Energy self-sufficient village Feldheim, district of the town of Treuenbrietzen in Potsdam-Mittelmark

A project initiated by Energiequelle GmbH, the farmers cooperative, the town of Treuenbrietzen, the district of Potsdam-Mittelmark and the villagers of Feldheim
Feldheim: a district of Treuenbrietzen

Population: 130

Residential, mainly farming, light industry, communal buildings
Where is Feldheim

About 83 km southwest of the German capital, outside the Berlin commuter belt
Feldheim I Components

- wind farm
- electricity grid
- biogas plant
- heating grid
- woodchip heating plant (backup during cold winters)
- heat distribution center
- battery storage (flexibility for national grid)

New Energy Forum (NEF): exhibitions, education, school projects, workshops, guided tours
Feldheim Wind Farm

• First turbine commissioned 1995
• 55 turbines in 2016

• Total power capacity: 123 MW
• Total annual output: 250 mio kWh
Arable, pig and cattle farming

- Farming co-operative
  Agrargenossenschaft "Fläming" eG
  Feldheim

- 30 Members

- 1,700 hectares of agricultural land, potatoes, sugar beet and cereals

- Liquid manure, a by-product of pig and cattle farming was spread on the fields as fertilizer

- 2004: prices for crops and milk falling, energy costs rising
Biogas plant

- Power capacity 526 kw
- Input: 8,600 m³/a pig and cattle manure
  - 8,700 t/a maize silage
  - 190 t/a ground cereals
- Commissioned December 2008
- Energy output: 4.15 million kWh/a electric power
  - 2.275 million kWh/a thermal power
- Output biological fertilizer: 15,500 m³/a
Biomass

• Woodchip heating plant

• Uses by-product of timber processing in the nearby forest

• Additional heating in very cold weather

• Heat distribution centre

• Hot water storage tanks
# Feldheim district heating grid

- **Length:** 3,000 m

- **Supplied entities:**
  - 35 homes
  - 1 industrial units
  - 2 communal buildings
  - 4 agricultural units

- **Prices**
  - **Electricity:** monthly standing charge €5.95 and 16.6 cents/kWh
  - **Heating:** monthly standing charge €1.50 x capacity building connection and 7.5 cents/kWh

- **Operational since December 2009**
Battery Storage

- Type: Lithium-ion battery
- Size/Capacity: 10 MW / 10,7 MWh
- Efficiency: > 85 %
- Grid connection: Feldheim Wind Farm
- Market: Primary control power
- Investment: €12.5 million
- Funding: RENplus Programme 40%

Accompanying research: Ancillary services from large-scale batteries

Partners:  b-tu  energequelle  50hertz

Internet: www.forschung-energiespeicher.info
Battery Storage

Fall 1: Es wird mehr erzeugt


Fall 2: Es wird mehr verbraucht

Die Netzfreqenz sinkt unter 50 Hertz. Das RRKW erreicht innerhalb weniger Sekunden seine Nennleistung, speist Strom in das Übertragungsnetz ein und trägt auf diese Weise dazu bei, dass sich Einspeisungen und Entnahmen wieder die Waage halten.
Feldheim Smart Electricity and Heating Grids

Die Energieversorgung des Energieautarken Dorfes Feldheim über private Nahwärme- und Stromnetze
Energy supply to the energy-efficient village of Feldheim via private local heating and power grids

Windpark Feldheim:
42 Wind turbines with a power capacity of 81,1 MW, as well the separate power grid, are operated in Feldheim 2015.

Batteriespeicher:
Construction starts: August 2014; Capacity: 10 MW; Lithium-ion module. Storage of surplus amounts of power that can be brought online when needed.

Biogasanlage:
Electric capacity: 526 kW; Wärmeleistung: 560 kW; Inputmaterial: maize silage, as well as maize silage and crushed corn material that is locally produced.

Holzhacksschnitzel-Heizung:
Waste from peak heating periods to produce heat.

Verbraucher, Haushalte:
37 connected households, with 145 residents.

Kommune:
2 kommunale Einheiten.

Verbraucher, Agrarbetriebe:
3 Agrarbetriebsanschlüsse.

Nahwärme-Netz Feldheim
In der Feldheim Energie GmbH & Co. KG sind Hausbesitzer, Gewerbe- u. Agrarbetriebe und die Stadt Treuhenbieten Gesellschafter.

Feldheim local heating grid
Homeowners, businesses, farms and the municipality of Treuhenbieten are all partners in Feldheim Energie GmbH & Co. KG.
### Solar Farm Selterhof

- Ex-military telecommunications centre and depot
- 85 buildings and a petrol station
- 9,844 photovoltaic modules
- 284 trackers
- Total power capacity 2.25 MWp
- Annual output 2,748 MWh
- Electricity supply for 600 households
Feldheim Energie GmbH & Co KG (Limited)

- 49 partners: residents of Feldheim, the town of Treuenbrietzen, Energiequelle Management Ltd. as general partner with full personal liability

- Partner contribution €3,000
- Committee of five represents the interests of all partners.

- „Only Feldheim home or land owners are allowed by law to become a partner of the limited company“
# The funding of the district heating network

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall investment costs</strong></td>
<td>€1,725,000</td>
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<tr>
<td><strong>Limited Company resources</strong></td>
<td>€138,000</td>
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<tr>
<td><strong>Public subsidies (Brussels, state government)</strong></td>
<td>€830,000</td>
</tr>
<tr>
<td><strong>Remaining funding</strong></td>
<td></td>
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<tr>
<td><strong>general financial market</strong></td>
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## The funding of the electricity network

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own resources</td>
<td>€450,000</td>
</tr>
<tr>
<td>Subsidies</td>
<td>None!!!</td>
</tr>
</tbody>
</table>
The advantages

• Diversification / commercial exploitation of agricultural products
• Security or creation of new jobs in the local farming cooperative
• Economical and ecological energy.
• Increase in value remains in the region, as all input is produced locally.
•Eliminates the "import " of 160,000 litres of heating oil.
• Generation of business tax revenues from wind farms and biogas plant
• Potential: the arrival of other "clean" industries
• "New Energy Forum Feldheim (NEF): Education and Information Centre
• The town of Treuenbrietzen and the district Potsdam-Mittelmark
  position themselves as a centre of excellence in the field of renewable energies
The only energy self-sufficient village in Germany

- 100% Co2-neutral
  Independent, direct energy supply.

Winner of Federal Award „Bioenergy village of the year 2010
Prizewinner „365 landmarks in the Land of Ideas 2011
German Solar Prize 2015
Agenda-21-Prize for the region 2016
Auf Wiedersehen im Energieautarken Ortsteil Feldheim