

SUCCESS STORY:

Forestry wood enables renewable district heat

INVESTMENT CASE

Title:

Combination of forestry wood chips and wood pellets for 100 percent renewable district heat

Year (commissioned):

2008

Location:

5644 Auw and 5643 Sins, Switzerland

Stakeholders:

1. Wärmeverbund Auw – Investor and operator
2. WALD kommunal + – Plant operator and supplier of forestry wood chips
3. SCHMID AG energy solutions – Supplier of the heat production plant

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Auw, a village in the Swiss midlands, is owner of 200 hectares of forest, which was historically managed to produce stem wood for the local wood industry.

Heating networks

To improve the economy of the forest management, the community decided in the 1990's to additionally develop forestry wood for energy purposes and to become a contractor of renewable heat in the region. In about 20 years, 12 district heating networks based on forestry wood were established. Based on positive experiences in Auw, an additional district heating network was established in 2008 to supply a new residential estate in the neighbour village Sins.

District heating boiler stations based on a wood chip fired boiler are often complemented with a fossil fuel fired boiler for peak load and warm water production in summer. However, in this network a 100 % renewable heat production was aimed at to further improve the sustainability criteria. Therefore, a 550 kW moving grate boiler was installed to utilise the wood chips from the local forest, while for peak load and warm water in the



Fuel type:

- Wood pellets, wood chips

Feedstock origin:

- Domestic forestry by-products/ residuals: bark, wet wood chips, etc

Conversion system:

- Boiler combustion, e.g. stand-alone boiler plant including co-firing and combined heat and power

Co-fire:

- Heat generator (i.e. boiler) is 100 percent biomass-fired.

Heating system heat sources:

- Biomass is the only heat source in system

Comment:

- Moving grate boilers with flue gas condensation.



According to the forest owners, the local use of forestry wood chips enables an improved care of the forest.

summer season, a 150 kW pellet fired boiler was added to complement the heat production. In the meantime, two additional district heating networks were established in further neighbour villages and a team of seven employees are responsible to provide full-time service and support of the just-in-time supply with forestry wood chips and the heat production and distribution.

According to the forest owners, the local use of forestry wood chips enables an improved care of the forest and contributes to local added value and job creation.

The investment and its technology

In 2008, the boiler station with a 550 kW wood chip fired

boiler (moving grate boiler) and a 150 kW pellet fired boiler was implemented to supply the new district heating network in Sins. A real estate with 120 apartments and additional buildings such as the restaurant and the bank was connected to the network. The motivation for this and more than ten other district heating networks in Auw and neighbour villages is to generate additional income from the local forest, which contributes to improve the forest care and management and assists local job creation. Furthermore, the replacement of fossil fuels by wood chips aims at significant CO₂ savings and assures a safe supply of residential heat in the region. The total forest area managed by the local stakeholders is 700 hectares, which can sustainably produce 10 000 m³ of wood chips per year from

Relation to Sustainable Development Goals:



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



Make cities and human settlements inclusive, safe, resilient and sustainable



Ensure sustainable consumption and production patterns



Take urgent action to combat climate change and its impacts



Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Comment:

● The local energy contractor manages in total 700 hectares of forest, which provides up to 10 000 m³ of wood chips enabling to save more than 2000 t CO₂ per year.

silviculture residuals and therefore offers the potential to provide renewable energy for two additional district heating networks in the area.

Factors behind the decision

Beside the CO₂ neutrality of woody biomass, an additional motivation for the investors was to use an energy source that is locally available and assists local job creation.

In Switzerland, the confederation and the cantons support efficiency measures and the substitution of fossil fuels by renewables based on a national vote on an “Energy Article” back in 1990 and a consecutive national vote on the “Energy Strategy 2050” in 2017.

Furthermore, Switzerland follows strong air pollution control regulations to avoid local air pollution on particulate matter, which mainly occurs in winter periods due to traffic and residential wood burning. Therefore automated wood combustion systems are favoured and in addition, highly efficient particle removal systems are implemented not only in large utility boilers, but also in small and medium scale combustion devices. Financial support to district heating networks and automated wood combustion was provided in



the framework of different funding schemes by the cantons and the federation.

Lessons learned

The presented case study is one example of a large number of similar projects in the area. The main conclusions are that local entrepreneurship is necessary to establish regional biomass systems and that synergies and cost savings are possible with replicated initiatives.

Success factors

Local entrepreneurs and financial support of the communities are needed to establish regional supply of forestry wood chips.

Constraints

Since biomass systems exhibit higher investment cost than fossil systems, biomass systems are only favourable if a strong focus on sustainability is met and a significantly longer depreciation period is accepted by



Replicability potential:

- High local replicability
- High regional replicability
- High national replicability
- High international replicability

Scale-up potential:

- Medium local potential
- Medium regional potential
- Medium national potential
- Medium international potential

Comment:

- The presented project resembles a typical and ideal situation of an SME production sites in a small town in Switzerland. There is a limited number of significantly larger applications in Switzerland, while in other countries, larger production sites are also common.





Web sites:

www.schmid-energy.ch

www.holzenergie.ch

www.ri.se

www.energimyndigheten.se/en/

www.iea.org/tcp/

www.ieabioenergy.com

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