

# Renewable energy at the Zheshart Plywood Factory, Komi Republic, Russia

”Zheshart Plywood Factory”, one of the largest plywood, particle board and MDF producing enterprises in Russia, made significant savings in energy costs by replacing their natural gas fired boilers with boilers fired with waste wood originating from their production process. Thanks to the reduced consumption, the investments are repaid in approximately 1.5 years.

## Short site description

Closed joint-stock company (CJSC) “Zheshart Plywood Factory” is located on the Vichegda River bank, near the settlement of Zheshart, is situated 150 km north-west of Sytyvkar.

The factory was founded in 1941, with an estimated production capacity of 10 000 m<sup>3</sup>/year. Today the mill capacities allow production of over 300 000 m<sup>3</sup> of wood-based panels per year. Two thousand five hundred people are involved in the production process. Over 80 % of plywood is exported to the USA, Sweden, Great Britain, Denmark, Germany, Italy and other countries worldwide. All products from the “Zheshart Plywood Factory” are sold under the trade mark “United Panel.



*Disposal of waste wood at a local dump*



*Wood waste from the production process to be used as fuel*

## Installation of a biomass boiler at the Zheshart plywood factory

Up to the beginning of 2007, Closed joint-stock company (CJSC) “Zheshart Plywood Factory” had its own boiler-house producing heat to satisfy both the needs the factory and the whole settlement where it is located. The boiler-house comprised 6 boilers. Four of the boilers used natural gas as fuel, whilst the other two used wood waste (tree bark and waste from the production process). These two wood fired boilers could not, however, burn sawdust, as this requires a very specific boiler design. A significant amount of sawdust generated at the factory (approx.



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34.5 tonnes/day), could not be used as fuel and was therefore being taken to a local solid waste disposal site.

The project in question involved the installation of a new boiler in the existing boiler-house for combustion of sawdust, with a capacity of 7 megawatt (thermal). The sawdust is transported pneumatically from the MDF (Medium Density Fibreboard) and particle boards sawdust bunkers to a filter with a retention bunker installed near the boiler-house. Once filtered, the sawdust goes to the plenum chamber, where the air/fuel mixture is generated, after which it is transported to the pulverized fuel burner. The pulverized fuel burner is constructed according to the design of a gas burner. The fuel lights with the help of natural gas, and as soon as the furnace is heated to the required temperature, the furnace switches to using 100% sawdust as fuel. The design of the furnace has been adapted to provide complete combustion of sawdust, being elongated with an additional primary furnace for burning sawdust.

### Financing and project implementation

With the assistance of the Komi Energy Efficiency and Cleaner Production Partnership (KEEP) and Norsk Energi, the Zheshart Plywood factory was able to secure a loan of € 340 000 from the NEFCO Cleaner Production facility. Zheshart Plywood factory also provided € 100 000 of its own equity.

Installation of the new boiler was begun in November 2006 and the new boiler was put on line in February 2007.

### Economic savings and environmental benefits

The project results in significant savings, in economic terms, in resources and in emissions to the environment, as presented in the table below:

Savings Element	Change after project implementation	Annual savings (1000 rubles/year)	Annual savings (€/year)
Natural gas consumption	- 5 600 thousand m <sup>3</sup> /yr	5 108	173 680
Electricity	+ 130000 kWh/yr	- 153	- 5 200
Environmental fees	--	2 231	75 885
Fuel for transport of the waste to the landfill	- 107222 liters/ yr	1 206	41 000
Drivers' wages	--	173	5 880
Landfill maintenance	--	432	14 710
Operating and maintenance	--	216	7 350
<b>Total</b>		<b>9 214</b>	<b>313 306</b>

The profitability of the project as a whole is summarised below:

Profitability parameters		
Total project costs	440 000	Euro
Total net savings	313 306	Euro/yr
Payback	1.5	Years

The project leads to significant environmental benefits, including significant reductions in emissions of sulphur dioxide and carbon dioxide. As a result of the elimination of the need to dump waste wood at the local disposal site, emissions of methane, a very strong greenhouse gas which contributes to global climate change, have also been reduced. The project is therefore also a good candidate for development as a Joint Implementation project.

### Conclusions and lessons learnt

This project demonstrated the multiple benefits of replacing fossil fuel based boiler equipment with renewable energy based technology in an industrial site. This type of project leads to economic and environmental benefits, including a significant reduction in emissions of greenhouse gases which cause climate change. This type of biofuel conversion project is not limited to industrial sites, and many opportunities exist to adopt this option for municipal centralised heating projects.

### More information

For more information of this project and to find out the benefits of Energy Efficiency please contact Norsk Energi,

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