

Case story

Why Bleiburg opted for a **CO₂ neutral district heating** system

Biomass heating in Bleiburg, Austria

9,538,200

tons of CO₂ are saved
in total since the
district heating
system was taken
into operation.



Biomass district heating from local resources

Franz Skuk from Bleiburg is not only a dairy farmer – he is also an innovative entrepreneur running his own biogas system on his property since 1999, which supplies 300 kW of electricity to the public grid.



I was able to assure energy supply for our citizens in the long term – and at the same time the quality of life has improved significantly. Overall, I am convinced I have taken the right steps and can only recommend that you follow examples such as here in Bleiburg. The key to survival is a sustainable economy!

Franz Skuk, Entrepreneur and dairy farmer from Bleiburg, Austria



Skuk uses the waste heat to heat his house and the farmyard buildings. A number of years ago the success of his system inspired him to think even further. He developed a district heating system that uses wood chips as fuel to supply his local community, with the intention of taking it a step closer to energy-independence.

His project, “Biomwärme Bleiburg” (biomass heating), is not unusual in Austria. There are actually about 100 similar projects in the neighboring 100 km alone. District heating grids based on renewable energy sources are particularly popular in villages and small towns in Austria, and have been running with success alongside conventional district heating systems since the 1980s.

Biomwärme Bleiburg went into operation in 2003. Today it is one of the key suppliers of heating energy in the picturesque location. Although it was, as Franz Skuk puts it: “a long way from being a farmer to an energy supplier”, he overcame political as well as technical challenges in order to realize a reliable, cost-efficient and CO₂-neutral district heating system for his hometown.

District heating in Austria

About 10 % of the district heating is produced by means of renewable energy sources (~55 % with gas, ~25 % with coal, ~10 % with oil). The most common form of renewable energy is wood or wood chips, but there are also projects that use straw, biogas, geothermal energy or industrial

exhaust heat. Conventional and alternative district heating systems coexist in harmony, due additionally to the fact that differentiation is becoming more and more blurred because municipal district heating grids are also integrating biomass heating plants into their systems or rural biomass district heating grids also use oil-fired boilers for handling peak loads.

But why did the development of alternative district heating systems at such a relatively early point in time take place in Austria? The second major oil crisis of 1979/80 made Austria aware of the problem of being fully dependent on the fossil fuels oil and gas. Furthermore, solutions were sought to strengthen the Austrian economy, particu-

larly in rural areas. To be less dependent on energy deriving from fossil fuels and to promote forestry, the Austrian state decided to financially support by means of grants local district heating projects based on biomass.

An opportunity for Bleiburg

Although district heating systems based on biomass are commonplace, why did Skuk particularly choose Bleiburg? The reason is simple: the investor lives nearby and can provide the necessary biomass from his own production facilities or through local businesses. He also owned the land near the town center where the heating plant was to be built. Moreover, the local population was very accepting of the project as oil prices were rising and 90 % of the households used individual oil heating systems for their heating requirements.

Personal relationship helps

Originally a non-local seller was to sell the heating energy, but this idea was rejected because the personal contact between the operator and end customers was key to success. Finally, Mr. Skuk sold the heating energy himself after setting up the company in 2002. He received extensive support from Danfoss in the documentation of the existing heating systems and in the development of optimization proposals for each object for connection.

Franz Skuk's greatest challenge was to convince potential heating energy consumers to switch to a local provider who originally came from a completely different sector – namely, from agriculture. To add to this, existing heating systems (usually in good working order) had to be completely replaced. Skuk's good relationships with the local population served to gain their support and promote the sale. Construction work began in 2002. The boiler house was able to be taken into operation in February 2003 and the first consumers were supplied.

System description

The project is planned for approximately 1400 full load hours annually for 229 heating days (3360 heating level days for Bleiburg). Already 70 % of the potential customers are supplied by the district heating grid. 110 buildings are currently connected to the heating grid, including an army barracks, a junior high school, a retirement home, other municipal buildings and private homes.

Each consumer is connected to the district heating system indirectly by means of a district heating substation from Danfoss. Each substation is individually configured to the heating requirements of the consumer. The substations are equipped with a communicative controller that controls the secondary system as required (different operating modes, etc.). Three circuits for heating and domestic hot water can be controlled. Using a substation, hot water can also be generated in a separate circuit that is connected on the secondary side. Additional controllers can be connected as required, and they can be operated by remote control in the homes. A heat meter records the consumed energy in each substation.

Central monitoring and control

The controller communicates with the power plant by a LON bus over a copper cable that is laid with the district heating pipes. In this way, the grid operator can access the controller units of the district heating substation via a centralized visualization and remote control system in order to remotely control and monitor them. The entire district heating grid can be optimized using this visualization system. Temperatures, the latest consumed heat quantities and much more information is visualized. With dedicated control measures, power peaks can be flattened in order to make the whole grid more efficient. Bill-

ing also works digitally with this system – there is no longer any need to read meters at the customer's premises.

Using local resources

The district heating grid is run both with wood chips produced directly on site from residual wood and with the exhaust head of the biodiesel engines – the resulting energy balance is CO₂-neutral. Since the grid was taken into operation, CO₂ savings amount to 9,538,200 tons per year. This means that 770,000 liters of heating oil are saved each year.

Sustainable economy

Skuk has reached his personal objectives with regard to Biowärme Bleiburg in any case: to make the system profitable as quickly as possible and to strengthen his own agricultural and forestry business. He has also made it possible for the local community to take a decisive step in the direction of meeting climate-political targets and in achieving energy independence: "I was able to assure energy supply for our citizens in the long term – and at the same time the quality of life has improved significantly. Overall, I am convinced I have taken the right steps and can only recommend that you follow examples such as here in Bleiburg. The key to survival is a sustainable economy!"

The following services and products were provided by Danfoss during this project:

- Consulting in the development phase
- Provision of assistance in the selection of project partners
- Support in the sale of heating energy
- Delivery of the substations (Unistat 2013), distribution systems and components for the secondary systems
- Supply of control components and control valves for the central heating systems
- Implementation of a centralized visualization and control system
- On-site commissioning of substations by a Danfoss service technician
- Support in the expansion of the district heating grid
- Continuous maintenance activities

3 good reasons to choose Danfoss

Danfoss is more than a wide range supplier of premium solutions. Our customer insight and technical expertise also make us a strong partner for your business.



1 Broad application know-how and customer understanding



2 Supplier of solutions with a wide product range



3 A strong and dedicated business partner

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