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Cogeneration Power Plant as Role Model for Distributed Energy Supply

In March 2019, the new pellet plant and its connected control energy power plant in Wunsiedel were officially inaugurated.

800,000 m³ of sawdust—dried and compressed, this huge pile delivers 105,000 t of wood pellets. These in turn are used to heat approximately 30,000 detached houses.

The sawdust is a byproduct of sawmills and other wood-processing businesses in and around the region of Upper Franconia. In the new pellet plant in Wunsiedel, the sawdust is dried and pressed in pellet form. This consumes energy, which is produced in the factory of WUN Pellets GmbH by a dedicated cogeneration power plant with three MWM TCG 2032B V16 engines. After about six months of test operation, the new pellet factory and its cogeneration power plant were officially inaugurated. The new building supplements an existing pellet plant, quadrupling the pellet output.

The new facilities, which have been installed in one hall along with the drier and cogeneration power plant, were planned and implemented by the factory manager of WUN Bioenergie and by eta Energieberatung under the supervision of project manager Sebastian Kleins. "Based on the operator's experience from the first pellet plant, we were able to set up a highly efficient plant that covers its entire power demands internally and feeds in a surplus of up to 64.4 million kWh into the public grid", explains Sebastian Kleins. Thanks to the excellent efficiency and reliability observed in the first pellet plant, the planners again opted for MWM gas engines. A special feature in Wunsiedel is the concept-specific use of the low-temperature exhaust heat and the extremely high utilization of the natural gas energy.

Depending on the outside temperature, the cogeneration power plant operates as needed. In winter, all three engines run under full load during daytime. On the weekend, only one cogeneration power plant module continues to operate in order to cover the internal demand.

The "old" plant is equipped with a biomass cogeneration power plant with ORC turbine. Here, a natural gas-fired cogeneration power plant with MWM engine additionally supplies power for internal use. Both plants operate independently. However, they can be thermally coupled for emergency operation.

A lot of the experience gained from the operation of the first pellet plant was used in the planning of the new cogeneration power plant. While the first plant consists of numerous smaller spaces, the goal was to integrate all processing steps as well as the cogeneration power plant in a single hall in the new plant. As the belt drier is located on the second floor of the hall, the exhaust heat from the cogeneration power plant can be fully utilized. The cogeneration plant and the drier can be operated independently from the pellet presses. A dry sawdust silo with a capacity of 3,700 m³ is used as a buffer.

Sebastian Kleins
Project Manager
eta Energieberatung GmbH

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Important Component in the Climate and Energy Concept of the Municipal Utility Company

Together, the three natural gas cogeneration power plant modules with the MWM TCG 2032B V16 engines produce about 81 million kWh of power. The new pellet plant consumes about 20.5 percent of the generated electrical energy for its internal needs. The rest is fed into the public power grid and marketed by EON Germany.

Pellet Plant Wunsiedel

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Contact:	Sebastian Kleins, eta Energieberatung GmbH
City:	Wunsiedel, Bavaria
Country:	Germany
Operator:	WUN Pellets GmbH

Technical data CHP

Go-live of the second plant:	November 2018 (test operation)
Plant builder:	Caterpillar Energy Solutions GmbH
Genset type:	3 x MWM TCG 2032B V16
Generator:	Marelli
Gas type:	Natural gas
Control:	TEM
Therm. efficiency:	43.6 %
Electr. efficiency:	44.2 %
Therm. output:	5.2 MW_{th} per genset (including low-temp. exhaust heat)
Electr. output:	4.5 MW_{el} per genset
Total efficiency:	95.5 %

All photos: eta Energieberatung

Wunsiedel Becomes Pellet Center

With the 30-million-euro investment in the new pellet plant with connected cogeneration power plant, Wunsiedel in Upper Franconia has become a veritable pellet center. This is the second pellet plant in town that is operated by WUN Pellets GmbH. The plant is expected to produce about 105,000 t of wood pellets a year. With its high energy efficiency and the local generation and use of heat and power, the new pellet plant serves as a trend-setter for distributed energy supply as a component of the energy strategy of the local utility provider SWW Wunsiedel GmbH.

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