

BIOMASS-WOOD

District heating

IGNALINA

(Lithuania)

By the year 2010, 12% of the gross inland energy consumption of the European Union is to be covered by renewable sources of energy. To meet this goal, intensified use needs to be made of biomass, both for heating purposes and for power generation. Timber and forestry residues are available in ample quantities, but the required investment costs are a barrier to the broad-based use of this energy source. In Ignalina, an energy production from biomass project financed under a Swedish funding programme has come to symbolise the commitment of the local authority in a town provided with a nuclear plant.

THE CITY

Ignalina is a town with 7,500 inhabitants located in the north-eastern part of Lithuania in the Utena Region. The town is situated in a nature reserve and is subjected to strict environmental rules as regards emissions.

Climatic data:

Annual average temperature: 5,5 °C



CONTEXT

In 1998 a project for a wood-fired boiler was launched in Ignalina to supply the existing district heating system. The overall aim of the biomass plant and district heating system rehabilitation project was to create an environmentally-friendly system suitable for use in an environmentally sensitive area.

The project demonstrated that it was possible to concentrate heat production in only one out of the three existing boiler houses. Two old boiler houses were closed and a new 6MW wood-fired boiler was installed. The project was carried out under the Swedish EAES Programme as part of Sweden's international climate-related energy programme.



EXPERIENCE OF IGNALINA

The local project partner is Ignalina District Heating Company, a municipality-owned company. The company and the municipality had several reasons for launching into the project. The most important one was to reduce heat production costs. Other reasons include access to new technology, improved heat supply reliability and quality and reduced emissions.

The host country institutions are the Ministry of Economy, the Energy Department and the Ministry for the Environment. They supported the project for it contributes to a number of environmental and energy-related objectives, such as reducing the dependency on imported fuels. The most important environmental objective is to reduce emissions of SO₂, CO₂ and other harmful air pollutants. Transfer of technology and know-how as well as the creation of local jobs are other reasons that account for governmental support.

The boiler covers base-load demand for heat and hot water. The distribution networks were inter-connected and new substations were installed. Annual energy production amounts to 36,000 MWh. The heat supply is based on 40% light oil and 60% heavy oil. Heavy oil will still be used in the boiler house to provide top-up heat at time of peak demand and to provide back-up. In 1999 stricter environmental rules were introduced by the Lithuanian Government and now only heavy oil with low sulphur content is allowed for heating purposes.

Project data

The new central heating station in Ignalina comprises the installation of the wood boiler, biofuel firing equipment, basic biofuel storage on the ground (asphalt), fuel conveyor, flue gas cleaner (cyclone), civil works, buildings and control equipment (see diagram in Figure 1).

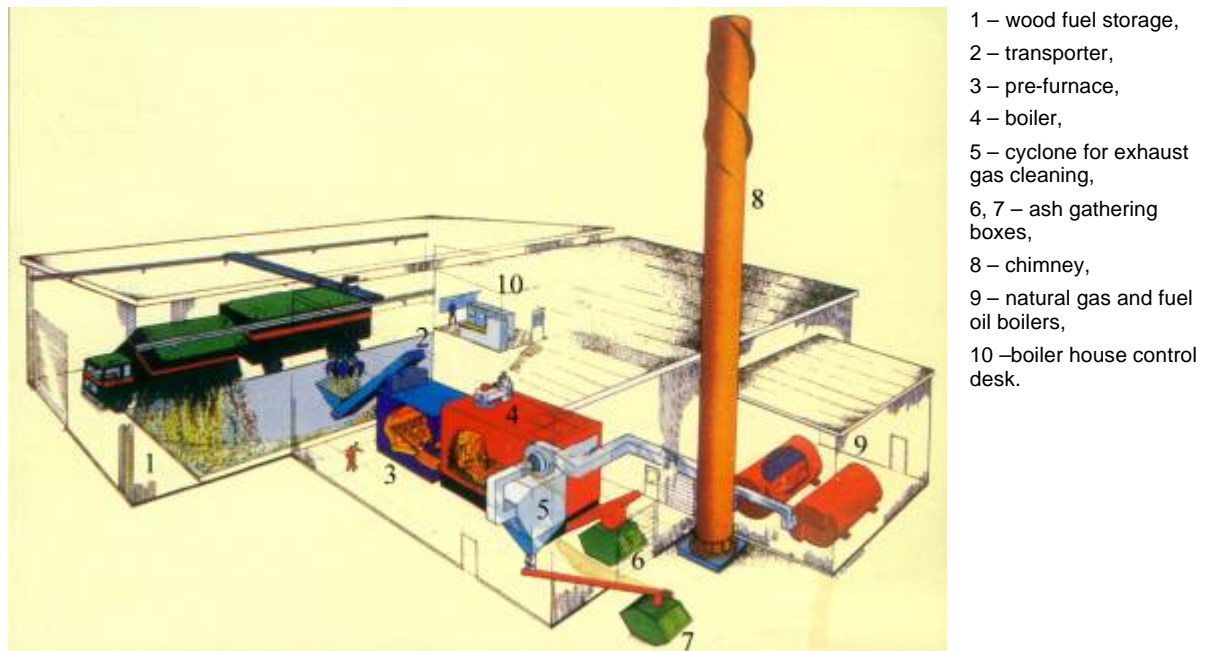


Figure 1. Boiler house diagram

A new 300-meter long pre-insulated pipeline was installed to interconnect the existing networks as well as 30 new substations in buildings and block centres.

Biofuel boiler	6 MW
Oil Boiler	7 MW
Automatic fuel storage	200 m ³
Flue gas cleaning	multicyclone < 300 mg/N m ³

Substation equipment Network and boiler house installations	
Pre-insulated pipes	ABB
Heat exchangers	OTTO Plattenw.
Pumps	WILO
Commissioned	March 1999

Base case parameters

Annual heat production includes 25,000 MWh/year produced from biofuel and 10,000 MWh/year from heavy oil. The energy savings resulting from the installation of the new pipeline and substations are estimated at 1,000 MWh/year. Biofuel is expected to substitute for 2,300 tons/year of heavy oil.

Before		After	
Energy (MWh/year)	36,000	Energy (MWh/year)	35,000
Produced from light oil	14,000	Produced from light oil	0
Produced from heavy oil	22,000	Produced from heavy oil	10,000
Produced from biofuel	0	Produced from biofuel	25,000
		Savings	1,000

The bio-fuel used in the boiler is a mixture of sawdust and wood chips from local woodworking industries. Sawdust is delivered directly by two sawmills (approx. 10% of total wood fuel used) whilst a third company equipped with a wood chipper provides the wood chips (approx. 90%). These are derived from waste wood from municipal sawmills.

Economic aspects

The calculations show that heat production costs decreased from about 1.1 million €¹ to 0.8 million € (26.5%) between 1998 and 2000. In the meanwhile, the share of fuel costs in total heat production costs dropped from 47.6% (1998) to 21.4% (2000).

Specific heat production costs decreased by 5.12 €/MWh (17.7%). In the period 1998 - 2000 consumer heat price was 27.2 €/MWh (Ignalina District Heating). The price had been set by the Ignalina District Heating Company and approved by the National Control Commission for Prices and Energy. The price fully covered heat production costs in 1999 and 2000.

Light fuel oil and heavy fuel oil are imported from outside the municipality, whereas biofuel is produced locally. Expenses related to fuel imports between 1998 and 2000 decreased by 93.4%, thus resulting in 477,000 € being saved due to avoided fuel imports. The following table shows how the project was financed:

Total costs in million €	2.27
Loan (STEM) in million €	1.60
Grace period (years)	2
Maturity period (years)	10

¹ Exchange rate as at 27.08.2002

Environmental aspects

The project is included in the Pilot Phase for Joint Implementation Activities initiated under the United Nations Framework Convention on Climate Change. The main objective is "reduction or limitation of greenhouse gas emissions to the atmosphere at a level that would prevent dangerous man-made interference with the climate system". Results obtained in Ignalina are as follows:

Saved CO ₂ emissions	8,112	tons/year
Saved SO ₂ emissions	123	tons/year
Saved NO _x emissions	3	tons/year

Most of the ash accumulated during the biofuel combustion process was given, after being analysed, to local gardeners to be used as a fertiliser. Some of it was also used on several forest sites.

EVALUATION AND OUTLOOK

Lithuania is a rural country with no high concentrations of population. The potential for exploiting biofuel is high and the technical potential is quite good.

The wood-fired plant installed in Ignalina contributes to meeting the objectives set to the Lithuanian energy sector in terms of reducing energy intensity, creating and improving an energy infrastructure based on indigenous energy sources, utilizing the existing energy production capacity efficiently and developing co-operation between Baltic, Nordic and other Central European countries.

The installation also had some social and cultural benefits. The boiler plant provides an outlet for waste from local sawmills. Wood fuel production contributed to creating local jobs and working conditions were improved.

FURTHER INFORMATION

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