The Demand of Forest Biomass Is Increasing – How Can We Develop Supply Chains?

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- Fusion of
  - MTT Agrifood Research Finland
  - Finnish Forest Research Institute Metla
  - Finnish Game and Fisheries Research Institute RKTL
  - Information Centre of the Ministry of Agriculture and Forestry Tike

- Started 1 January 2015
- Combined resources 2014 turnover 140 EUR milj.
- Personnel aprox.1600
- Locations 38
Drivers of development of harvesting and logistics

- Increasing demand -> increasing distances -> need to increase cost efficiency
- Seasonal fluctuations
- Quality management

Figure 1. Regional balance between harvesting potential and demand of RFB under two different harvesting scenarios for roundwood, Maximum sustainable scenario (MAX) and Business as usual scenario (BAU). For more information see Anttila et al. (2014).
Mapping and critical analysis of existing harvesting technologies
Whole tree supply chains in Norway

Figure 4. Delivered cost of chips ($€ \cdot t_d^{-1}$) by supply chain and supply chain components.

- Roadside chipping chain cheapest
- Bigger trucks more cost efficient
- Use of terminals increases costs

Belbo & Talbot (2014)
Whole tree supply chains in Norway

Figure 7. Cost of losses for each stage in the supply chain, including storage costs, and at the terminal.

Storage costs ~10% of the total

Lowest costs in direct deliveries

Biggest costs in baling chains

Belbo & Talbot (2014)
Evaluating long distance transportation solutions
Long-distance supply of energy wood in Finland

Whole-tree chains more expensive than stemwood chains

Big trucks more competitive than train

Nivala et al. (2015)
Wood chip transport in Estonia

Rear driving axle trucks

Double driving axle trucks

Multi-lift trucks

Multi-lift trucks uneconomic due to high investment cost

Irdla et al. (2015)
Wood chip transport in Estonia

10°C increase in temperature -> 5% decrease in fuel consumption

Irdla et al. (2015)
Evaluation of the cost saving potential of precision supply of biomass
Precision supply of logging residues in Finland

Fig. 4. Drying curves for energy wood by Sikanen et al. [40] used for predicting the moisture content of the individual storages.
Precision supply of logging residues in Finland

Up to 8% higher energy content could be delivered

Windisch et al. (2015)
Precision supply of logging residues in Finland

Supply costs could be decreased by up to 7%
Binding the results to the other work packages...
Logistical wishes for the future energy forests

Fig. 4. The cutting and forwarding costs of delimbed pine stemwood and pine whole trees.

Laitila et al. (2010)
Logistics as a part of the future energy systems

Fig. 5. GHG emissions of the bioenergy schemes (basic scenarios) and their Finnish reference systems' emissions. Reference systems: for CHP, peat; for condensing power (left to right), hydropower, average power in Finland, average power in the EU-27, and coal power; for gasification, coal; for torrefied pellets, coal; for pyrolysis, heavy fuel oil.

Jäppinen et al. (2014)
Conclusions

• Logistical solutions location specific
• Increase net loads in transportation
• Utilize existing information more efficiently
References


Thank you!