

Use of wood waste for energy production, Verkhnetulomskij, Murmansk Oblast, Russia

Since 2001 the local sawmill in Verkhnetulomskij has been providing 60% of the fuel that is needed for heat energy in the village. This is the result of a fuel switch project which was implemented by Tekos in 2000 and which demonstrates that switching from fossil fuel to biomass use in energy production leads to significant cost savings and environmental benefits. The project, as 4,5 MW wood waste boiler, was jointly financed by Tekos, the Norwegian Ministry of Foreign Affairs and the Barents Secretariat.

Short site description

The village of Verkhnetulomskij is located 70 km south west of Murmansk on the Kola Peninsula, and has 3000 inhabitants. In the past, the village relied on a district heating system and three boiler houses, where the main energy carrier was heavy fuel oil (mazut). Fuel oil prices, however, increased significantly since the end of the soviet era. The mazut price was even higher than in Verkhnetulomskij than in other parts of Russia because of the long transport distance for oil, and the fuel cost was a heavy economic burden for the village municipality. The emissions to air from the mazut fired boilers also represented an environmental problem.

Project description

The saw mill belonging to JSC NoRu Priroda, located at Verkhnetulomskij, produced large amounts of wood waste as a result of its process. The wood waste was deposited in a local landfill. The wood waste could, however, be used as a fuel at the local district heating boiler houses, and the quantities of biomass fuel were sufficient to substitute the major part of the mazut. Utilization of the wood waste as a fuel would also solve practical and environmental problems connected to the landfill.

A feasibility study of the project was made by The Norwegian Energy Efficiency Group (NEEG) and the Murmansk Oblast Energy Efficiency Centre in October 1997. This study concluded that conversion of the

mazut fired boilers to the use of biomass fuel was economically profitable.

Recycling technology

The biggest district heating company in Murmansk Oblast, TEKOS, has been the owner of the boilerhouse in Verkhnetulomskij since 1996. The 11 September, the company TEKOS and NEEG signed the last contract in connection with purchasing an old biomass fuelled plant for delivery and installation at Verkhnetulomskij. The plant was manufactured by Saxlund, and has a capacity of 4.5 MW. The plant was disassembled from Forssjö Bruk in Sweden, and transported through Finland to Verkhnetulomskij. About 100 tons of equipment needed to be transported using 6 trucks.



Boiler schematic



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Environmental and social benefits:

The municipal budget and the inhabitants had to allocate a major share of their money to pay for heat. The economic situation for the inhabitants of Verkhnetulomskij was therefore very difficult. The reduction in heating resulting from the fuel conversion had a significant positive impact on the personal economy of the inhabitants.

The project in Verkhnetulomskij also resulted in several environmental benefits:

- The wood waste substitutes 3 200 tons/year heavy fuel oil with a sulphur content of 2,5 %. This gives a reduction in the emissions of CO₂, SO₂, NO_x and dust to the atmosphere.
- The waste problem at the saw mill is solved. This reduces acidic water pollution to soil and river.
- Deposition of organic material also have a global environmental effect because of the formation of methane, which is a very aggressive greenhouse gas. The elimination of the need for deposition solved this problem.

Financing and economics

The project was financed through the use equity from the local district heating company, TEKOS, plus grants from the Norwegian Ministry of Foreign Affairs, the Barents Interreg Programme and the Barents Secretariat, in the following proportions:

| Financing source | Amount (Euro) | % of total |
|---------------------------------------|----------------|--------------|
| TEKOS | 430 000 | 71 % |
| Norwegian Ministry of Foreign Affairs | 70 000 | 12 % |
| Barents Interreg programme | 42 000 | 7 % |
| Barents Secretariat | 62 000 | 10 % |
| Total investment | 604 000 | 100 % |

Annual savings of heavy fuel oil amount to 2 300 tonnes per year. The payback time for the project was 2.1 years.

Conclusions and lessons learnt

This project demonstrated the multiple benefits of replacing fossil fuel based boiler equipment with renewable energy based technology in a village in North West Russia. 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 municipal centralised heating systems, and many opportunities exist to adopt this option for industrial sites as well.



The new biofuel boiler house

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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