

# FLEXIBLE BIOGAS PLANTS

## with Jenbacher cogeneration technology

### Background

Biogas farmers are facing the need to make significant changes to their energy systems. Many governments have set ambitious climate goals that require farms to produce sustainable energy while also efficiently managing their energy use. Baseload operations from combined heat and power (CHP) systems no longer conform to these requirements.

In addition, blackouts, the volatility of renewable energy sources such as wind and solar, and the resultant need to meet additional demands with other ecological and sustainable energy sources such as biomass make it critical for biogas plants to operate flexibly, producing energy when it is needed.

As early as 1999, the Heslerhof farm recognized the potential of sustainable heat and power generation. The farm opted for biogas as a renewable energy source, thus paving the way for a biogas plant with an output of 50 kWel. The goal was to better adapt the supply of heat and power to market demands and to compensate for the fluctuating energy supply from renewable energy sources such as wind and solar.

Two flexibilization projects of the plant to 865 kWel in 2014 and 2016 soon followed.

### Future-oriented CHP plants: an indispensable building block of the energy transition

At the Heslerhof farm, the constantly changing requirements of the energy sector have necessitated a systematic approach to the overall CHP/gas and heat storage concept as well as a comprehensive heat use strategy. With the installation of a Jenbacher J420 engine and investments into a large buffer storage tank as well as a gas storage tank, the plant was converted into a renewable storage power plant with flexible, power market-driven operation in 2020/21. As a result, the plant now makes essential contributions to the energy transition and grid stability through environmentally sustainable energy production from regionally available energy sources and flexible operation.

As a ready-for-use container plant centered on the Jenbacher J420 engine, the system has an electrical output of 1,562 kW and



a thermal output of 1,760 kW. Pre-assembled and quickly constructed on site, the system boasts strong efficiency and high engine reliability.

The overall plant, which consists of several CHP modules, has a maximum rated power output of 350 kWel and a total output of 2,222 kWel. However, in its current flexible operation, the plant's highest output is 1,722 kWel—and this at maximum reserves!

The plant's SCR catalyzer ensures compliance with the low emissions values required by law. Additional environmental sustainability is achieved through the use of Vapogant digestate evaporation systems that reduce the amount of residual biomass generated during biogas production. These supply the basis for the production of mineral fertilizers. In addition, the heat generated during biogas production can be used for digestate evaporation. Two exhaust-gas heat exchangers enable a high degree of heat extraction and increased efficiency. A 1000-cubic-meter buffer storage system enables the decoupling necessary for sensible heat use.

These retrofits allow the Heslerhof farm to react even more flexibly to the volatile power market and increase the plant's overall cost effectiveness at the same time helping to ensure its readiness to meet the challenges of the future.

## Results

By installing a Jenbacher J420 CHP system and using two exhaust-gas heat exchangers for high heat extraction, the overall efficiency was increased to more than 90%.

The farm generates its own power, which is used to supply all the electricity it requires, including that of the residential building. Surplus power is fed into the grid with attractive feed-in tariffs at market rates. Another decisive factor for the success of this flexible biogas plant was INNIO's tailored service offering. In addition to the rapid availability of parts and fast technical support on site, the 24-hour hotline and rapid troubleshooting via remote service were especially attractive factors.



## Key technical data for the Heslerhof regenerative storage power plant

Installed engines	1 x J420
Electrical output	1,562 kW
Thermal output	1,760 kW
Total efficiency	90.1%
Buffer storage system	1,000 m <sup>3</sup>
Energy source	Biogas
Year of commissioning	2021



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**Heslerhof video:**  
Town, country, flexibility - Heslerhof

## Customer benefits

- Optimization of revenue potential thanks to flexible operation
- Economic use of raw materials for the efficient generation of heat and power
- Efficient, sustainable and future-proof overall concept that optimally readies the plant for the future

**» A flexible, power market-driven approach is both the present and the future of every biogas plant. We decided to gradually add flexibility to our biogas plant, transforming it into a renewable storage power plant based on Jenbacher CHP technology. This enables us to optimize our revenue potential while also making better use of raw materials.«**

Clemens Maier, Shareholder of Clemens and Gregor Maier GbR, Heslerhof

INNIO is a leading energy solution and service provider that empowers industries and communities to make sustainable energy work today. With our product brands Jenbacher and Waukesha and our digital platform myPlant, INNIO offers innovative solutions for the power generation and compression segments that help industries and communities generate and manage energy sustainably while navigating the fast-changing landscape of traditional and green energy sources. We are individual in scope, but global in scale. With our flexible, scalable, and resilient energy solutions and services, we are enabling our customers to manage the energy transition along the energy value chain wherever they are in their transition journey.

INNIO is headquartered in Jenbach (Austria), with other primary operations in Waukesha (Wisconsin, U.S.) and Welland (Ontario, Canada). A team of more than 3,500 experts provides life-cycle support to the more than 54,000 delivered engines globally through a service network in more than 80 countries.

INNIO's ESG Risk Rating places it number one of more than 500 worldwide companies in the machinery industry assessed by Sustainalytics.

For more information, visit INNIO's website at [www.innio.com](http://www.innio.com)

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