

## Bioenergy in Austria - Potential, strategies, success stories

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The paper deals with the successful development of bioenergy in Austria since the oil crisis in 1973. Driving forces for the development in Austria have been the reduction of the environmental burden, regional development, the maintenance of the cultural landscape and of agriculture, guaranteeing employment and energy supply and the improvement of the balance of payments.

The geographic, climatic and social basic conditions for the production and use of bioenergy are described and compared with data collected in Europe, the United States and Canada. Parameters such as population density, per capita energy consumption, agricultural and forest area, the productivity of agriculture as well as the structure of the consumption sector and the attitude of the parties involved (decision-makers in the production of raw materials, in supply, conversion and marketing of final products on the one hand and the consumers on the other hand) influence the market development. The most simple parameter is the area per capita: in countries with less than 0.5 ha per inhabitant the possibilities of bioenergy are still low. In countries with an area of 0.5 to 1.0 ha per inhabitant bioenergy prospects are moderate, promising prospects are offered in moderate climates with an area of more than 1.0 ha per inhabitant [1].

With a share of currently 26 % renewable energy (waterpower and biomass) in the total energy supply Austria ranks third in Europe behind Norway and Iceland (the EU average amounts to 5 %). Bioenergy reduced drastically before the energy crisis in 1973 (1955: 18 %, 1976: 7 %), afterwards it increased considerably to 12%. As from the mid eighties the share of biomass has amounted to 12 %. In absolute figures the use of biomass has increased by 70%.

In most fields success could be achieved. Initially, biomass-fueled district heating plants with an output of up to 10 MW were constructed. Today, nearly 35 000 automatic plants are operated (31 200 up to 100 kW, 2700 up to 1 MW and 391 greater than 1 MW). A total output of 2.8 GW has been installed. Considerable progress could also be reached as regards central heating systems which are very common in Austria. Consequently, the thermal efficiency could be raised from 50 % to almost 90 %. Simultaneously, emissions sank drastically (carbon monoxide from 15 000 to less than 100 mg/m<sup>3</sup> [2], volatile organic carbon from 1600 ppm near to zero ppm).

An extraordinary success could be observed in the wood pellets and pellet furnaces market. In 1997 only 425 furnaces and 20 000 t pellets were sold, in 2000 3466 furnaces and 60 000 t pellets could already be marketed (predicted pellet use for 2001: 90 000 t). The reason for success is good marketing and high-grade fuels and furnaces. The positive basic attitude of Austrians towards renewable energy and the fact that Austrians mostly prefer living in their own single-family houses considerably contribute to the success.

The production and use of biodiesel made from rape has been examined in collaboration with science, economy and administration in laboratories, pilot projects, on the test bench and in fleet tests. A biodiesel standard could be developed which forms the basis of the release of engine and vehicle companies for the use of pure biodiesel in Diesel vehicles manufactured in serial production [3]. It is quite remarkable that in Austria almost twice as many automobiles with Diesel engines as with gasoline engines are sold. The reason being the low consumption and the high level of development of European Diesel automobiles as well as the lower Diesel price.

Although ethanol could so far not be established on the Austrian fuel market, the Austrian engineering company Vogelbusch has been successful in establishing large fuel ethanol plants on the US market

and it thus contributes to the production of environmentally sound fuels on the second largest biofuel market in the world.

New electricity made of biomass has so far been predominantly produced from biogas. Currently 100 biogas plants with an average performance of 50 kW are operated; about one half of the plants have been started in the past four years. The thermal gasification of biomass is still in a demonstration phase; with public support and in co-operation with the industry and a local interest group the Renewable Energy Network „reNet Austria“ is currently constructing a plant with advanced fluidized bed gasification and with a gas engine of Jenbacher Werke (electric performance 2 MW).

In the declaration “Puchberger Erklärung” the Austrian Biomass Association, the only Austrian lobby organization which equally represents all bioenergy resources and processing chains, calls upon decision makers and persons responsible for energy concerns in municipalities, regions and provinces and in the European Commission to adopt measures which guarantee that,

?? 40% of the heat demand, 4% of the fuel demand and 4% of the electricity demand are covered by bioenergy until 2010 [4]. In 1997 the total amount of energy used amounted to 1297 PJ. Until 2010 the share of biomass are to be increased by 68 PJ. The following objectives are pursued:

?? traditional wood fuels plus 43 PJ, straw plus 2 PJ, energy crops for solid fuels plus 8 PJ, grain and corn for ethanol as well as oil crops for biodiesel plus 6 PJ.

Bioenergy is to increase on the following markets:

?? plus 30 PJ for heating systems in single-family dwellings, plus 3 PJ in industry, plus 9 PJ for district heat, plus 19 PJ for the production of energy and plus 7 PJ for transport fuels.

The following measures are requested for the implementation:

?? On a national level it is requested (a) to make the implementation of the Kyoto target and the conversion to other sources of energy a matter of concern of the Federal Chancellor, (b) to implement a flexible, ecological tax reform, (c) to draw up a coordinated concept for the implementation of the White Paper of the European Commission [5], (d) to introduce renewable energy in public buildings, (e) to make available the necessary assistance and support, (f) to create the legal framework in the energy sector, (g) to extend the exemption of bio-fuels from the mineral oil tax and (h) to improve the legal framework for the sale of bio-fuels.

?? Corresponding measures are requested from regional and communal politicians and persons responsible for energy concerns.

The stated objectives and requested measures of this nation-wide strategy may be ambitious, but looking back on the development they are deemed feasible.

## References

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