

Feasibility of Nordic forest energy technology in the EU

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Background

- Finland and Sweden developed intensively harvesting and transport technologies for solid wood fuels in 1990's
- Focus was on the primary forest residues i.e. logging residues and small diameter trees
- In the 1990's manufacturing of forest machines was concentrated in Sweden and Finland

Background, cont.

- In the 2000's Finland became the major supplier of wood harvesting machinery in Europe
- Our mission: Wood energy technology transfer



Technology transfer: Feasibility study

- Mapping of resources
- Construction of supply chains
- Estimation of productivity of machines and cost at each stage of a supply chain
- Connecting resources to heat/power plants with suitable supply chains
- Answer the question: How much biomass can we get at given price to the mill gate?

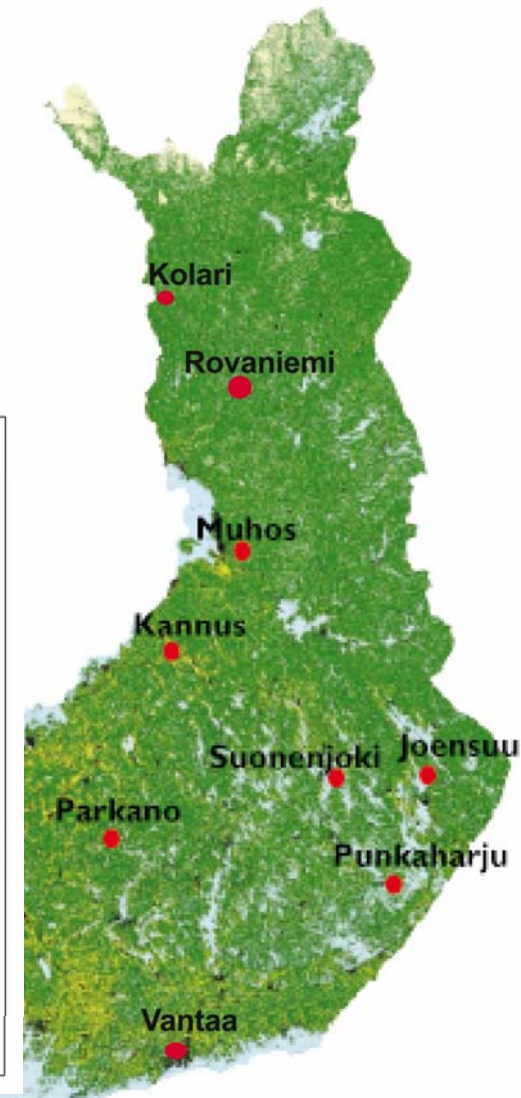
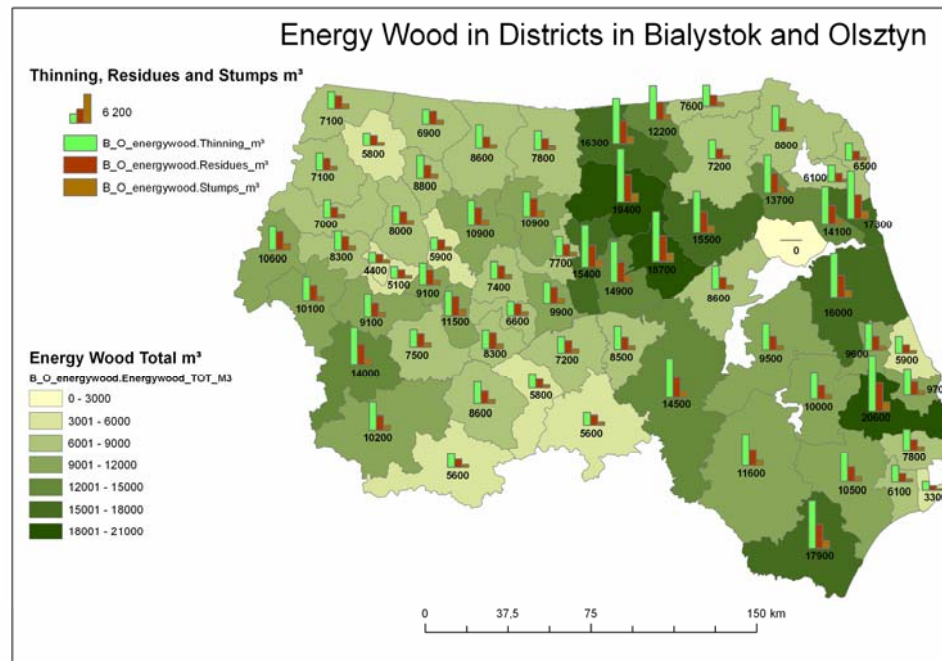
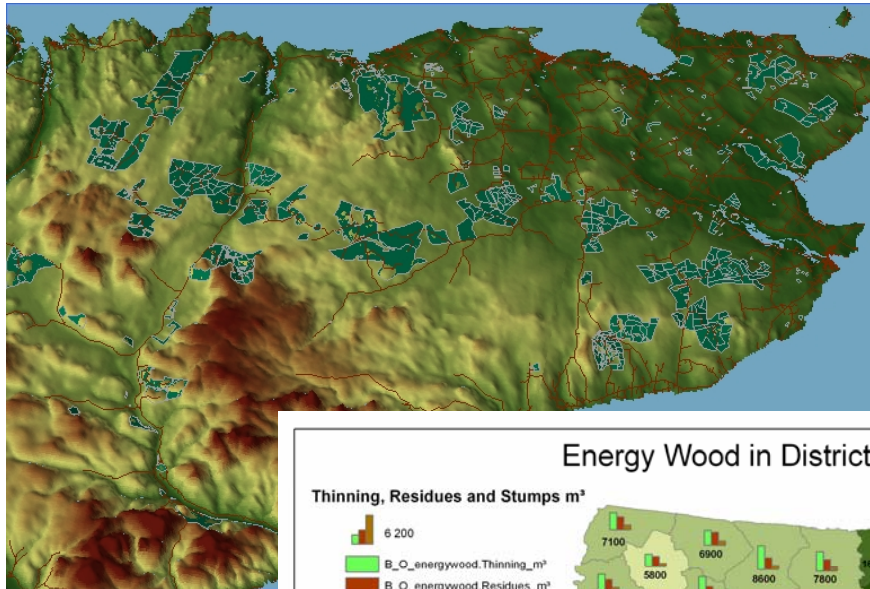
EU's target for the use of biomass

- EU aims to increase the use of biomass in energy production by 80 Mtoe by 2010 (Biomass Action Plan 2005)
- Forest biomass can contribute to about 1/3 of the target

Harvestable potential of forest energy in the EU25

- 140 mill. m³/a
- 110 mill. tonnes/a
- 280 TWh/a
- 24 Mtoe/a

Three cases: Finland, Scotland & Poland



Technical applicability of Nordic technology

- Poland:
 - Terrain conditions and tree species composition excellent for mechanised harvesting of forest energy
- Finland:
 - Large part of forest fuel resources are located on soft soils; harvesting possible in winter
- Scotland:
 - Often very poor bearability of terrain (peatlands)
 - Harvesting of roundwood possible
 - Steep slopes can be a problem on bearable soils
 - Very high rainfall causes storage problems

Typical users of biomass

- Poland:
 - Large district heating plant (100-300 MW) with several coal boilers
 - One boiler converted to cogenerate coal with wood chips
- Finland:
 - Municipal DH plants to large industrial CHP plants (2 MW -500 MW)
- Scotland:
 - Small boilers installed in public buildings, 100 kW-1 MW
 - Delivered batches a few tonnes at a time

Typical users of biomass



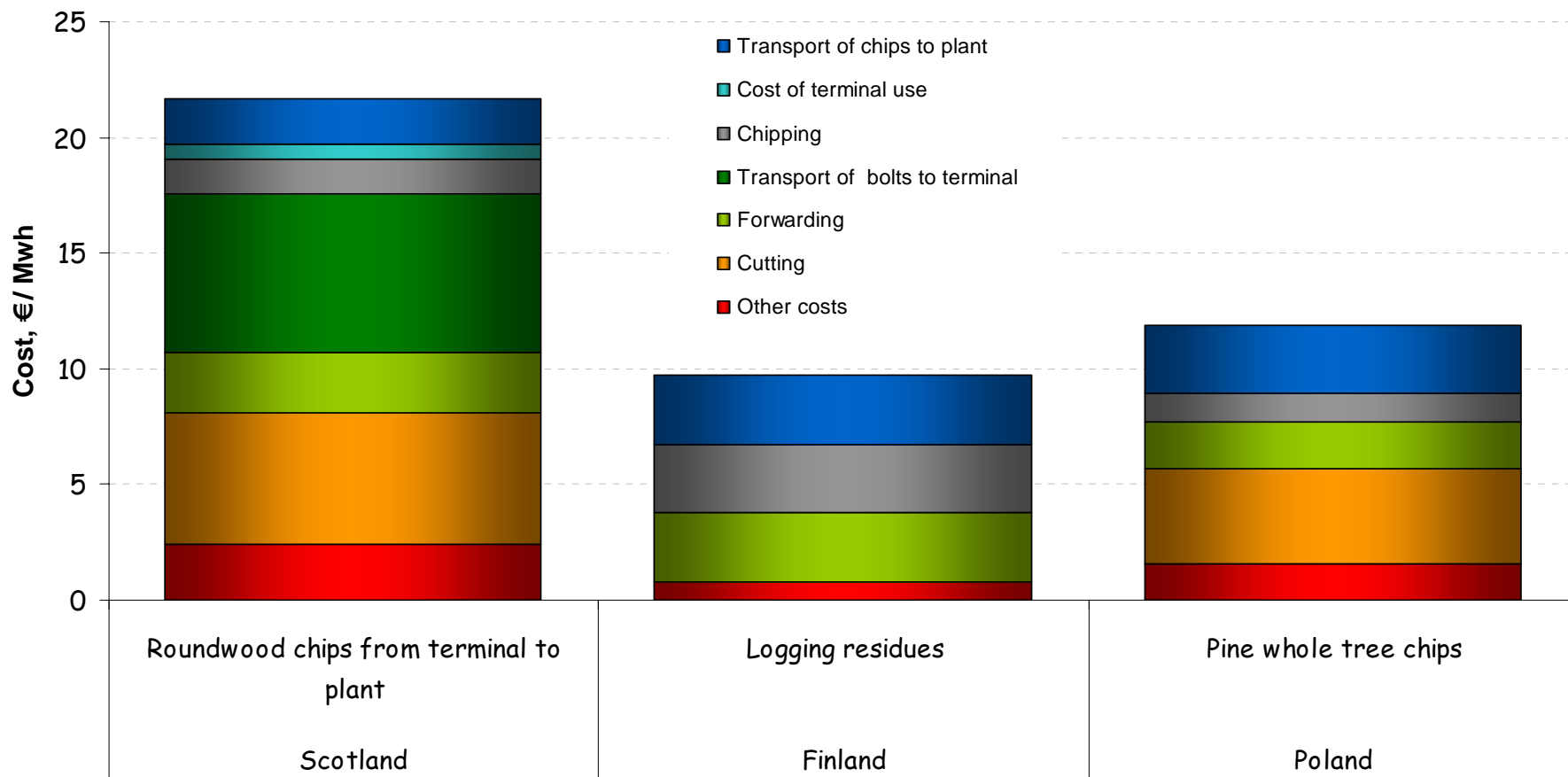
Raw material

- Poland:
 - Wood from thinnings (pine, spruce)
 - Low quality roundwood
- Finland:
 - Logging residues
 - Small diameter trees
 - Stumps
- Scotland:
 - Low quality roundwood
 - Whole trees from thinnings

Raw material



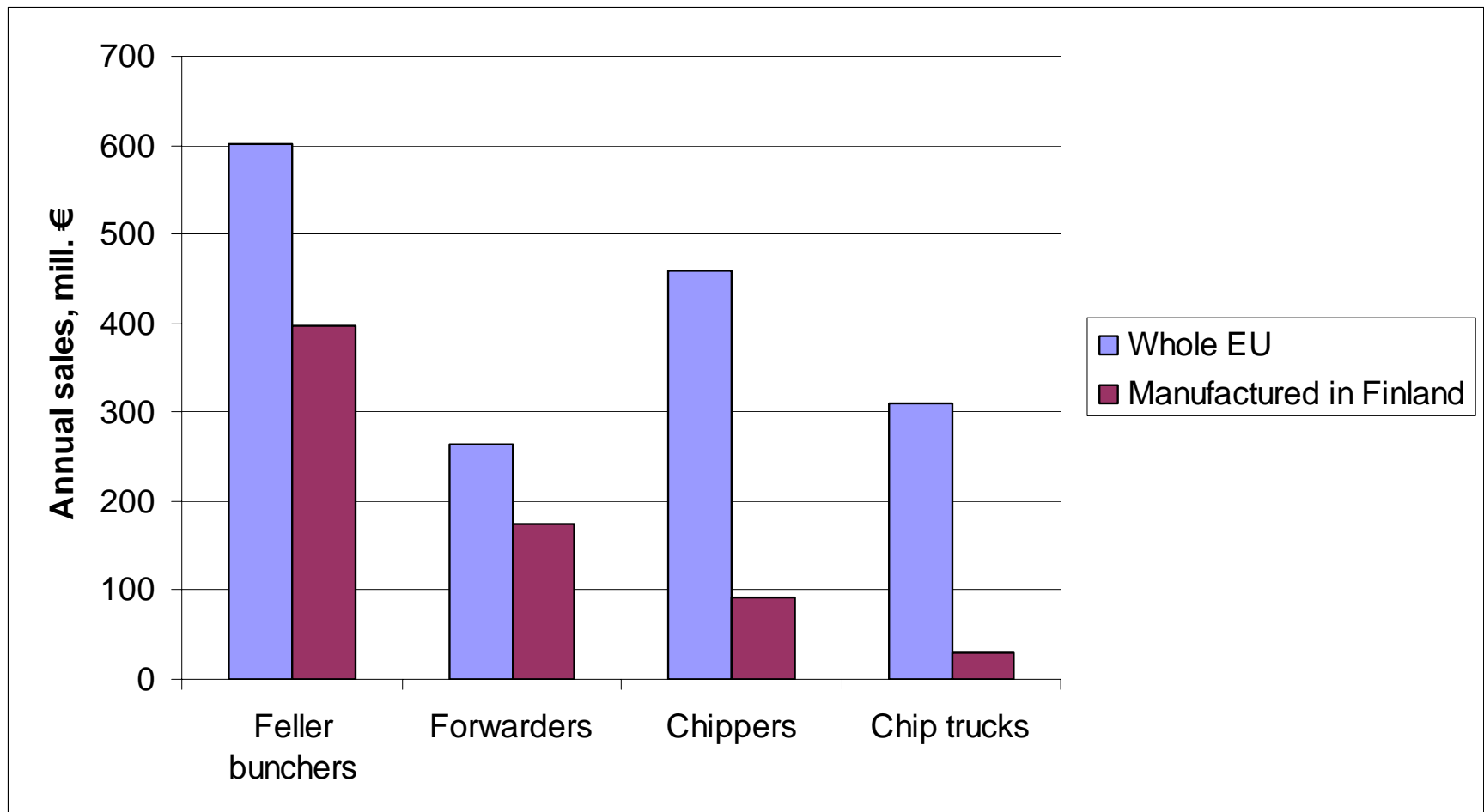
Cost competitiveness of forest energy



Socio-economic impacts of forest energy

- Task 29 and number of national studies:
 - Jobs in harvesting and transport
 - Jobs in running of plants
- Manufacturing of harvesting machinery:
 - Investments in the supply chain can be as high as investments in the plant itself
 - In 30 years all machines in the system are changed 4-6 times
 - In the European scale investment need is 1.5 billion euros/year, if whole harvestable potential is mobilized
- In Finland, manufacturing of forest energy technology would bring about 3 000 direct jobs in machine industry and 2 000 - 3 000 indirect jobs in services, transport etc.
- In the whole EU the respective figure would be about 10 000

Annual investments in supply chains of forest energy in the EU25



Conclusions

- Large variation between countries in
 - Forest biomass harvestable for energy
 - Harvesting conditions
 - Readiness to start mechanised forest energy operations
- Cost of forest energy differs remarkable between countries and areas
- Competitiveness of supply chains must be estimated country by country, project by project

Conclusions

- Applicability of Nordic forest energy technology is surprisingly good
 - Slopes are clearly a limiting factor in Alpine and Carpathian regions
 - Elsewhere in Europe the applicability is good
 - If roundwood can be harvested with wheeled cut to length machinery, also forest energy is accessible
- Forest energy is not competitive with coal
- Gas and oil countries very favorable areas

**“You can not simply replicate someone
else’s solution”**

Cliff Beck, Highland Birchwoods, Scotland



builds the future of forest sector through research

**Remember us
wherever you plan a supply chain
for bioenergy !**