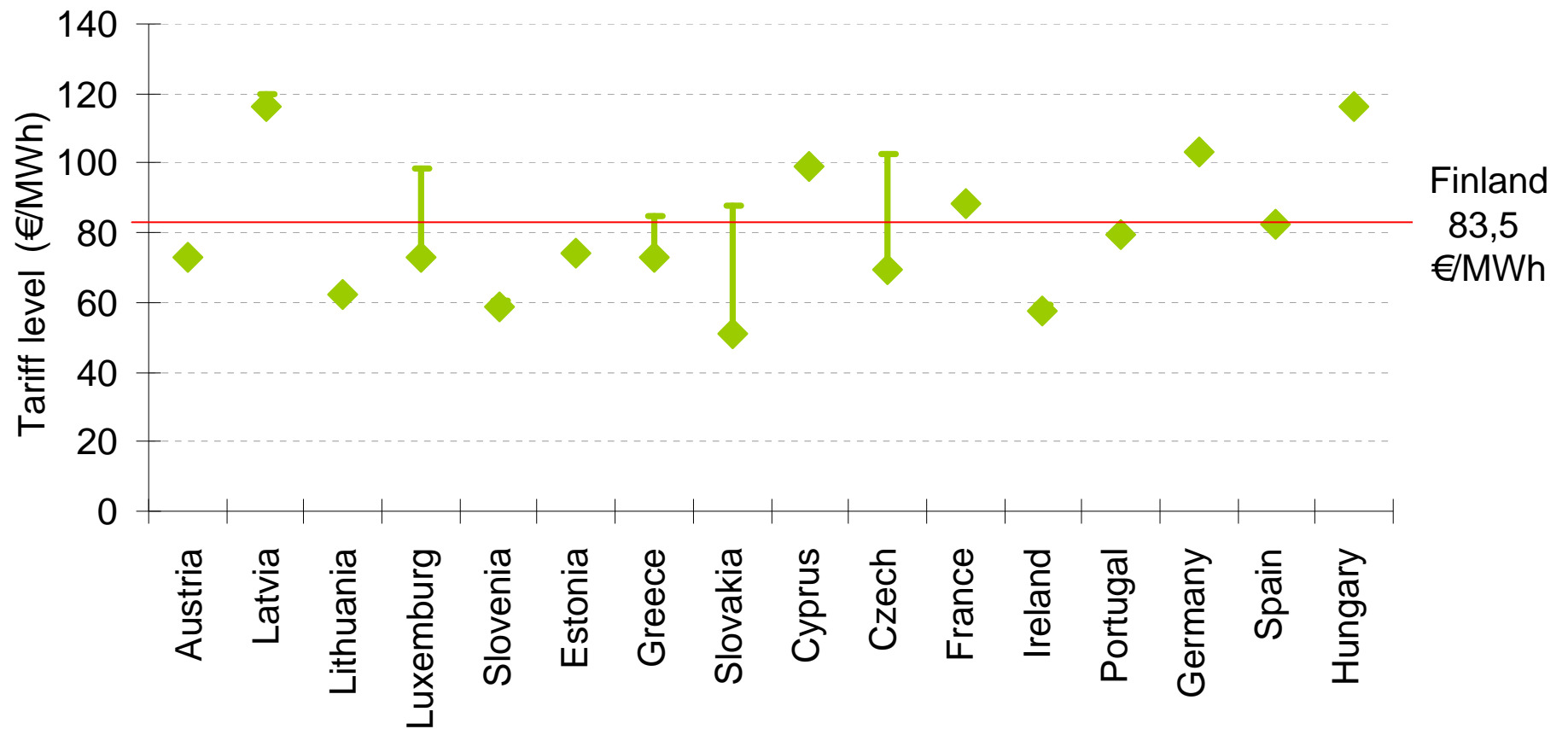
- **Market based guaranteed price**
  - Includes features of guaranteed price and premium price models
  - Model is market based but it also guarantees a steady income for the wind power producer
  - Producer sells the power to the market and is balance responsible
  - Producer is paid a tariff, which 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 for wind power?

- 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 average spot market price (E.g. tariff is 33.5 €/MWh, if the spot price is 50 €/MWh)
- **During the first 2-3 years the tariff level is 90.2 €/MWh (12 years for these investments)**
- 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 %
  - Write-off period 15 years
  - Loan period 12 years
  - Feed-in tariff period 12 years

## Tariff levels elsewhere (normalized into 12 year tariff period)

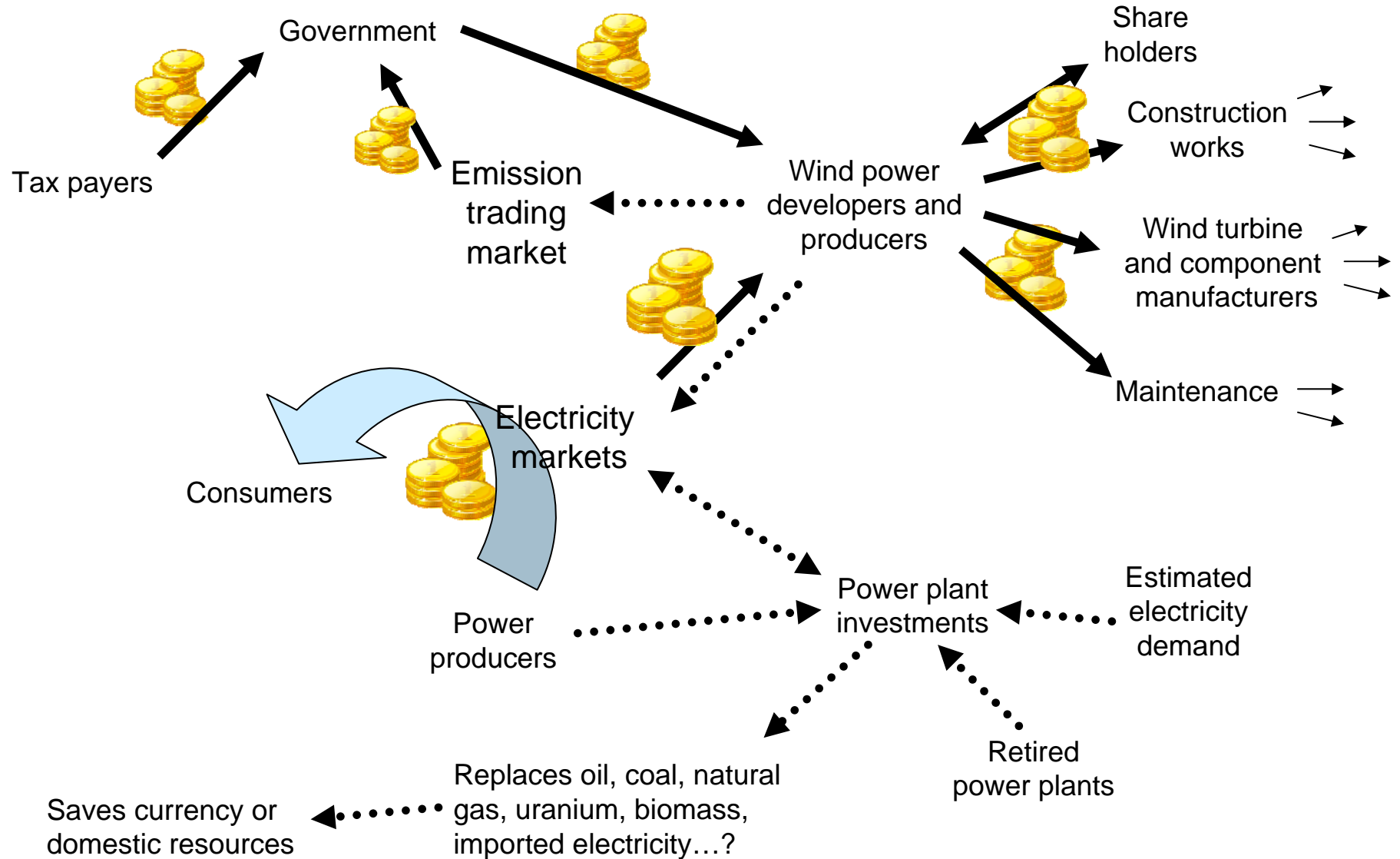


## How tariff level is defined for biogas electricity?

- Tariff is paid to power plants using biogas from biogas reactors (not biogas from landfills)
- No restrictions for raw materials
- Target price for biogas electricity is 83.5 €/MWh and the tariff is paid for 12 years - in CHP generation target price is 133.5 €/MWh.
  - Heat production from CHP will also help to reach the EU target for the renewables
- Producer is paid a tariff, which is the difference between the target price and the spot market price (E.g. tariff is 83.5 €/MWh, if spot price is 50 €/MWh)
- With the proposed tariff level
  - Farm-size biogas plants are not economical
  - Plants using bio waste and manure are economical if they receive fees from bio waste
- Estimated participation
  - About 60 plants
  - 19 MW, 150 GWh

## Government bill under preparation

- The WG report was circulated for comments
  - Based on the comments (Ministry of Finance) feed-in fee from the electricity system can't be a source of finance
  - Such fee is regarded as a tax according to the article 81 of the Finnish constitution
    - ➔ The feed-in system must be financed from the Government budget
    - ➔ Energy market authority would be responsible for operating of the system (calculation of the subsidy, database etc.)
    - ➔ The Finnish feed-in tariff is regarded as State Aid according to EU rules and the subsidy scheme must be notified to the European Commission



## Feed-in tariff from national perspective

- Helps to achieve the renewable energy target of 2020
  - About ¼ of the RES needed for the 38% target
- Tax payers will have less money to spend
  - Annual cost 200 million € (6 TWh wind power and spot price of electricity 50 €/MWh)
  - What are the choices, if the target has to be met?
- Total investments for wind power 3,5 billion € of which domestic investments 1.9-2.5 billion €
  - Replaces other power plant investments and changes them
  - Saves fuel from existing and new power plants
  - Decreases electricity imports
- Less need for emission allowances
  - Wind power displaces mostly power production with CO<sub>2</sub> emissions (these tend to have highest marginal costs)

## New scenarios from the Ministry of Employment and the Economy Nov. 2009: The use of RES in primary energy, TWh per year

	2007	2008	2020
Bioenergy dependent on forest industry	65.1	56.9	42
Forest chips	6.1	9.4	21
Hydro power	14.0	16.9	14
Wind power	0.2	0.3	6
Other renewable sources	18.1	17.5	28
Sum	103.5	108	111

**-18 TWh**

**How the deficit will be supplied =>  
National Renewable Energy Action Plan June 2010**



**VTT creates business from  
technology**