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Case study – Biomass

PROJECT: RES-CHAINS
PROGRAM: SOUTH BALTIC PROGRAM
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LANDKREIS NORDWESTMECKLENBURG
FOR: SOUTH BALTIC PROGRAM USERS
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Biomass Heating System Stellshagen



Summary

In 2010 inhabitants and interested landlords built a central heating station, to supply their village with heat and warm water. As a first step the cooperative “HWS HolzWärme Stellshagen eG” (wood heat Stellshagen) was founded in 2009 . With a committed consultation and a credit by the GLS bank the project could be carried out like planned. Due to heat production on basis of wood chips, supported by a thermal solar system and distribution via their own local heating net, the connected residents are supplied centrally with heat since November 2010. In the 1st stage of development 14 customers get supplied with approx. 2,000 m² apartments and business premises. Despite the high investments at the beginning, the long term calculation is profitable, shown by the reached parameters of power and the economically figures so far.

The citizens of Stellshagen are the first in the region, who are able to supply themselves with central heat made of local wood chips owned by them. They adduce evidence, that it is possible to build and operate a sustainable local heating system in a rural area. Thus the project ”HWS Holzwärme Stellshagen eG” is the first best practice for our initiative “(Bio)Energy Villages MV”, while not coached by the initiative, but developed by the citizens itself.

Site details

Start of operation (year):	October 2010
Location:	Stellshagen, Landkreis Nordwestmecklenburg, Mecklenburg-Vorpommern, Germany
Coordinates (for the map):	53.944847,11.138291 (google maps)
Area (m2):	boiler room 60m ² , storage 50m ² , pipes 1,089m for 2,200m ² area to heat (14 houses) up to 4,000m ² (30 houses) extension possible

Upstream process

What type of biomass is used?	Wood chips
What is the origin of the biomass?	Forest and felling residues from wood in region, partly self owned
What is the heating value of the biomass, MJ/kg as delivered?	4,0 kWh/kg = 14,4 MJ./kg
What's the humidity of the biomass, w/% wet basis?	ca. 25 %
What is included in the quality control on reception?	Manual sight control
Which means of transport is used?	Walking floor truck
How far is the transport on average, km?	30 km
Which way of drying is used?	Open air in forest, covered in storage
How is the storage organized?	Storage room beside boiler room, with big door for delivering wood chips with standard truck and push floor to screw-conveyor to feed boiler.
What's the duration of the storage?	30 days / °C like outside
How many tons of fuel are delivered to the plant annually?	175 to / a

Core process

What combustion technology is used?	feed grate
What's the thermal power of the boiler? (kW)	190 kW
What's the annual energy production of thermal energy?	700 MWh
What's the power of the generator (if installed)?	-xxx
What's the yearly production of electrical energy, (if installed)?	-xxx
What's the power of the condenser (if installed)?	-xxx
What's the yearly delivered energy from the condenser (if installed)?	-xxx
How much ash is produced yearly? (Bottom and fly ash)	1,12 to

Other important information

In addition is a thermal solar system installed on the roof of heating station with 96 m² and an annual solar heat production of 26 MWh.

Downstream process

How is the ash handled?	
Any other waste and it's handling?	-

Environmental aspects

What are the yearly emissions to air and water?

CO to air	
CO ₂ to air	239,2 t/a
SO ₂ to air.....	
NO _x to air	
Other to ...	
Other to ...	
Other to ...	

Financial aspects

The costs need be roughly estimated so as to reflect the total annual cost of the plant. The fundamental assumption is that the total annual cost comprises capital costs + O&M costs + fuel costs but if there is anything more important, please add that under the heading “Other costs” so as to make up 100 %.

What are the overall investment costs and interest rate?	Heating grid:	73,621 €
	Heating station:	106,000 €
	Heating system inclusive conveyor equipment and storage:	121,232 €
	Transfer stations (13 pcs.):	42,000 €
	Solar plant :	27,163 €
	Overall Costs: (net, w/o additional charges)	370,016 €
	Interest rat:	? % p.a.
What are the operational and maintenance costs?	?	
What is the total annual fuel cost?	12.600,-€ /a	
Other costs?	?	
What is the life time of the biomass facility?	20 years	
Average price for sold electricity? (€/mWh)		
Any subsidies?	Nation wide: KfW-Bank:	? €
	Federal state: LFI MV	106.000,- €

Summary

It is used for “coaching (Bio)energy villages MV” as example for a little biomass plant, organized/owned by citizen.

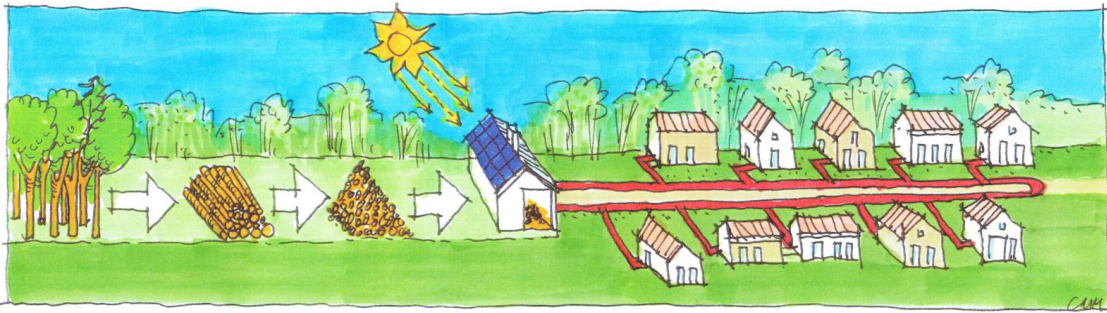


Figure 1 Idea of biomass using in Stellsbagen



Figure 2 Installation of the heating grid



Figure 3 roofing ceremony 17.10.2010