

Flexible and demand-oriented power production in Klein Meckelsen, Germany

SUCCESS STORY



Picture: MT-Energie

Operator

Naturenergie Osteraue GmbH &
Co. KG

Location of the project

Klein Meckelsen, Germany



Contact details

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Project results

Socio-environmental:

- Raised public awareness and acceptance on biogas and renewable energies
- Demand-oriented power production

Project outline

Most of the existing power plants produce electricity continuously or depending on the weather conditions. Although wind and solar plants are very effective, their production is rather unpredictable. Due to surplus or underproduction of electricity it comes to fluctuations in the power grid, to which the current power transmissions systems are not fully adapted. To balance the production and the demand, power plants which can be powered down or up for a few minutes are absolutely necessary in today's electricity management. Thus, it is important in the context of the targeted energy change to supplement not controllable renewable energy technologies with controllable technologies.

Technical data

Year of plant construction:

2012

Year of performed service:

2012

Plant size:

837 kW_{el} installed

Running 16 h/d -> in average 563 kW_{el}
2.300.000 Nm³/a , 263 Nm³/h

Digester volume:

Digester 1.900 m³
Secondary digester 1.900 m³

Gas storage: 6,000 m³

HRT : 100 days

Process temperature: 40°C

Type of raw material:

Maize silage, rye whole plant silage, grass silage, pig slurry

Utilisation of biogas:

Electricity goes to "energy2market" (e2m)

Utilisation of digestate:

The digestate is spread out on the fields of the plant owner

Heat utilisation:

Heating of households

Total investment costs:

€2,500,000

Subsidy:

Not applicable. The average FIT is for a plant of this size is approximately €19.21 c /kWh_{el} (5.54 CZK/kW_{el} and approximately €3-c/kWh_{th}).

Performed actions

To balance power production and demand, MT-Energie has developed a practice-oriented biogas plant concept, which is based on a purchase contract between plant operator and energy2market. Core of the concept is large overnight gas storage (N8 type) with twice the size of usual double membrane gas storage. The continuously produced biogas can be stored for several hours without using it in a CHP unit. Each day, plant operator communicates for how long he will run his CHP so that energy2market knows how much electricity will be produced and can be sold. The difference between night and day price amounts approx. 3-4 €/kWh_{el}.

N8 storage allows CHP unit (837 kW_{el}) to be switched off for 8 hours, thus an average capacity for running during another 16 hours is 563 kW_{el}. In case of power excess, grid operator can switch off certain biogas plant automatically. Apart from N8, a water buffer tank was installed to store the heat during the day time and to use the heat at night when the CHP unit is not running.

Results of performed service

Electricity in plant "Naturenergie Osteraue" is produced demand-oriented. Because the electricity price is higher during the day, the plant operator receives higher revenue. Additionally, through the German Energy Law (EEG 2012) a premium of 130€ per additional installed kW per year is paid for a flexible operation, meaning in this case 28.000€/a of additional profit. Thanks to extensive gas storage the biogas plant can also be powered down for short periods of time and the fluctuations in the grid are counteracted. Such a control is also additionally remunerated by the grid operator.

Due to this innovative technology and the resulting possibilities related to the operation, the importance and meaning of biogas plants has increased. This form of plant technology is an important contribution to the energy change and the full supply by renewable energies.