Case study North Karelia 6

Cost Competitiveness of Imported Russian Energy Wood

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Abstract

Number of small and medium size heating plants is increasing all over the Europe. Russia is an important source of timber for European forest industries. Economics of fuel chips and fuel wood export was clarified by case-studies. In addition, forest energy specialists were interviewed. The price of Russian fuel chips is higher with all studied heating plants if compared to domestic chips and valid prices paid. Although, good quality of Russian chips compensates the difference in some extent and that is why Russian chips are used. Surprisingly, the train transportation is more expensive than truck transportation. The main reason is that heating plants were located relatively near of the border. Export of timber and forest fuels from Russia is under continuous change and that is why counting too much on this fuel source can be risky. From economical point of view, remarkable savings in small and middle scale import in the long run are not probable either.
1 Introduction

North-Karelia is one of the leading forest energy and forest industry regions of Finland. Own forest energy resources are ample and one fourth of technically and economically feasible potential is used nowadays. Constantly increasing use of forest energy together with ambitious future targets and new utilisation forms of forest biomass require updating of all potential forest fuel sources. Road transportation of forest fuels in their traditional forms - roundwood, residues or chips - is proven to be the weakest link of procurements chain. Energy density of load remains usually low, which increase transportation costs drastically according to transportation distance. Transportation costs are also increasing due to increasing labour and fuel costs.

Import of roundwood from Russia has a remarkable role in wood supply of Eastern Finland forest industries. Railroad connections to Russia are fluent and tradition of international trade is strong. Russian forestry produces vast amounts of rejected timber and fuelwood transported either to roadside or to lower landing. This is a consequence of forest harvesting code, which directs the owner of cutting permission to harvest all trees away from clear-cutting areas. Not even biotope corridor trees or landscape trees are allowed to leave on site. Domestic use of forest energy in Russia is limited because of undeveloped infrastructure and cheap domestic fuels.

The aim of this case study is to find out the competitiveness of Russian fuel chips on North-Karelian forest fuel markets. The assumption is, that fuel chips are delivered to the Russian side of the Niirala border station, and the price of chips is set according to statistics and by FCA (free carrier) delivery term. Energy wood is further transported from Niirala either by train or by truck (Fig. 1). The end use takes places in Eno, Puhos, Outokumpu and Joensuu.

![Figure 1. Transportation routes from Niirala border station and the destinations.](image)
2 Calculation of costs

Costs were calculated using GIS information of distances and roads. Other costs like loading, unloading, truck transportation and overheads are derived from existing research results (Ranta & Rinne 2006). The supply chain alternatives are presented in the Table 1.

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<thead>
<tr>
<th>Form of delivery</th>
<th>Destination</th>
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<td></td>
<td>Puhos</td>
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<td>Chips by truck</td>
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<tr>
<td>Chips by train</td>
<td>X</td>
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<td>Roundwood by truck</td>
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<td>Roundwood by train</td>
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Loading of trucks was supposed to happen by front loaders. Truck transportation included driving empty to Niirala border station, loading with front loader, driving loaded to use place and unloading in reception by relevant method. In Finland, state railroad company VR has still monopoly for both passenger and cargo transportation by train. This is why train transportation cost is simply combination of loading and unloading costs added by railway car rent and tariff per km.

3 Results

Fuel logs from Russia are surprisingly more expensive than ready made chips. Chipping causes the additional cost of 5 €/m³. For the city of Joensuu, the delivery of chips is the most competitive alternative for wood fuel import (Figure 2.)
In roundwood import, extra roundwood tax (4 €/m³) changes the situation unfavorable for unprocessed fuelwood import (Hämäläinen 2007). Extra roundwood tax is a new Russian act to restrict roundwood export and promote domestic wood industry and further processing of trees.

Figure 2. Unit costs of imported fuel logs and fuel chips by transportation method in Joensuu.

Figure 3. Unit costs of imported fuel chips by transportation method in Puhos.
Figure 4. Unit costs of imported fuel logs and fuel chips by transportation method in Eno and Outokumpu.

4 Discussion and conclusions

The average comparable price of domestic forest chips for power plants was 11.1 €/MWh in 2005. (Ylitalo 2006). When the price of Russian forest chips is transferred to the price per MWh\(^1\), it varies from 11.8 €/MWh (chips by truck to Puhos) to 14.9 €/MWh (logs by train to Joensuu). The main reasons for price differences were efficiency of transportation and border price.

\(^{1}\) Conversion factor from solid m\(^3\) to MWh: 1 solid m\(^3\) = 1.85 MWh (stemwood with bark, 45% moisture) (Alakangas 2000)
The price of imported fuel wood was compared to actual price of wood chips in North Karelia. The market price was determined by a telephone survey with a sample of three North-Karelian energy cooperatives (Enon energiaosuuskunta, Tuupovaaran energiaosuuskunta and Kontio-Energia). The average price of fuel chips from suppliers not members of a cooperative was 11.2 €/MWh. The price of imported chips per MWh was higher in every case in this study. In the case of Puhos (nearest to the Russian border), the difference was relatively small, but in Outokumpu, the difference was about 3 €/MWh.

Wood import from Russia is in continuous change. Some operators are afraid, that additional payments are coming soon also for fuel chip import. Availability of fuel chips is also a bit limited in Russia. Some Finnish operators have modified supply chain so that Russian roundwood is transported near to border stations and chipped there by Finnish entrepreneurs and machines before customs. Hence extra tax for unprocessed timber (roundwood tax) can be avoided.

Russian fuel chips play a minor role in North Karelian heat entrepreneurship, and there is several uncertainties concerning the future. The price of chips is usually higher than with domestic fuel chips, but the quality is usually better (Hämäläinen 2007). Raw material of Russian fuel chips is usually harvester-made large diameter roundwood which has dried naturally.
5 Summary

The number of small and medium size heating plants is increasing all over the Europe. Russia is an important source of timber for European forest industries. The domestic use of wood for fuel in Russia is concentrated to use of firewood logs in households. Possibilities for large scale export of fuel chips and energy wood are ample due to forest harvesting practices, in which all timber has to be removed from harvesting sites. Economics of fuel chips and fuel wood export was clarified by case studies. In addition, professionals in energy wood procurement and import were interviewed.

The price of Russian fuel chips is higher in all studied heating plants, if compared to domestic chips and current market prices. The difference varied from less that 1 up to 3 € per MWh. Although, the good quality of Russian chips partly compensates the difference, and that is why Russian chips are used in some extent. Surprisingly, the train transportation is more expensive than truck transportation. Especially transporting of logs was uneconomic when compared to truck. This is due to low density and difficult utilisation of the full payload capacity of railway car. Another reason is that heating plants were located relatively near to the border, when the economics of train transportation in long distance transportation are not yet working. Export of timber and forest fuels from Russia is under continuous change, and that is why counting too much on this fuel source can be risky. From economical point of view, remarkable savings in small and medium scale import in the long run are not probable either.

6 References


Idän Metsätieto. 2007. Venäjän metsätalouden Internet-tietopalvelu. [Internet based information service of Russian forestry, in Finnish and in Russian] www.idanmetsatieto.info

