

Trend-Setting Energy Project in the Osnabrück Region

Since mid-November 2022, a new cogeneration power plant with two MWM gas generator sets has been producing heat and power for the inhabitants of Alfhausen. The heat is delivered to the connected homes via a district heating network established especially for this purpose.



Two containers, each with a length of about 20 m and a weight of approximately 40 t, in a hall in the new industrial zone "Am Waller Esch" in Alfhausen near Osnabrück, Germany – at first glance, this does not sound spectacular. Nevertheless, the plant represents a trend-setting heat supply concept for rural areas, which is suitable not only for the Osnabrück region. Each of the two containerized units with MWM generator sets delivers

hausen district heating network, which the local company Rasche & Weßler is currently building in the town of 4,000. It is fueled with biogas – more precisely with biomethane – a regenerative energy source that is more attractive than ever in these times of skyrocketing energy costs.

2,300 kW of electrical energy. They form the core of the new Alf-

Model Project

About two and a half years ago, when Andreas Rasche and Ralf Wessler came up with the idea of supplying the town with district heating based on regenerative energy, they would not have imagined how timely and popular the concept would become. "The local authorities readily embraced our idea", says Wessler, whose company Rasche & Weßler is specialized in energy management and automation technology. Even before the cogeneration power plant went live in November 2022, the energy concept had already been picked up by neighboring municipalities. Thus, another cogeneration power plant was commissioned in spring 2023 for the district heating of the neighboring town of Fürstenau. The collective municipality of Bersenbrück, too, has shown interest in the district heating concept. "We are pleased to see that our district heating concept is catching on. Decentralized heat generation from biomethane with highly flexible cogeneration power plants is an effective way to reduce the dependence on fossil fuels", says Ralf Wessler, expressing his conviction.



Ralf Wessler (left) and Andreas Rasche (right) are pleased to see the great demand for their trend-setting heat supply concept.

New Development at Ideal Location



The heat generated by the two MWM TCG 3020 V20 gas generator sets is delivered to the homes via a district heating network. Apart from the new cogeneration power plant with its two large gas generator sets, the new industrial zone "Am Waller Esch" also hosts a hot water storage unit with a capacity of almost 2,500 m³. The exhaust heat of the engines heats up the water, which is then transported to the individual homes through the district heating network. In the event of sudden cold snaps or cogeneration power plant outages, the buffer storage is capable of supplying the town with heat for up to four days in winter or up to 14 days in summer. An additional gas burner serves as an emergency backup. The community's new industrial zone was deliberately chosen as the site for the Alfhausen cogeneration power plant, as it is situated right opposite the local transformer station. Thus, the connection to the power grid was easy to implement, the electricity generated by the cogeneration power plant can directly be fed into the public grid, and the 10-kV medium-voltage generator does not suffer any transformation losses.

Flexible Thanks to Cogeneration Power Plant Technology

"Our idea was to generate energy from regenerative sources in a flexible way, aligned with the heat consumption on site and the power demand in the public grid. This flexibility is only possible with cogeneration power plants, whose combined heat and power generation enables the utilization of both the electricity and the heat", explains Wessler. The cogeneration power plant operates in flex mode. In this way, it can support the power grid, e.g. when there is no wind or little sunshine. "When the heat consumption is low in summer, the cogeneration power plant might sometimes be down for a whole week, as only hot water is needed", says Andreas Rasche.

Two 40-Ton Containers for Cozy Living Rooms

Each of the two containerized gas generator sets that form the core of the cogeneration plant weighs 40 t. The two MWM biogas engines were supplied by Caterpillar Energy Solutions from Mannheim, Germany. Each of the MWM TCG 3020 V20 generator sets delivers 2,300 kW of electrical energy. Together, the two power bundles generate up to 4.6 MW. "From the outset, we knew that we were going to deploy MWM gas engines", says Ralf Wessler. "We are familiar with the technology, and we know that the engines of the traditional brand from Mannheim are very reliable and powerful. Another important criterion is the quick and comprehensive service provided by MWM, which ensures high plant availability", explains Wessler.



MWM TCG 3020 V20 generator set

Killing Two Birds with One Stone

The planned 19-km district heating network is being set up directly by Rasche & Weßler GmbH. The development started in March 2021 and is to be completed by the end of 2023. "From the outset, people have been keenly interested in our supply concept, especially private individuals", says Ralf Wessler. According to Wessler, the demand for district heating network connections has undergone a sharp increase in recent months. He says: "People are pounding down our doors."

For the planning and establishment of the district heating network through the town, Ralf Wessler and his partner Andreas Rasche followed a special approach: They cooperated with Glasfaser Nordwest, a subsidiary of Telekom and EWE. In the course of the construction work, the houses in the town are thus being equipped with fiber-optic Internet connections in addition to district heating connections. This partnership makes the development more economical for all involved and helps avoid redundant construction measures. In this way, a modern, climate-friendly infrastructure is being established in Alfhausen.

By December 2022, some 65 percent of the network in the town center had been completed. Based on the current figures, approximately 10 million kWh/year will be delivered to the customers once all connections have been established. The plans for the development of the network outside the town center are already in the works. In December 2022, the homes of 175 people were connected to the district heating network. Of these, 45 have already been supplied with heat, and additional consumers are added every day. Currently, the heat delivered to the district heating network averages 750 kW. "The second main line was commissioned in mid-December 2022. At winter temperatures, we expect to deliver heat averaging about 1,200 kW", says Andreas Rasche.





Modern Heat Supply Thanks to Regional Generation

The biogas for the cogeneration plant originates from the gas grid of Westnetz GmbH. Depending on the demand, the flexible MWM gas generator sets in Alfhausen transform this biogas into heat and power.



Alfhausen District Heating

Location: Country: Contact(s): Operator: 49594 Alfhausen Germany Ralf Wessler, Andreas Rasche Rasche & Weßler GmbH



Cogeneration Power Plant Specifications

Go-live:	November 2022
Engine type:	2× MWM TCG 3020 V20
Generator:	Marelli
Control:	TEM
Gas type:	Biomethane
Plant builder:	Rasche & Weßler GmbH
Electrical efficiency:	44.8 %
Thermal efficiency:	49.6 %
Electrical output each:	2.3 MW
Thermal output each:	2.5 MW
Total efficiency:	94.4 %



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Award-Winning Concept

Alfhausen entered the "Klima Kommunal 2022" competition of the federal state of Lower Saxony with its pilot project for producing electricity from biomethane for a new district heating network in a rural area. The project was designated a lighthouse project in the field of climate protection. The "Green Village" project of the Alfhausen municipality won a prize of € 10,000. Special attention was drawn to its function as a role model in the region.

