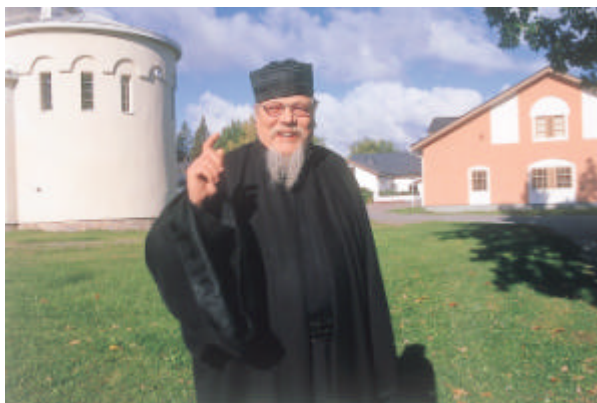




Valamo Monastery byes heat from Vapo Oy produced by wood pellets

The Orthodox monastery of Valamo is located in Heinävesi, about 60 kilometres west from Joensuu, at the frontier of Savolax and northern Karelia. The monastery is an active Orthodox cultural centre with over 100,000 visitors annually. There are about a dozen monks residing in the monastery permanently.



Brother Andreas points out that the services of the Valamo are tourism and ideology. Wood pellet heating is suitable for the ideology of the monastery.

According to an old tradition, the monastery is self-sufficient, which is why Valamo offers a wide variety of services for tourists. More than 200 visitors can be accommodated. There is also a restaurant, winery, shop, meeting rooms, a library, museum, conservation unit, and an educational institute (a folk high school) in Valamo. Heated space amounts to 40,000 cubic metres.

Wood substitutes fuel oil, heat obtained from Vapo Oy

The Valamo monastery was previously heated with wood chips and fuel oil. However, there was a desire to lower the heating costs as well as to decrease the amount of work required for heating. When the heat consumption was low, wood chips could not be used in the old boiler of the monastery. Hence, in warm seasons, all heating had to be produced by using oil.

The Valamo monastery and Vapo Oy Energia signed a heating contract in September 2000. Valamo was Vapo

Oy's first heat customer whose heating was produced with wood pellets. The contract is for 15 years.

In order to implement wood pellet heating, Vapo Oy modernised the old heat station of the monastery, which consumed up to 100,000 litres of fuel oil annually and required regular attendance. FIM 200,000 was invested to install a wood pellet burner into the old chips boiler, a screw feeder from the fuel store into the burner, and an ash remover screw. Vapo Oy made the investments and rented the heat station from the monastery, which in turn buys the heat from Vapo Oy and is in charge for the heat station.

Automatic operation

The wood pellets are stored in the old chips silo with two screw conveyors installed. They operate in turns, transferring the pellets from the silo into a day container. The surface switch of the container activates the screw. The pellets are evenly fed into the furnace by the screw.

There is an air space in the furnace with air blown by a centrifugal blower. Combustion takes place on the outer wall of the furnace. The ashes are transferred over the walls onto the boiler floor, from where a screw transfers them into an ash container outside the plant.

The capacity of the wood pellet burner GrandeG 400, which was delivered by JPK-Tuote O, is 400 kilowatts. A programmed logic controls all operation of the burner. The heating of the store chamber can be adjusted by a heat recovery system that was installed in the place of the earlier feeder door. About 55 kilowatts are obtained from the feeder, and it has been connected into the mixing circuit of the boiler. The computational efficiency factor of the boiler is 85 per cent.

The modernised heat station of Valamo produces about 2,000 MWh of energy per year, using about 440 tons of pellets. There is also an oil-fired boiler in the heat station as a source of backup heating.

The modernised heat station is automatic with the janitor of the monastery taking care of practical maintenance work. The plant has operated by wood pellets since November 2000 without any problems, and no fuel oil has been consumed in winter.

Use of pellets decreases carbon dioxide emissions

Wood pellets can be used to decrease the use of fossil fuels in energy production. Because wood pellets constitute a renewable fuel, their use decreases carbon dioxide emissions caused by energy production. Carbon monoxide and nitrogen emissions are low with correctly adjusted equipment, because combustion is controlled due to the even quality of the fuel and the even feeding of the fuel into the burner.

The carbon dioxide emissions of the plant are 530 tons lower than with the same energy produced with light fuel oil.

Wood pellets from Ilomantsi

The pellets are supplied to Valamo from Vapo Oy's Ilomantsi Pellet Plant 130 kilometres away. It has produced wood pellets for about a year. Earlier, the same plant produced peat briquettes.

Two new Bühler pellet presses and a hammer mill have been acquired for the plant. The annual production capacity of the plant is 45,000 tons of wood pellets, which corresponds to 216,000 MWh of energy. This is enough for heating 10,000 detached houses throughout the year. The main marketing area is Finland, with pellets also exported to Sweden and Denmark.

Pellet plant important for the Municipality

The founding of the Vapo Oy Pellet Plant was supported by the Employment and Economic Development Centre of northern Karelia, the municipality of Ilomantsi and the Regional Council of Northern Karelia (Pohjois-Karjalan liitto), through which also some EU co-financing was allocated to the project. The start-up of the pellet plant was the main project in the municipality of 7,300 inhabitants in 1999, and had an important job-creating effect.

The cutter shaving, grinding dust and sawdust used by Vapo Oy in the production of wood pellets are purchased from forestry enterprises in northern Karelia.

The main part of the raw material is dry cutter shaving that is stored indoors. When necessary, a fluidized-bed drier is used for drying wet raw material. When pellets are pressed, the wood is heated and the released lignin binds the raw material. This is how the solid form and shiny surface of the pellets are created. Finished pellets are cooled before transferring them into store.

Vapo Wood Pellets

Size	diameter 8mm, length 10–30mm
Energy content	4.8MWh/ton, i.e. 3 MWh/loose m ³
Moisture content	8–10%
Ash content	0.4%
Raw material	cutter shavings, grinding dust, sawdust
Bulk volume	650kg/ loose m ³ .
Volume	1.5 loose m ³ /ton

Technical data

Output of the pellet burner	400kW
Fuel	Wood pellets
Heated space	40,000 m ³ .
Annual energy production	2,000 MWh
Annual fuel consumption	440 tons
Capital costs	FIM 200,000 (33,640 €)
Introduction	11/2000

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