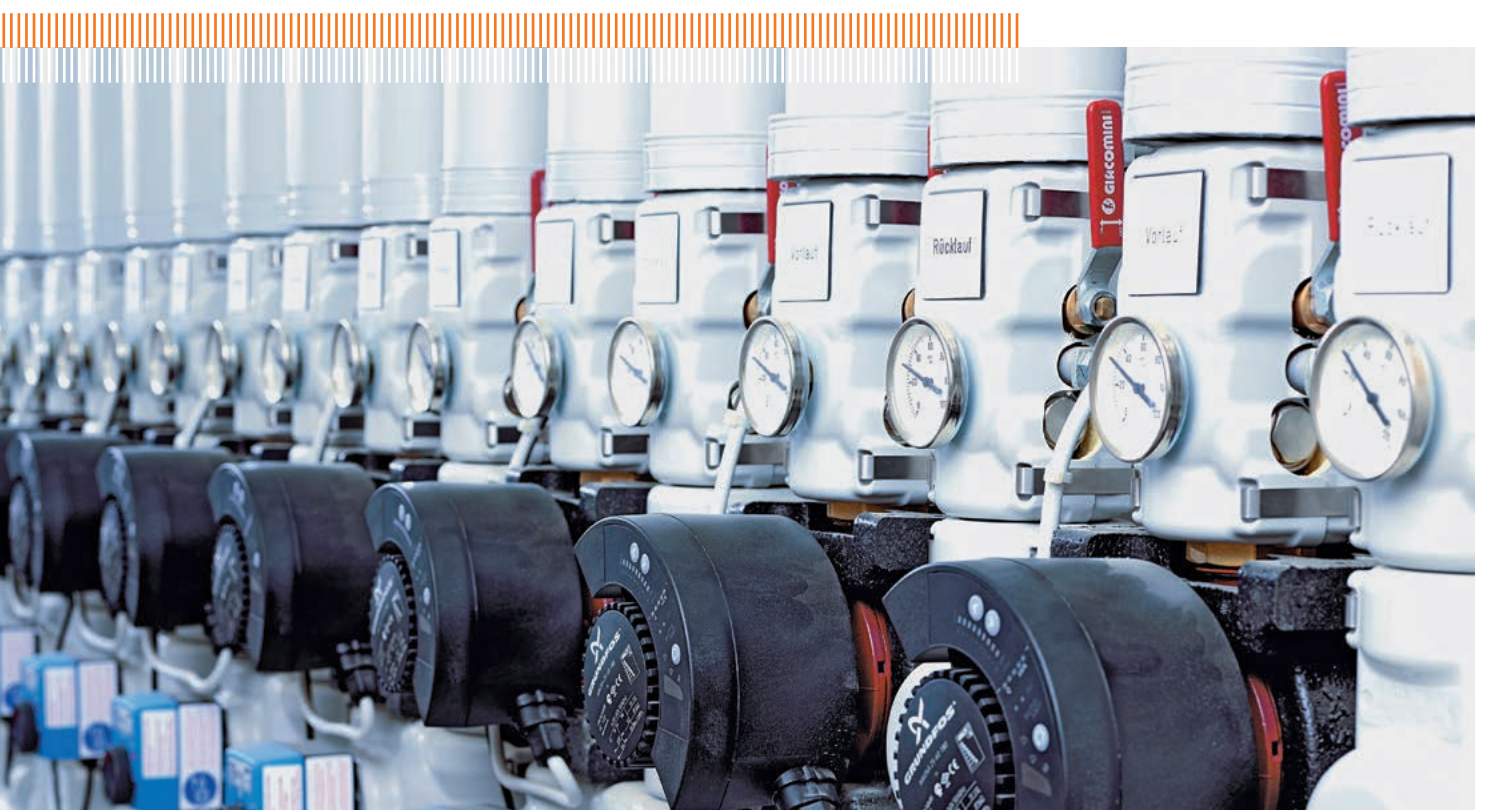




## Schmallenberg: Biogas from one district to the next Satellite CHP plant expands catchment area



### The background

In the picturesque Bad Fredeburg, a district of the town of Schmallenberg in the Hochsauerland region, the school centre, the SauerlandBad swimming pool and the local academy have been heated since July 2012 through a local heating network. The thermal requirement of 3 million kWh is more than 80 % covered by a satellite combined power and heat plant (CHP) fired by biogas. This lowers the CO<sub>2</sub> emissions of the three municipal buildings from 1150 tonnes per year by 67 % to approximately 380 tonnes CO<sub>2</sub> annually. The gas is fed in via a micro gas network from the district of Ebbinghof two kilometres away. There a biogas plant has been supplying the whole district with heat and power since 2009.

### The matter in hand

Early on Schmallenberg was concerned with climate protection and the use of renewable energy sources. In 2008 an integrated climate protection strategy was drawn up. In this the town set itself the target of cutting the CO<sub>2</sub> emissions 33 % by 2020 as compared to 2006. The reason for converting the heat supply was the replacement of the electric storage heating in the old school centre. This underwent energy-efficient modernisation in 2010 and 2011 from funds obtained under the so-called Economic Stimulus Package II (Konjunkturpaket II). At the same time a new water heating system was installed. Heat was supplied to the SauerlandBad swimming pool and the academy by means of natural gas until the conversion.

### Technical details

The backbone of the heat supply system is a CHP plant with 400 kW<sub>el</sub> and 450 kW<sub>th</sub> at the school centre in Bad Fredeburg. This is operated by Ebbinghof Biogas GmbH & Co. KG as a satellite CHP plant. It is fed through a two kilometre biogas pipe. The CHP plant is modulating and can therefore adjust its power and heat production to the actual demand. If required it can be run down to 50 % of the output. The heat-controlled mode of operation makes it possible to utilise the heat generated almost completely.

The three buildings require about 3 million kWh per year and so account for more than one third of the heat consumption in the town of Schmallenberg. This is the equivalent of the calorific value of more than 300,000 litres of heating oil. The biogas-fired CHP plant at the school centre covers more than 80 % of this heat demand. Four natural-gas-fired boilers with a total of 1600 kW thermal capacity and two 15,000 litre buffer stores are available to cover peak loads in the winter and as a reserve, e.g. when the CHP plant is being overhauled. Natural gas and the biogas from Ebbinghof are fed in underground via a micro gas network. In the health spa of Bad Fredeburg there is therefore no need for additional truck deliveries.

Commissioned	Plant	Location	Biogas lines	Electrical output	Thermal output	Heat network
2005	Woodchip-fired boiler 1	Ebbinghof (place)			200	300 m
2008	Woodchip-fired boiler 2	Ebbinghof (place)			300	expansion + 700 m
2009	CHP plant	Ebbinghof (place)	0,3 km	250	320	expansion + 600 m
2011	CHP plant	Building contractor in Schmalleberg	1,8 km	250	250	
2011	CHP plant	Ebbinghof biogas plant	0,1 km	250	250	
2012	CHP plant	School centre Bad Fredeburg	2,0 km	400	450	1.000 m
2014	CHP plant	Kirchplatz Schmalleberg			250	140 m

### Costs and benefits

The investment costs for construction of the satellite CHP plant, the piping network, the five transfer stations and four natural-gas-fired boilers for peak loads in winter amounted to 1.3 million euros. Under the heat supply contract 42 % of the heat costs are pegged for 15 years.

11 % are tied to the development in wage costs in the energy industry and only 47 % of the heating costs are linked to energy price indices. This means that with biogas as the primary energy the heating costs for the three buildings will rise only half as sharply as the prices for fossil energy resources.

### Brief profile of the local heating network with biogas CHP plant in Bad Fredeburg

**Location:** Bad Fredeburg

**Construction period:** 8 months

**Commissioned:** 1 July 2012

**Contractor:** Energie Schmalleberg GmbH, a joint enterprise of the utility Stadtwerke Schmalleberg, RWE Energiedienstleistungen GmbH and Ebbinghof Biogas GmbH & Co. KG

**Customer:** SauerlandBad swimming pool, School Centre and Academy

**Investment amount:** approx. 1.3 million euros for construction of the plant and the piping network, the transfer stations and the peak load boilers

**Technical data:**

- CHP plant: 400 kW<sub>el</sub> / 450 kW<sub>th</sub>
- Supply via biogas line: approx. 2 km
- Buffer store: 2 x 15.000 litres
- 4 peak load boilers total 1.600 kW (natural gas)
- 5 transfer stations

**Funding for the heat piping network:** Funds from the progres.nrw programme of the state of North Rhine-Westphalia

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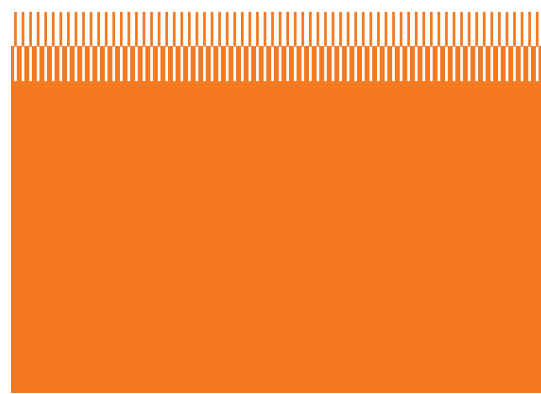
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