“Use the Flexibility Bonus – Flexible Biogas Future with MWM”

Onno Wilberts & Guido Koch,
Directors of Biogasanlage Ahe GmbH

“Future-Proof Strategies for Needs-Oriented Energy Feed-in in the Biogas Segment”

Since the amendment of the German Renewable Energies Act (EEG) 2012, power from biogas plants can be marketed directly. Thus, biogas plant operators can switch from the fixed feed-in tariff system to so-called “direct marketing”. In collaboration with a listed power marketer, plant operators can thus generate more income. Additionally installed combined heat and power (CHP) plant capacity enables operators to abandon permanent operation in favor of flexible operation according to schedule. To enable a power-controlled operating mode, gas and heat quantities need to be buffered. Thus, power can be systematically generated profitably during high-price periods on the market. According to the EEG 2012, investments in such power plants are subsidized with the flex bonus. Onno Wilberts and Guido Koch, the initiators and operators of Biogas Ahe GmbH, which is located near Beverstedt in the district of Cuxhaven, have addressed this challenge. They have evaluated the opportunities and risks of an investment in flexibility for needs-oriented feed-in and configured the plant in the best way possible for their operations. With their project, which was launched back in 2011, the two plant operators were considered pioneers of the German biogas industry. Their joint plan provided for operation of a biogas plant that would be designed for maximum network frequency stabilization and a power price-controlled operating mode.

“Our Power Marketer Can Dispose Freely over Our CHP Plant”

The plant of Ahe Biogas GmbH, which is situated in the special “Bioenergy” zone, went live in December 2012. From the outset, it was designed and built so as to provide control energy. To market the power, a cooperation agreement has been entered into with

The combined heat and power plant in Ahe

Next Kraftwerke. The company actuates the three installed MWM gas gensets of the TCG 2016 and TCG 2020 engine series of the biogas plant up to 20 times a day via a remote control unit (Next Box). In this way, the plant operation can be aligned with the power prices of the intraday market of the EPEX spot exchange in a needs-oriented manner, and valuable control energy can be supplied to the transmission network operators. The Cologne-based company Next Kraftwerke can dispose freely over the CHP plants and switch the plant off and back on at quarter-hourly intervals. It takes five minutes for the system to be set from full load to zero or from zero to full load. The marketing of the available flexibility on the control energy market and via the EPEX spot market has been under way for more than a year. “We have made very good experiences with the responsiveness of the MWM engines”, confirms the power marketer Next.

Feeding the biogas plant with substrate

"Control Energy and Flexibility from Biogas"

The average power generation capacity of the biogas plant (nominal capacity) is approximately 1.4 MW, while the installed CHP plant capacity is almost 4 MW. Additionally, the facility has a gas storage volume of 14,000 m³ above the plant's four digesters and digestate storage units. The biogas facility in Beverstedt in North Germany thus boasts enormous flexibility for balancing part of the fluctuating solar and wind power generation.

"Biogas Must Abandon Flat-Only Feed-in in Favor of Flexibility"

In terms of the gas production, the two biogas plant operators believe in diversity. A mix of liquid manure, dung, grass, and up to one third of corn silage serve as input substances. For this purpose, long-term supply contracts have been concluded with farmers in the immediate vicinity of the plant. "The mix of power prices and substrate prices determines our level of plant operation", explains Guido Koch. To minimize the wear of the gas engines, hot water is used to keep them at a temperature of approximately 70°C (158°F) while they are switched off. In this way, wear-intensive cold starts can be avoided. The hot water is kept in a storage tank of 42,000 l. Moreover, part of the heat gained from the buffer storage is used for the purpose of heating the digesters in winter. When the engines are running, they supply the storage tank with heat. Through the high plant flexibility, the biogas plant operators can also reduce downtimes due to maintenance and repairs. Owing to the additionally installed flexible engine capacity, such work can easily be scheduled for other times.

"The Success of Our Operations Is Based on the Right Selection of Partners"

Despite the flexibility, Guido Koch and Onno Wilberts want to be able to budget the plant operation. For this reason, they have agreed a lump-sum fee for the flexibility of their plant with Next Kraftwerke. This fee is aligned with the availability of every flexible kilowatt of plant capacity.

The energy producers from Ahe have some good advice for potential operators: The demands on the plant operator must not be underestimated. Firstly, he will temporarily have to allow a third party to directly access and control his plant. Secondly, participating in the control energy market requires absolute notification discipline and adherence to the schedule. Notification discipline means that the marketer must be notified of maintenance measures or planned downtimes in advance, as agreed. Malfunctions and unscheduled downtimes as well as the operational readiness after the elimination of the cause of the error must be reported without delay as soon as such become known.

Guido Koch and Onno Wilberts in front of the TCG 2020 gas engine

"The Next Step: Positive Secondary Control Energy"

Whenever there is too much power in the network, the biogas plant is switched off in order to stabilize the network. This way of providing control energy is also referred to as negative secondary control energy. In Ahe, efforts are now being made in order to enable the provision of positive secondary control energy as well. This is the case when there is not enough power in the network. Provided that the storage facilities contain an adequate amount of gas, the biogas plant could then feed in power into the network up to its maximum capacity, thereby contributing to the stability of the network. The operators already have the required prequalification for this operating mode.

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Energy. Efficiency. Environment.

Boost the Plant Flexibility and the Income.

After many successful and bountiful years, the biogas industry is now faced with major challenges. In view of the constantly sinking power feed-in subsidies, the construction of new biogas plants has become virtually impossible under economic considerations. However, as far as existing plants such as the one in Ahe are concerned, there are attractive possibilities for boosting the income and guaranteeing the future. By means of the flexibility bonus, the German government subsidizes the flexible operation of biogas plants. The subsidy of €130.00 per additionally installed kW of electrical capacity offers significant opportunities and is paid for 10 years or until your EEG subsidy runs out.

Start Using the Flexibility While the Current EEG Remains in Force.

The 10-year period for plant operators that have applied for the flex bonus is already running. What counts is the date of the claim, not the actual flexibilization launch. Applying for the bonus but delaying the start of flexibilization means losing valuable subsidization time.

"The Annual Flex Bonus Payments Alone Cover All Our Additional Investments"

Therefore, plant operators should start with the needs-oriented generation as soon as possible in order to get ready for the markets of tomorrow. After the EEG subsidy ends, the market premium will no longer apply, and existing plants will no longer be able to generate additional income on the power market. Experience has shown that the flex bonus does not merely finance the new flex CHP plant, but also parts of the plant peripherals, such as the gas storage, heat storage, transformer, and gas train to a great extent, if not in full.

Flexibilize with MWM.

Superior Technology

- Turnkey container solutions
- Control systems designed for flex operation
- Operating modes tuned to flex operation

Long-Standing Experience in the Biogas Segment

- 2,000+ biogas gensets in the field
- Successful customers in control energy and flex operation
- Expertise in the fields of control energy and flex bonus

Good Reasons for MWM

Reliability and Customer Orientation

- Service-network throughout Germany
- Maintenance agreements for flex operation
- Optimized, improved components
- Warranty for up to 24 months

Comprehensive Partner Network

- Planning firms
- Attractive financing offers
- Plant builders
- Direct marketers

TCG 2016/2020 Series Flex Gensets.

As a competent partner, MWM assists plant operators with its extensive experience in the development and production of gas engines and power gensets for decentralized energy supply. The models in the capacity range from 400 to 2,000 kW_{el} fulfill the elevated requirements of flex operation and ensure efficiency, reliability, flexibility, environmental compatibility, low TCO, and high profitability. Apart from being more eco-friendly, the enhanced biogas variants of the gas engines are also more durable.

Exploit Flex Potential – Seven Compelling Reasons and Your Advantages at a Glance

1. **High, steady subsidy**	▶ **CHP plant & parts of the peripherals are financed**
2. **Needs-oriented feed-in**	▶ **Additional income via power exchange (1.5 – 2 c/kWh)**
3. **CHP plant availability**	▶ **100 % biogas utilization**
4. **Efficiency increase (new CHP plant)**	▶ **Substrate savings**
5. **Fewer operating hours**	▶ **No pressure for 100 % availability**
6. **Flex CHP plants have a longer life**	▶ **Hidden reserves (only 20,000-40,000 operating hours in 10 years)**
7. **Perspective after EEG subsidy**	▶ **Better utilization of high prices on the power market**

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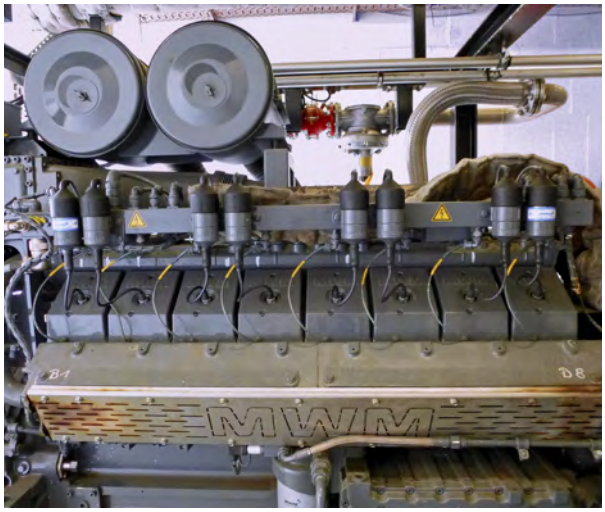
“The Ahe Biogas Plant Impresses with Its Concept, Flexibility, and Sustainability”

Biogas Ahe GmbH – Beverstedt, Germany

Contact	Onno Wilberts
Location	Ahe near Beverstedt
Country	Germany
Substrate	Corn silage, grass silage, liquid manure
BHKW capacity in kW	3,920 kW_{el} total
Possible operating mode	0 kW_{el} to 3,920 kW_{el}
Rated capacity	1,172 kW
Gas storage volume	4,000 m³ controllable capacity share 50 % of the installed capacity of all CHP plants infinitely controllable
Go-live	December 2012
Flex bonus	Since November 2013



CHP Plant Specifications

Engine type	1 x TCG 2016 V16
Generator	Marelli MJB
Electrical capacity	1 x 800 kW_{el}
Engine type	2 x TCG 2020 V16
Generator	Marelli MJB
Electrical capacity	2 x 1,560 kW_{el}

Caterpillar Energy Solutions GmbH
Carl-Benz-Strasse 1
DE-68167 Mannheim
T +49 621 384-0 | info@mwm.net
F +49 621 384-8800 | www.mwm.net

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