BIOENERGY MARKETS

Suomen Energiaekonomistit ry:n kevätkokous
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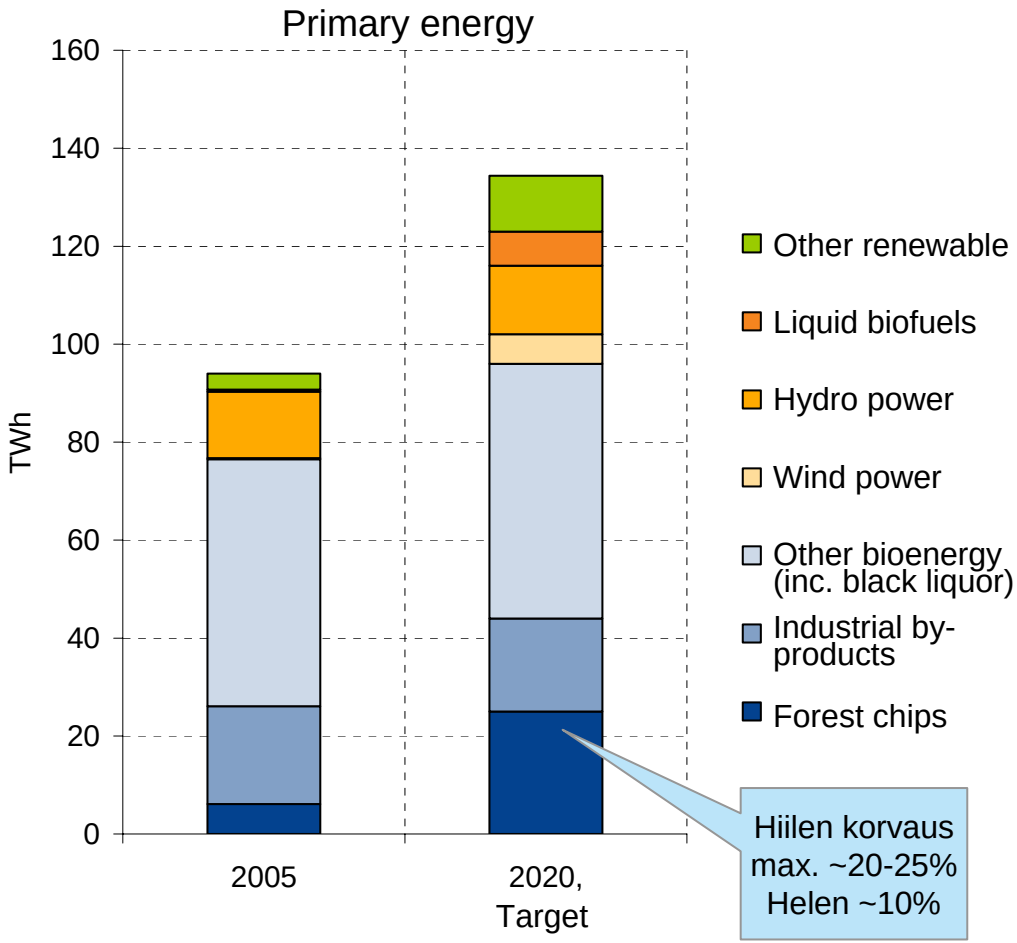
SIGNIFICANT ACTIONS ARE NEEDED TO REACH THE FINNISH RENEWABLE ENERGY TARGET OF 38 %

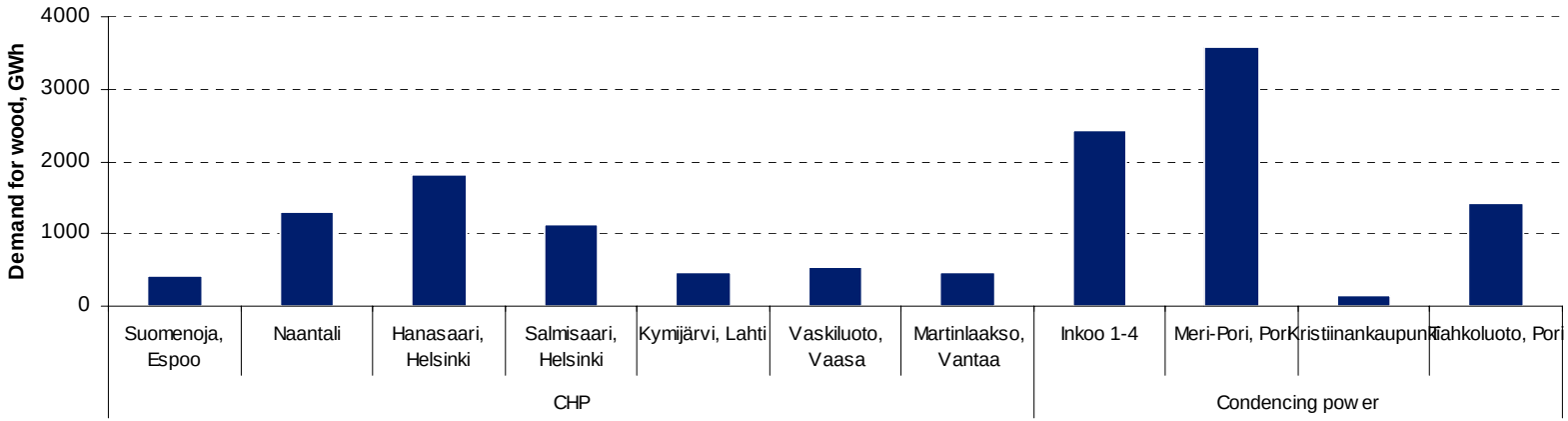
- The Long-Term Climate and Energy Strategy (2008) emphasizes the reduction of emissions, promotion of renewable energy, or enhancing the efficiency of energy consumption.
  - Security of supply and competitiveness.
- Finnish government has established a “renewable energy package” with the aim of increasing energy production based on renewable forms of energy by a total of 38 % of the final energy consumption by 2020 (124 TWh, increment 38 TWh from 2005).
- Forest chips are considered to be the most important fuel in reaching the targets in 2020.



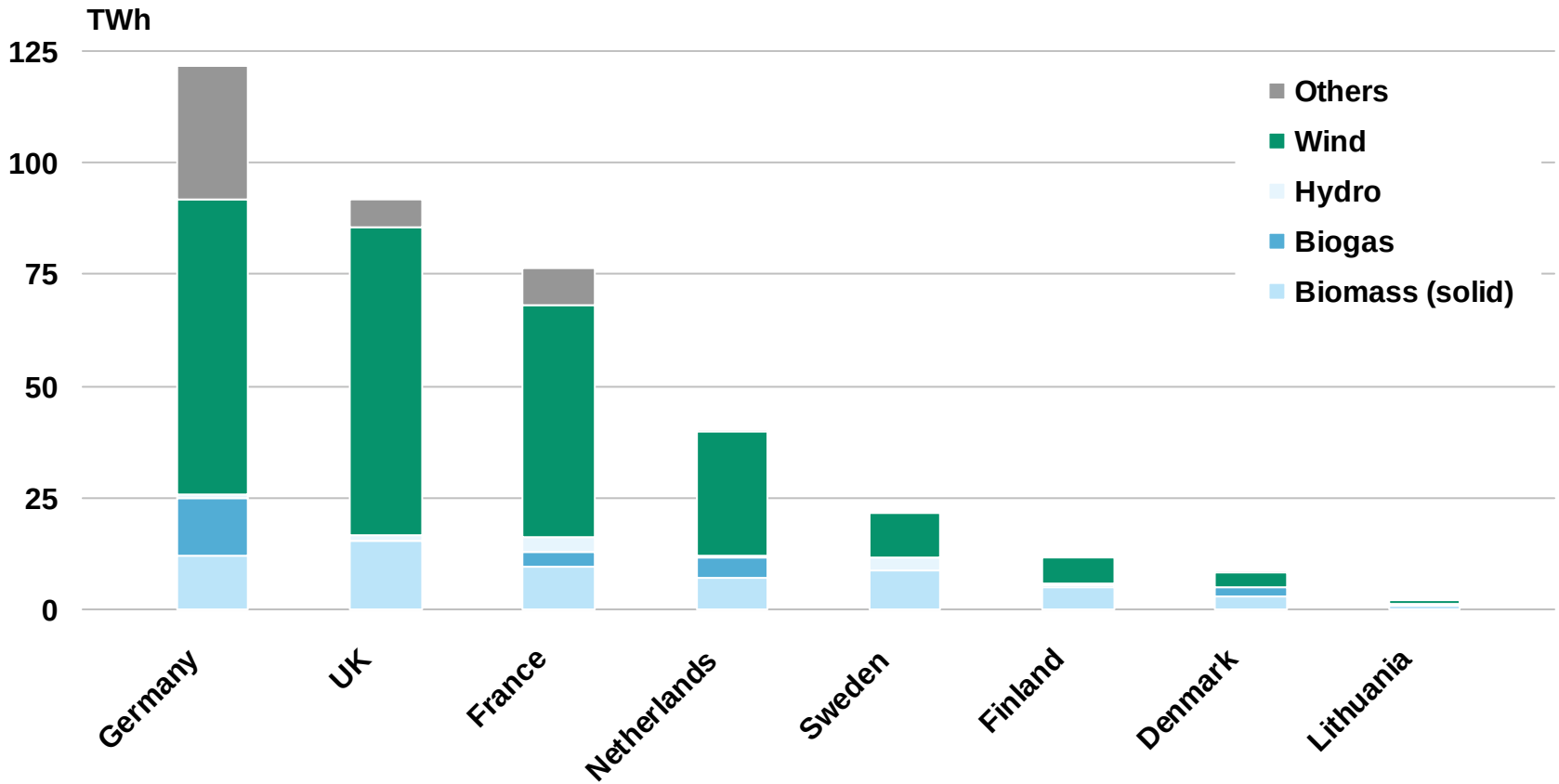
COAL REPLACEMENT IN EXISTING POWER PLANTS

- Coal replacement facilities
  - In CHP production: Hanasaari 1-2, Salmisaari, Suomenoja, Martinlaakso, Naantali 1-3, Vaskiluoto, Kymijärvi, Mussalo
    - Potential approximately 7 TWh
  - In condensing power production: Meri-Pori, Kristiinankaupunki, Tahkoluoto, Inkoo 1-4
    - Potential depending on the amount of power production is estimated to be under 1 TWh
- VTT (03/2011) has recommended investment subsidies, variable electricity production subsidy (for uppgraded fuels (pellets, biocoal) in CHP production and additional support for agrofuels
  - Not in active development before the elections

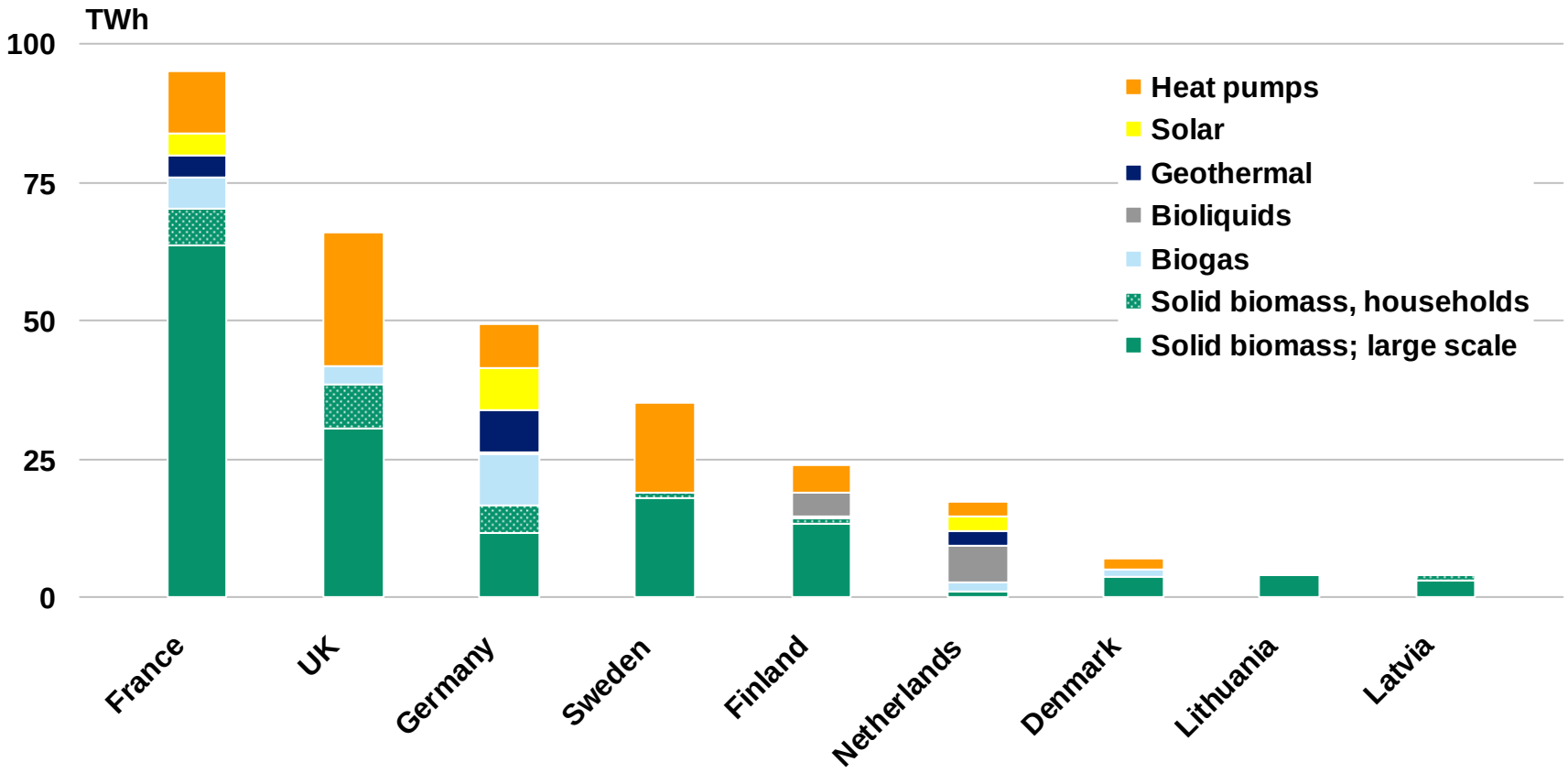
- Gasification
  - Requires investment and space reservation (fuel storage and handling + gasifier)
  - Wood chips from the market
  - Flexible with wood availability, maximum share of 50 % in the fuel mix
- Grinding (pulverized fuel firing)
  - Requires investment and space reservation (fuel storage and handling + grinder)
  - Wood chips from the market
  - Flexible with wood availability, limited share (~ 10 %) in the fuel mix
- Wood pellets
  - Good availability
  - Maximum share of 5-10%
  - Fuel storage and handling required (space requirement less than wood chips)
- Biocoal (torrefied pellets)
  - Not commercially available in large scale
  - Maximum share some 50% (not verified, can be even higher)
  - Fuel storage and handling required (space requirement less than wood chips and pellets)



RENEWABLE ELECTRICITY INCREMENT BETWEEN 2009-2020

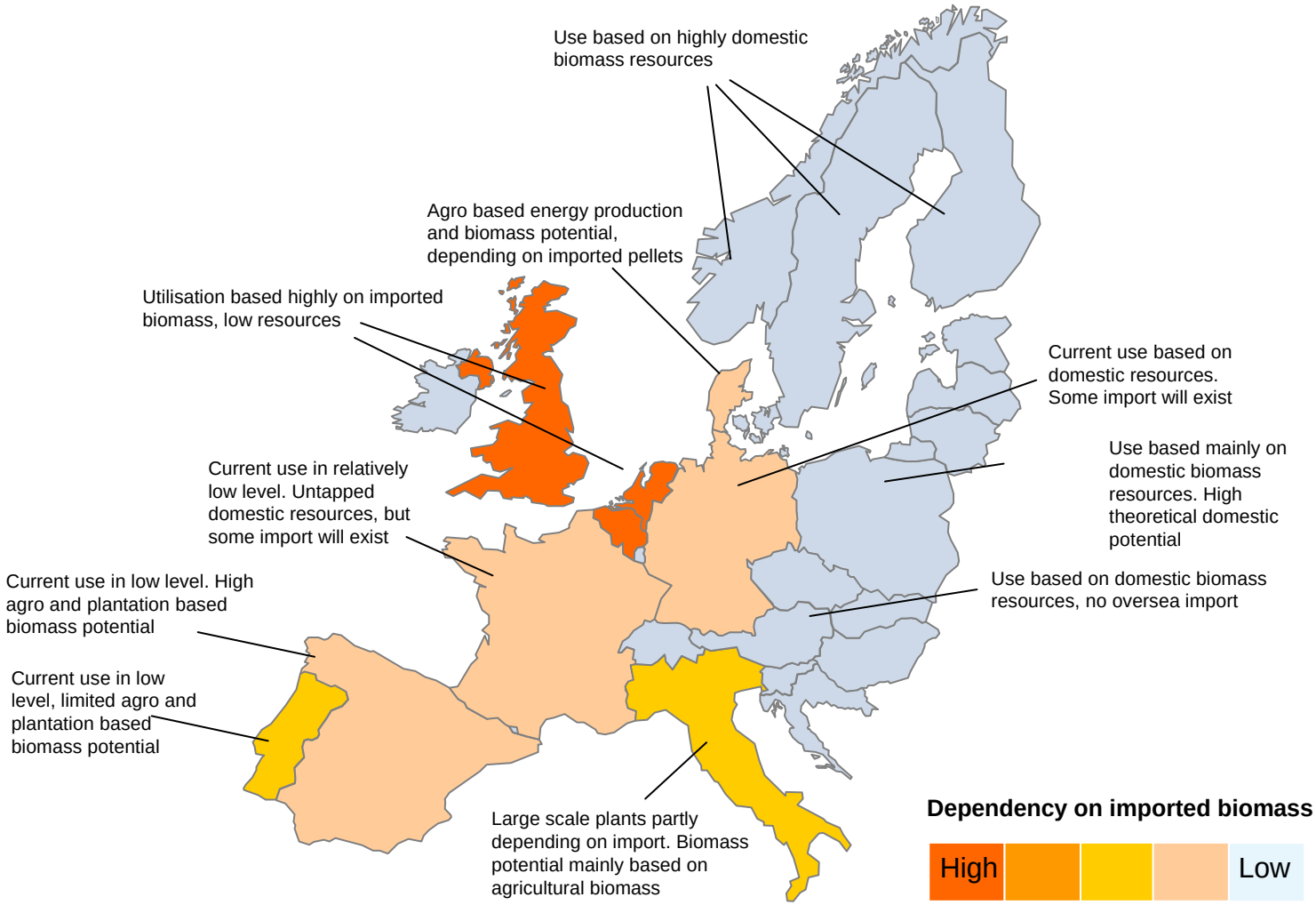


RENEWABLE HEAT INCREMENT BETWEEN 2010-2020

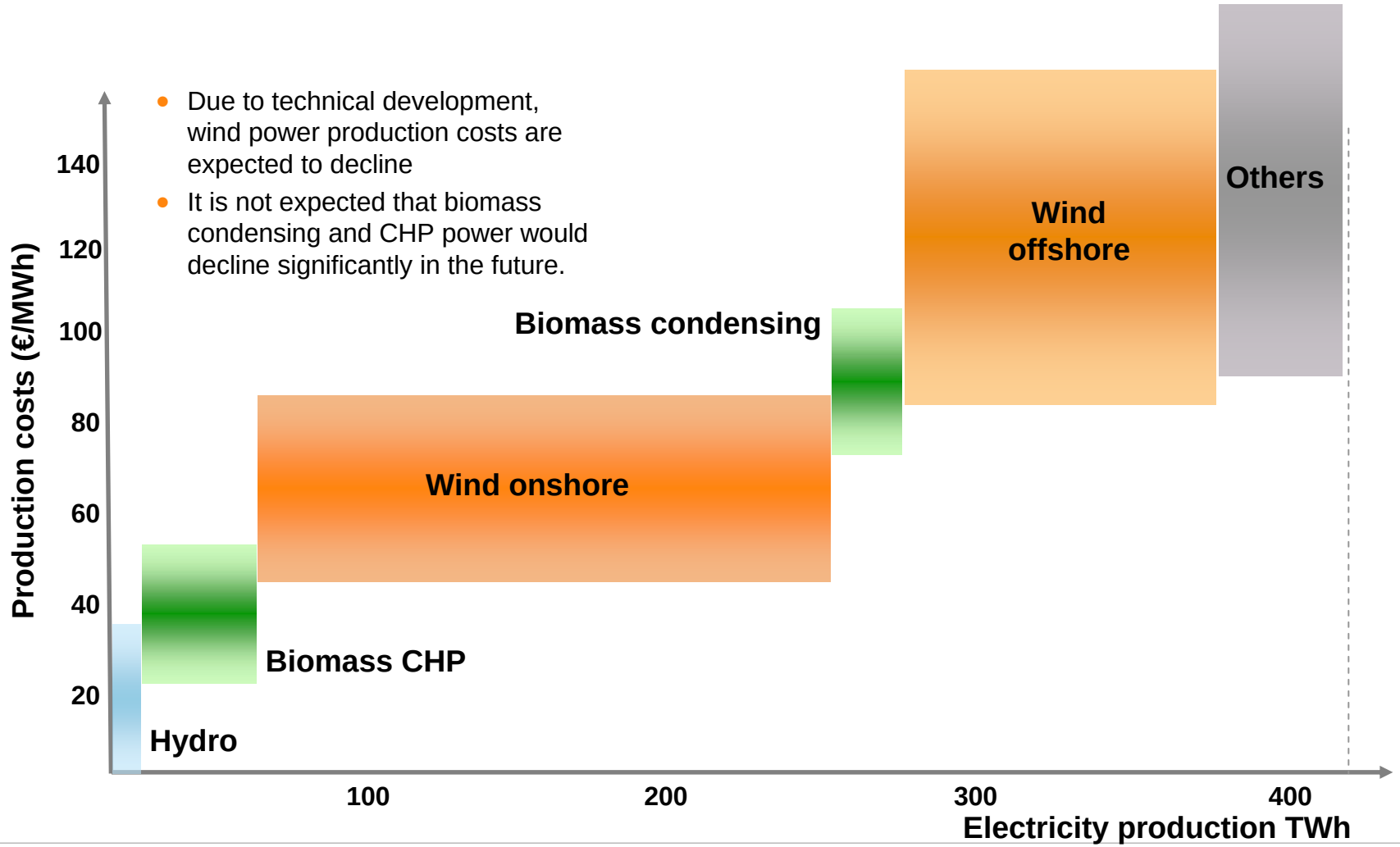


THE GROWTH WILL ACCELERATE BIOMASS TRADE IN EUROPE

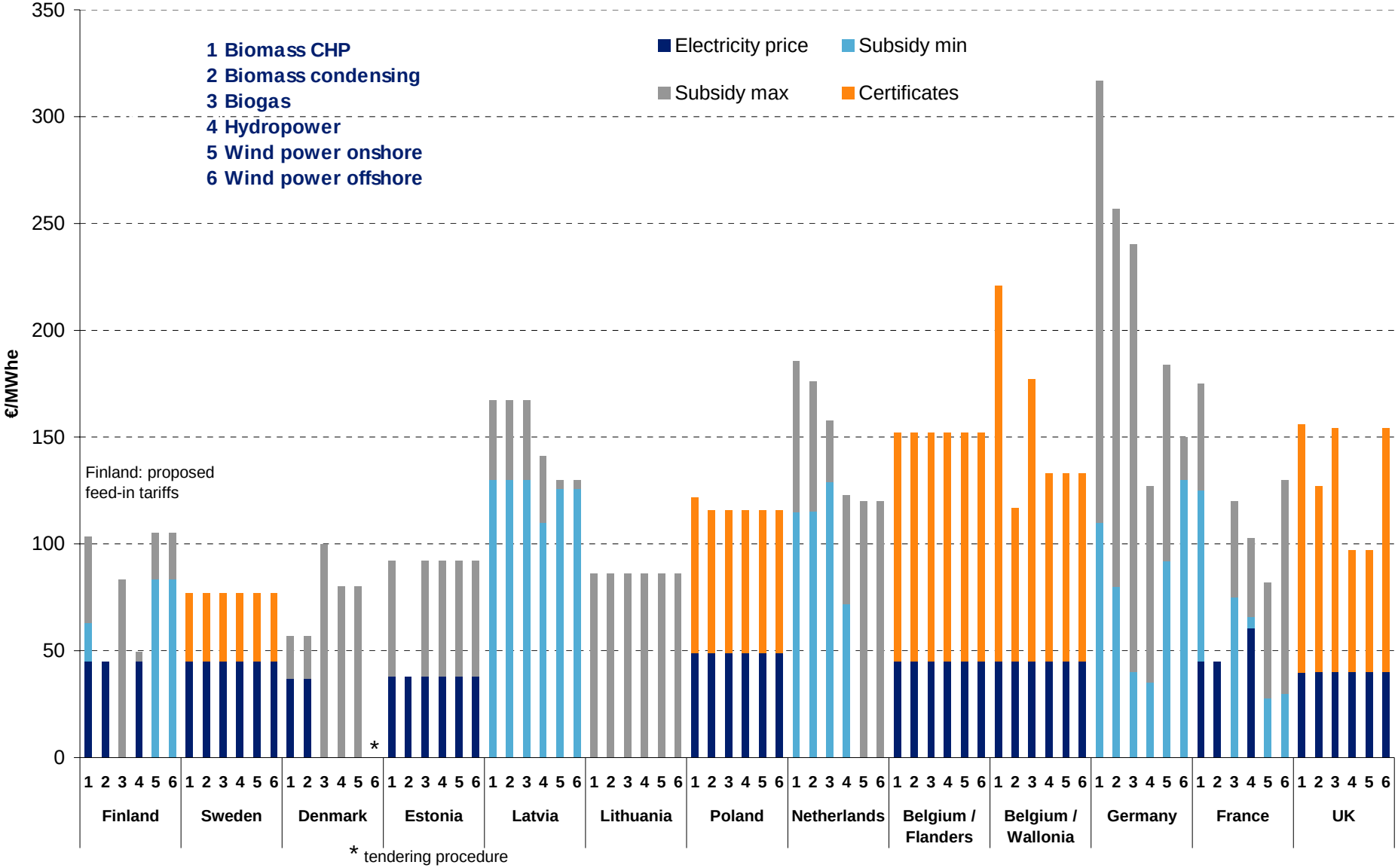
United Kingdom, Netherland and Belgium will be mostly depending on imported biomass



INCREMENTAL RENEWABLE ELECTRICITY CAPACITY AND PRODUCTION COSTS (INCLUDING INVESTMENT)



EXAMPLES OF SUPPORT SYSTEMS FOR RENEWABLES

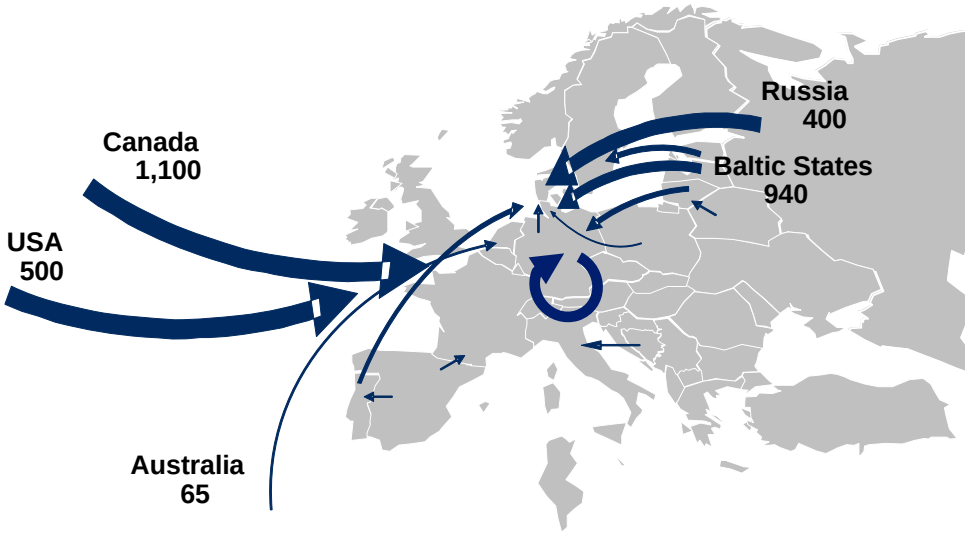


Possible subsidies for production or harvesting of fuels are not included

EUROPEAN PELLET TRADE FLOWS IN 2010

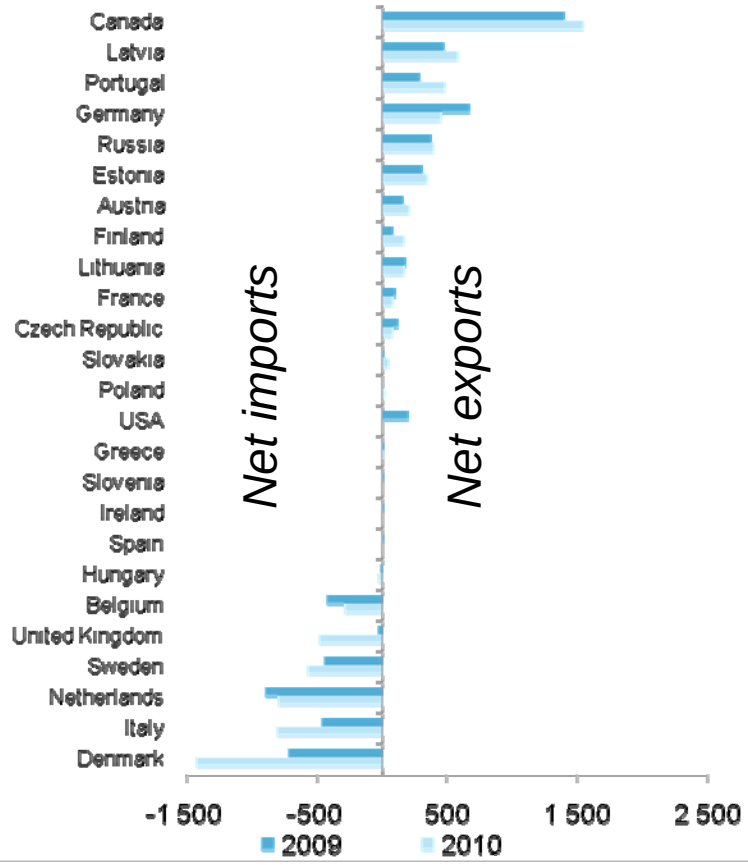
North American wood pellet exports to Europe have risen to 1.6 million tonnes in 2010. Canada has been the largest exporting country with a positive trade balance of more than 1.5 million tonnes. Intra-European trade is estimated at 3.3 million tonnes.

European wood pellet trade flows (2010)



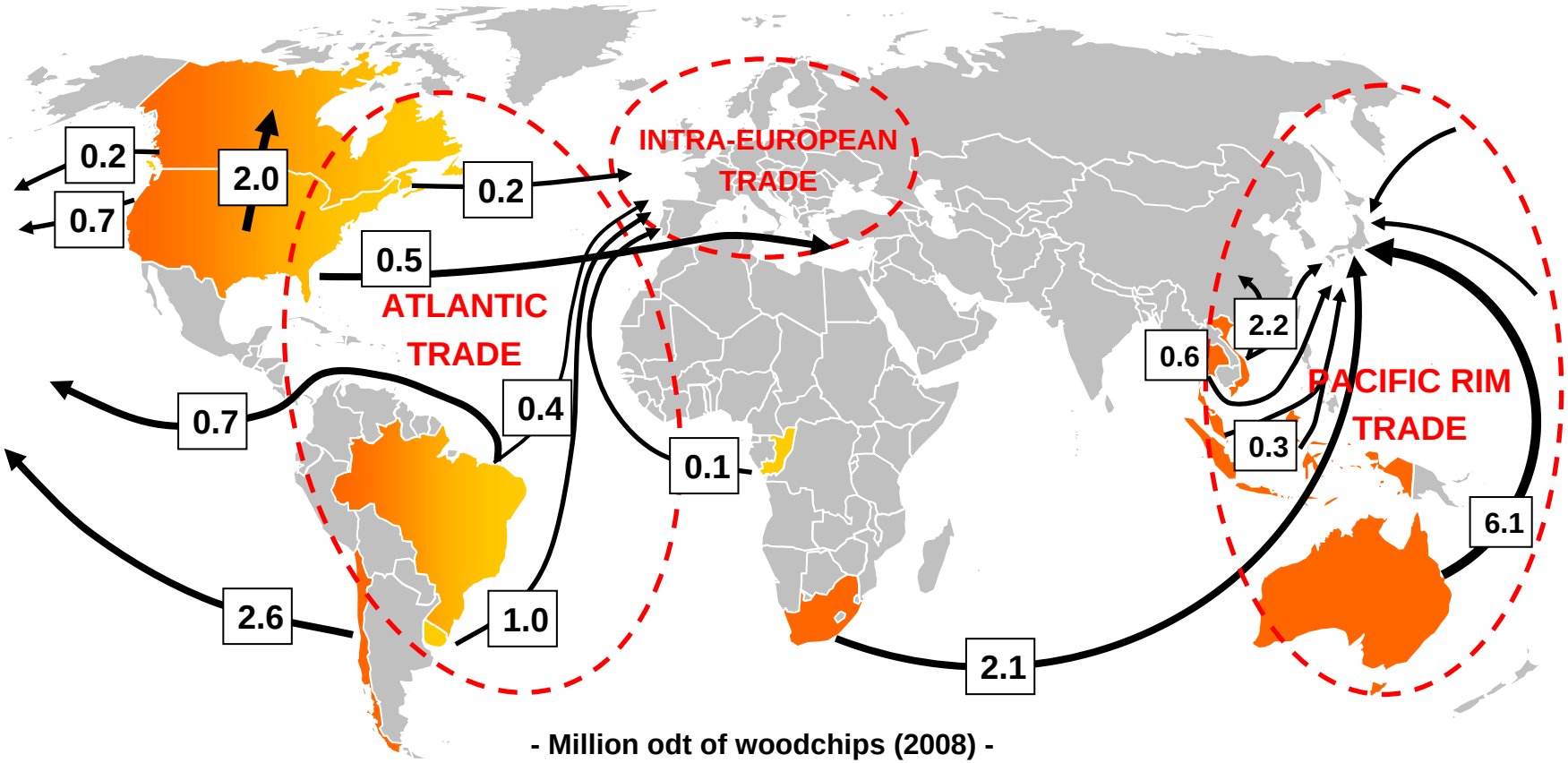
Trade flows (1,000 tonnes)

Net trade balance (2010)



GLOBAL BIOMASS MARKET IS ALREADY THERE

The global export trade in woodchips reached 19.4 million odt in 2008. The Pacific Rim trade accounts for 77% of this volume. The major suppliers to Asia are Australia, South Africa, Chile and Vietnam. The Atlantic trade is much smaller but is expected to grow significantly in order to meet biomass demand in Europe. Major trade flows of woodchips are shown below.



- Million odt of woodchips (2008) -

POWER COMPANIES ARE STARTING TO INTEGRATE UPSTREAM TO GUARANTEE THEIR BIOMASS SUPPLY

RWE:

1. 750 000 t/a pellets in Georgia USA (100% stake)
2. 250 / 500 000 t/a pellets in Alabama USA (rumoured to join forces with German Pellets)
3. 120 000 t/a pellets in Germany (90% stake, 10% German Pellets)
4. Torrefaction technology – Topell, the Netherlands (25% stake)

Vattenfall:

5. Torrefaction technology – ECN, the Netherlands (partnership)
6. Waste rubber-tree operation – Buchanan Renewables, Liberia (20% stake)
7. Pellet mill in Miramichi, NB, Canada (50% stake rumoured)

Drax:

8. 100 000 t/a straw pellets, UK (100% stake)

Electrabel:

9. Minority stake in a pellet mill in British Columbia, Canada

Dong/Inbicon:

10. 5,4 million litre ethanol and 13 000 t/a lignin pellets demonstration plant in Denmark

Scotish Southern Energy:

11. 2 400 hectares planted forest land in the UK

CONCLUSIONS

- Coal replacement is an effective way to reach 2020 targets in Finland
- Finland is already a part of global bioenergy market
- Biomass demand and competition will grow in EU and global level