

BIOMASS-WOOD

Power plant

LIENZ

Austria

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 most countries of the European Union, wood plays only a minor role beyond its traditional use in rural areas. Scandinavia and Austria are the exception to this rule. Thus, for instance, the town of Lienz started up the largest biomass facility of Austria in October 2001, thus making a sustainable contribution to improving local air quality.

THE TOWN

Lienz, the regional capital of East Tyrol with some 13,000 inhabitants, is located at the foot of the Dolomites mountain range and between the Isel and Drau rivers. Tradition and the arts are very important in Lienz, which was home to, among others, the painter Albin Egger-Lienz.

Local industry is dominated by refrigeration appliance manufacturing, while the new industrial estate has attracted mainly service and 'new media' companies.



Climatic data:

Heating degree days: 4211
Annual mean temperature: 7.6°C

CONTEXT

The local climate in the area of the Lienz valley is characterized by a pronounced basin-shaped topography. In order particularly to improve the winter-time air situation (in view of the classic basin situation), the environment department of the city authority of Lienz developed in 1993 the Lienz Energy Project. This involved establishment of the Lienz Energy Council (bringing together, on an honorary basis, members of administration, citizen initiatives and environmental organizations, student and teacher representatives and experts in environmental medicine) with the support of the Energie Tirol regional energy agency. Activities focus on road transport and on cutting energy consumption.

The 'Lienz Energy Perspective' was developed upon the basis of an energy data survey conducted among 2,500 households in the year 1996. This led to the '500 roof installation programme' and a boiler replacement campaign. In addition, a five-year grant scheme was established for solar installations for households and firms in Lienz, providing 73 Euro/m². Further activities in Lienz include the East Tyrol Energy Conservation Days, a regional energy advice centre, several public seminars on energy conservation options and intensified public awareness-raising activities with regard to energy.

EXPERIENCE IN LIENZ

Through constructing the largest biomass-fired power plant in Austria and a piping network for district heat supply covering the entire area of the town, Lienz is implementing its environmental policy consistently.

In 1998, a sub-group "District heat for Lienz" was established within the Energy Council, with the remit to put out to tender a biomass-fired, central district heat project. In April 2000, the town of Lienz, the hydroelectric company Tiroler Wasserkraftwerke AG TIWAG and the district heat company Steirische Fernwärme Stefe established the district heat production and distribution company for Lienz "Stadtwärme Lienz Produktions- und Vertriebs-GmbH" (the town of Lienz holds 4% of the shares, TIWAG and Stefe each 48%). The task of the new energy service provider is to construct and operate the district heat supply system.



Citizen assemblies, press releases and an extensive marketing campaign were used to inform the public about the project from the very outset and to animate people to sign heat connection contracts. The town of Lienz undertook to have its 250 housing units connected to the network. Once a threshold of 10 MW had been reached, the decision to commence construction was taken in September 2000. The first construction phase, comprising 18 km supply piping, the necessary house service connections and the heat plant, started in spring 2001. The biomass facility started operation in the autumn of 2001.

The central heat station was erected in the Peggetz area near the composting plant. This has two biomass-fired boilers (a high temperature boiler and a thermal-oil boiler) with a capacity of 7 MW and 6 MW respectively, and an oil-fired boiler with a capacity of 11 MW which covers peak load and provides reserve capacity. The station is fitted with a flue gas purification unit with heat recovery. In addition, a turbine with a capacity of 1 MW generates power which is fed as high-grade 'green electricity' into the network of TIWAG. The turbine is driven by the biomass-fired thermal-oil boiler with an Organic Rankine Cycle (ORC) processor. The heat extracted from this cogeneration system is also used for district heat supply.

A 640 m² solar thermal installation on top of the heating station rounds off the 'green' energy supply concept in Lienz. The plant shall deliver 250 MWh heat annually.

The district heat piping system shall be expanded in three phases until the year 2003, with a total length of 31.5 km when finally completed. The biomass fuel (100,000 Srm [m³ piled timber] per year) in the form of sawmill residues, wood chips from forestry operations and tree bark is supplied by regional wood processing companies; at least 10% is supplied by local farmers. This provides farmers the opportunity to earn money with wood chips from previously unsellable small-diameter wood. The biomass is stored in a facility at the composting plant and is delivered daily in winter. The suppliers have 'just in time' delivery

contracts. In winter, the daily peak biomass requirement of the plant is around 400 m³ piled timber. The biomass heat plant creates firm employment for four persons.

Under the principle of even heat demand, it is assumed that the total heat load is never required simultaneously. This makes it possible to connect a total load of 32.5 MW to the biomass-fired cogeneration plant, although the three boilers and the heat recovery system together can provide a maximum heat load of 25.5 MW. The forecast heat output of the cogeneration plant in Lienz figures 68,000 MWh/a, of which 95% will come from biomass.

The investment required to construct the heat plant and the piping network in its completed form is estimated at Euro 19.6 million. These costs are shared equally by the Tyrol regional government, the Austrian federal government and the European Union. The investment in house service connections is expected to cost a further Euro 10 million. The district heat is delivered at a price of 0.052 Euro/kWh for small-scale customers and 0.035 Euro/kWh for large-scale customers.

EVALUATION AND OUTLOOK

By summer 2001, heat purchase contracts amounting to an overall capacity of 25 MW (corresponding to 75% of the final capacity of the plant) had been signed.

In October 2001, Stadtwärme Lienz started operations at the biomass-fired cogeneration plant, launching district heat supply after a construction phase of only 7 months. The 18 km supply piping of the first network phase connects 280 transfer stations for households and municipal buildings such as the hospital and the home for the elderly.

The biomass cogeneration plant saves 29,700 t CO₂ emissions annually, which is more than half of total emissions (118%); electric heating systems are also substituted by the district heat. Similarly, SO₂ emissions are cut by 114%, or 29.9 t. NO_x emissions are reduced by 53% or 17.4 t, and dust emissions by 37% or 1 t.

In 1998, the Energieinstitut Vorarlberg energy institute launched the e5 programme together with partners in the Austrian regions of Tyrol and Salzburg. e5 is a qualification and label award programme for local authorities. Some 30 local authorities in Europe are now working to earn their 'e' grades and their number is growing constantly. In June 2001, the town of Lienz was already awarded the third 'e' (five are possible), which means that 50% of the maximum possible measures relating to sustainable energy policy have been implemented. From 'e3' onwards, the local authority automatically receives the 'Communal Label' awarded by the EU. This award highlights the commitment of the local authority.

FURTHER INFORMATION

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