FORPA
Biomass to the Masses

SOUTH EAST EUROPE
Jointly for our common future

Programme co-funded by the EUROPEAN UNION

GOOD PRACTICE EXAMPLE

Biomass - District heating project Sarnthein

UNSERE ENERGIE

TIS innovation park

www.foropa.eu

1. The Idea

The Sarnthein Biomass District Heating Plant arose from the idea that one should be able to make better and increased use of the local renewable resources of wood energy. Entry into energy production seemed to be a sensible way forward for rural enterprises to increase the added value of forestry operations through the on-going management and ministration of local forests.

Timber from the forest which is unsuitable for sawing has hitherto had no commercial use, so the installation of the heating plant was designed to increase the importance of this material as the last link in the forestry timber value-added chain.

Implementation Timetable:

- 1998: Foundation of the district heating plant Sarnthein association
- 2001: Start of construction of the boiler house and the storage area
- 2002: Connection of Sarnthein and beginning of operation of the heating plant
- 2006: Expansion of the heating network to Nordheim
- 2013: Expansion of the heating network to Astfeld

A management board, which was set up in 2009 on the basis of equal representation, oversees the work of the cooperative, which means that the timber suppliers as well as the energy customers are represented on the board and take joint decisions on matters such as the price of wood or heat. Altogether 263 heat transfer stations for approximately 790 units (houses, firms, public buildings and so on) had been installed and were operational by spring 2013.

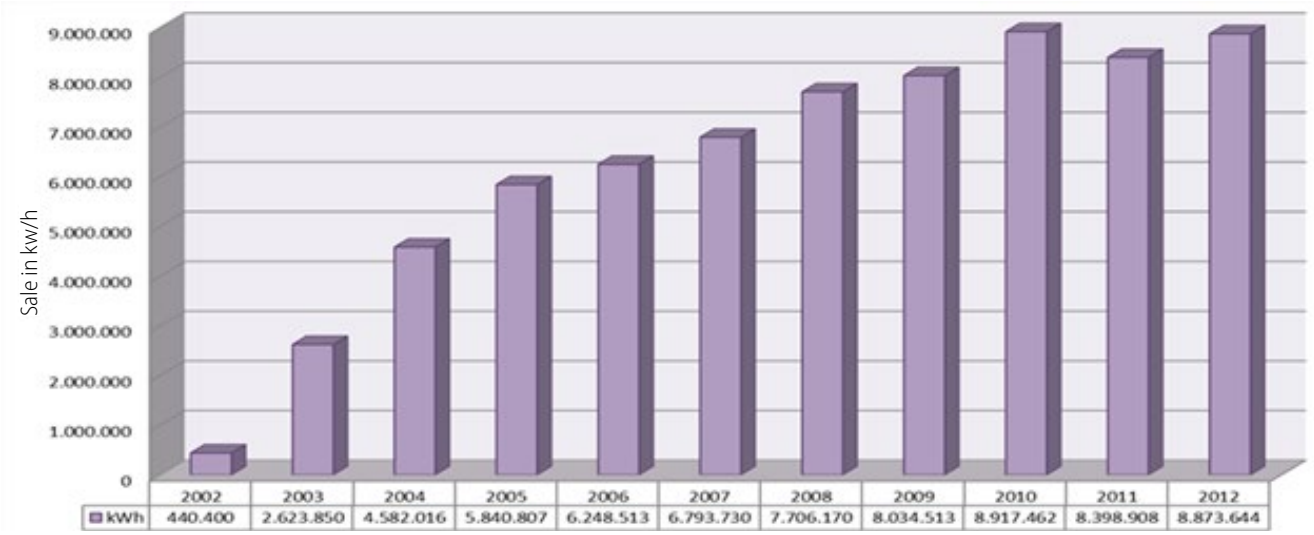
2. The Technology

The Sarnthein Biomass District Heating Plant is located at the upper end of the industrial zone north of Sarnthein. This situation places it right at the centre of the service area between the main location of Sarnthein to the south and Nordheim and Astfeld to the north. The position is equally convenient in terms of access routes for delivering the fuel, avoiding the need for streams of vehicles to pass through the built-up areas.

The building consists of two structures: the boiler house with dimensions of 27.8 m x 15.3 m, and the adjoining fuel store measuring 45.0 m x 25.3 m. Part of the boiler house is used by the administration offices of the operating cooperative. The following facilities are housed in the boiler house: the biomass boiler plant, the oil-fired standby boiler, the flue gas treatment system and condenser, the district heating water installation with pumping system and expansion vessel, the automated feeder, the automated ash removal system and the emergency power unit. A 100,000 litre buffer store tank is available to cover peak demand as well as for providing environmentally friendly operation in transitional periods. Currently, 53% of the buildings in Sarnthein and Nordheim are heated by the district heating plant.

3. The Heating Network

The district heating network is laid out as a radial dual-pipe system with flow and return. The pipe system consists of a friction-lock network system of factory-made pre-insulated pipework. The pipes are formed of a steel medium pipe with a polyethylene casing pipe and a heat-resistant insulator. They are buried in a sand bed at an



Increasing sale of the heat in past years

average depth of 0.9 m. The pipes are equipped with signal wires for surveillance and locating leaks, and the signal wires can detect leakages not just in the medium pipe, but also in the casing as a result of water ingress from outside and thus indicate problems with the insulation and a potential danger of corrosion. The route of the district heating pipe system mostly follows publicly owned roads and paths.

4. The District Heating Substation

Connecting the heating circuit to the consumers' buildings takes place indirectly via district heating compact substations. Hydraulic separation into a primary circuit (i.e. the district heating network) and secondary networks (i.e. the central heating systems of the individual buildings) allows for adaptation to the different operating conditions in the heating systems of the consumers, and is also necessitated by technical and safety considerations. The following controls are available on the section of the primary network which enters the building:

- A blocking valve each for feeding and return flow
- Manometer
- Thermometer
- Dirt trap
- Combivalve for the adjustment of differential pressure and mass
- Heat counter
- control and feedback control systems

This provision allows the setting of an individual weekly heating programme and a timed programme for domestic hot water heating.

5. Our Raw Material (100% Sarntal)

- Overall area of the valley of Sarntal ..... 30.250 ha
- Forest area ..... 13.000 ha
- Amount of forest owners ..... ca. 700
- Total reserves ..... 3,2 Mio scm
- Annual increment ..... 51.000 sfm/year
- Annual allowable cut ..... 45.000 sfm

The Sarnthein District Heating Plant exclusively uses biomass from the surrounding sustainably managed forests of the Sarntal. Approximately 36,000 cubic meters of standing wood are made available for felling each year, of which an average of approximately 30,000 cubic meters per year have been used over the past few years. Therefore, it can be argued fairly that the forest of Sarntal is managed sustainably.

The economically useable energy wood potential of timber from the Sarntal Forest represents around 18,500 cubic metres of standing wood per year (current consumption of timber in the Sarnthein District Heating Plant is 6,800 solid cubic metres, corresponding to around 17,000 cubic metres of loosely poured woodchips). Sustainable exploitation of the forests is guaranteed by the internationally recognised PEFC-Certification of all forest owners. This heating plant Sarntal is thus one of the few district heating plants in South Tyrol which are exclusively powered by local biomass.

6. Ecological advantages for the valley

By spring 2013, 317 buildings, including 45 businesses and 17 public buildings, had been connected to the Sarnthein District Heating Plant to the 12.7 km long pipe network. The network includes the townships of Sarnthein and Nordheim with the current extension to Astfeld.

The total quantity of heating oil replaced by wood in 2012 came to 1.15 million litres. As wood is a carbon-neutral energy source – when burnt it releases the same amount of CO2 it has absorbed whilst it has grown – around 3,400 tonnes of CO2 emissions could be saved in 2012. Thus the plant is making a significant contribution to the reduction of greenhouse gases.

Before the Sarnthein Plant started operations, all buildings in the area had stand-alone heating systems. On cold winter days at times of temperature inversion a blue pollution cloud would often form over Sarnthein. Several individual boilers have been replaced by

the implementation of a central controlled furnace. This has led to a significant reduction in the emission of airborne pollutions and in turn to an improvement of the air quality.