NEUE ENERGIEN FORUM FELDHEIM

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

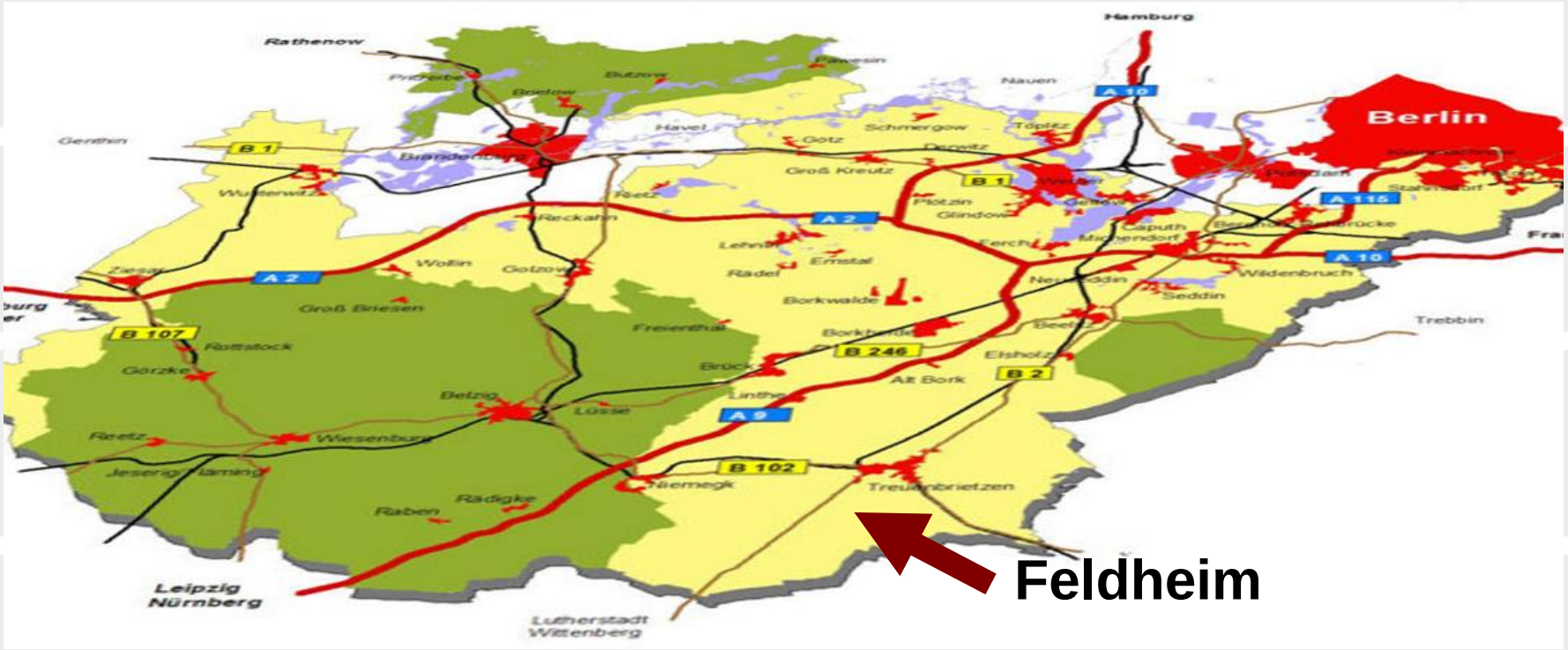
Feldheim: a district of Treuenbrietzen

NEUE ENERGIEN FORUM FELDHEIM

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

NEUE ENERGIEN FORUM FELDHEIM

- First turbine commissioned 1995
- 55 turbines in 2016

- Total power capacity: 123 MW
- Total annual output: 250 mio kWh

NEUE ENERGIEN FORUM FELDHEIM

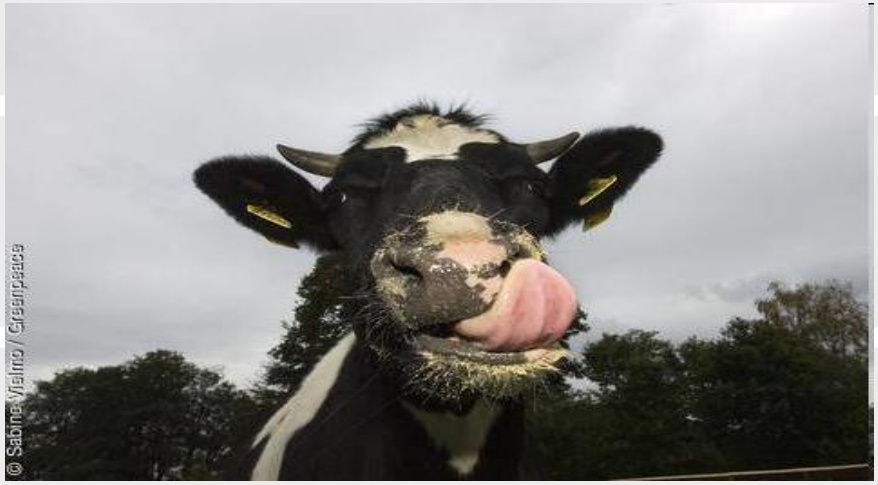
Arable, pig and cattle farming

- 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

NEUE ENERGIEN FORUM FELDHEIM

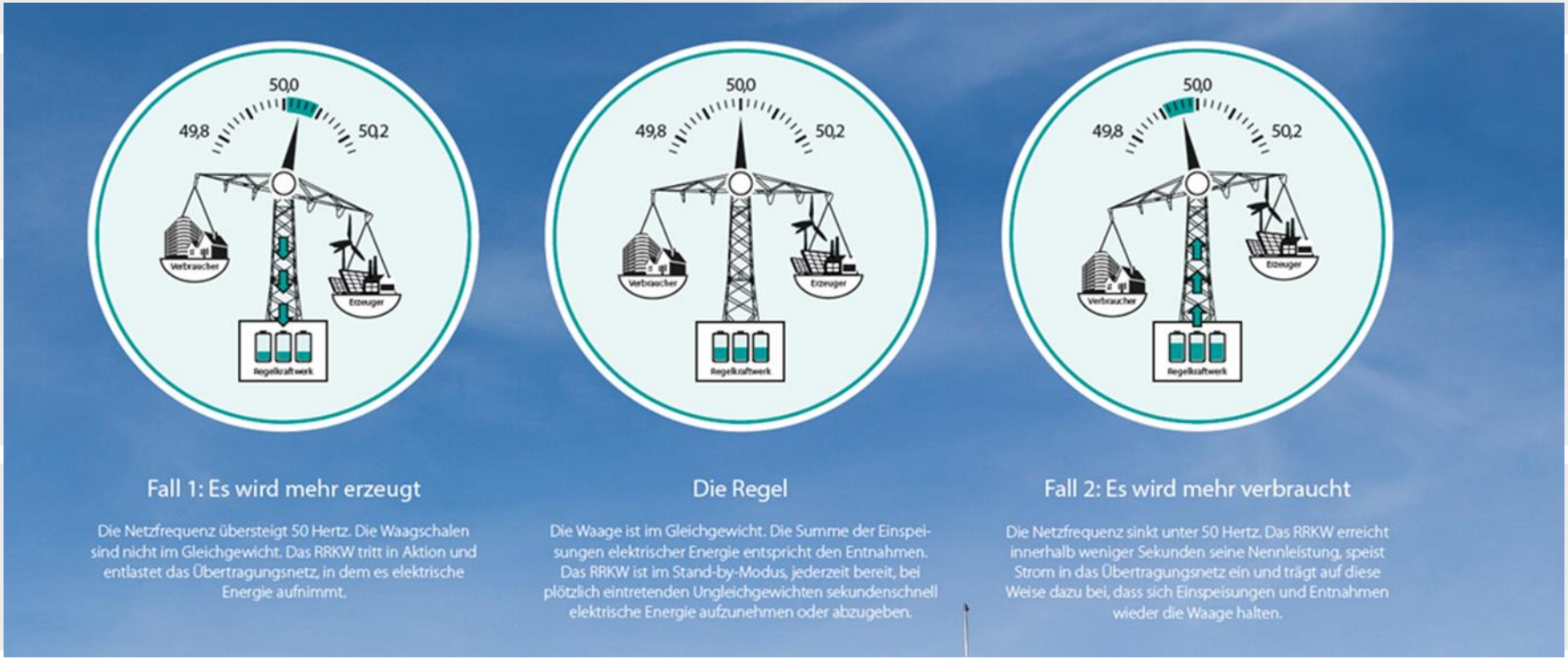
- Type: Lithium-ion battery
- Size/Capacity: 10 MW / 10,7 MWh
- Efficiency: > 85 %
- Grid connection: Feldheim Wind Farm
- Market: Primary control power
- Investment: €12.5 million
- Funding: RENplus Programme 40%

Accompanying research: Ancillary services from large-scale batteries

Partners: : b-tu Brandenburgische Technische Universität Cottbus - Senftenberg; energiequelle gmbh; 50hertz

Internet:
www.forschung-energiespeicher.info

Battery Storage



Feldheim Smart Electricity and Heating Grids

NEUE ENERGIEN FORUM FELDHEIM

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

Strom

Windpark Feldheim:
42 Windkraftanlagen mit einer elektrischen Leistung von 81,1 MW (152,7 Mill kWh/Jahr), werden in Feldheim betrieben (Stand 2015).

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

Batteriespeicher:
Baubeginn August 2014; Kapazität: 10 MW; Lithium-Ionen-Module.
Speicherung überschüssiger Strommengen, die bei Bedarf zugeschaltet werden können.

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

Wärme

Biogasanlage:
Elektrische Leistung: 526 kW; Wärmeleistung: 560 kW; Inputmaterial ist Rinder- u. Schweinegülle, sowie Maissilage und Getreideschrot als NaWaRo, die vor Ort produziert werden.

Biogas plant:
Electrical capacity: 526 kW; heat capacity: 560 kW; input material is cattle or pig slurry, as well as maize silage and crushed cereal as renewable raw material that is locally produced.

Holzhackschnitzel-Heizung:
Wird in Spitzenzeiten zur Wärmeproduktion zugeschaltet.

Woodchips:
Used during peak heating periods to produce heat.

Verbraucher, Haushalte:
37 angeschlossene Haushalte mit 145 Bewohnern.

Consumers, households:
37 connected households, with 145 residents.

Kommune:
2 kommunale Einheiten

Local authorities:
2 local authority entities.

Verbraucher, Agrarbetriebe:
3 Agrarbetriebsanschlüsse.

Consumers, agricultural enterprises:
3 farm connections.

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

Feldheim local heating grid
Homeowners, businesses, farms and the municipality of Treuenbrietzen are all partners in Feldheim Energie GmbH & Co. KG.

Förderung des Fernwärmenetzes Feldheim durch:

Solar Farm Selterhof

NEUE ENERGIEN FORUM FELDHEIM

- 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

NEUE ENERGIEN FORUM FELDHEIM

Overall investment costs

€1,725,000

Limited Company resources

€138,000

Public subsidies (Brussels, state government)

€830,000

Remaining funding

general financial market

The funding of the electricity network

€450,000

Own resources

€450,000

Subsidies **None !!!**

The advantages

NEUE ENERGIEN FORUM FELDHEIM

- 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

NEUE ENERGIEN FORUM FELDHEIM

- 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

LEITSTERN 2008
Der Bundesländerpreis für Erneuerbare Energien

LEITSTERN 2010
Der Bundesländerpreis für Erneuerbare Energien

Euroopan suurin akku saksalaiseen pikkukylään

JORMA MATTILA

Feldheimin pikkukylä Berliinin lähistöllä Brandenburgissa testaa käytännön ratkaisumalleja Saksan suuren energiakäänteen ongelmiin.

Kokonaan energiaomavaraisen 130 asukkaan kylän sähkö tulee pääasiassa 43 tuulivoimalasta, jotka on pystytetty paikallisilta maanomistajilta vuokramaalle. Niiden yhteinen uusiutuvien osuuden tavoite 80 prosenttia.

Miten varastoida sähköä?

Energian varastointi on energiakäänteen onnistumisen aivan keskeinen edellytys. Maan tekniset yliopistot ovat vuosikausia tutkineet menetelmiä tuulen ja auringonpaisteen mukaan [illegible] sähkön tuotannon suurempi", sanoo diplomi-insinööri **Werner Frohwitter** Energiequelle GmbH-yhtiöstä.

Korealaisen LG-elektroniikkayhtiön valmistama akku sijoitetaan 30 kertaa 17 metrin suuruiseen halliin kylän tuulivoimapuiston viereen. Akun hinta on 13 miljoonaa euroa. Investoinnista 40 prosenttia katetaan Brandenburgin osavaltion ja EU:n tuella.

Akkusähkö on hyvää bisnestä

Feldheimin jättiakulla otetaan talteen se energia, mitä ei huippuotannon aikana saada kylän tuulivoimapuistosta ja 284 aurinkokennokohde[illegible] sähkötekniikan ja elektronisen käyttövoiman instituutista (ISEA) arvioi sähkön keskihinnaksi Saksan primäärisäätömarkkinoilla noin 2,5 euroa kilowattitunnilta (kWh).

Kuluttajasähkön keskihinta Saksassa on 29,4 senttiä / kWh. Feldheimin asukkaat maksavat omavaraisesta sähköstään 16,6 senttiä / kWh.

"Kun arvioin akkulaitoksen käyttöiäksi 20 vuotta, niin tällä systeemillä voi ansaita ihan mukavasti, jos investoinnit jäävät alle 1,2 miljoonaan euroon megawattia kohden", sanoo professori Sauer.

resurssien mark[illegible] mittaluokka on [illegible]

Sähköverko[illegible] tasaamassa on [illegible] hiilivoimaloita. [illegible] pitämään jatku[illegible] nillä, koska vara[illegible] hyvin lyhyide[illegible] 15 sekunnista [illegible] nuutteihin kest[illegible] korjaamiseen.

"Jos tämä[illegible] akkuvarastoja[illegible] kymmenkunta, [illegible] ruskohiilivoim[illegible] primäärisätöm[illegible] kea kokonaan",

SPIEGEL ONLINE DER SPIEGEL SPIEGEL TV
INTERNATIONAL

A Power Grid of Their Own

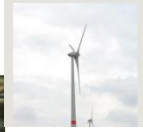
German Village Becomes Model for Renewable Energy

The tiny village of Feldheim, some 60 kilometers southwest of Berlin, was catapulted by chance to the forefront of the renewable energy movement. Now visitors from around the world are flocking to this otherwise unremarkable rural community to see if they can replicate its success.

By Renuka Rayasam

Feldheim–a German village leading the renewable energy revolution

Written by Ajay Pal Singh Chabba, 14-01-2013



Feldheim, a village in Germany, has recently come into the limelight as a result of changes in federal government policies. These policies stipulate an end to reliance upon nuclear energy and has set a target of supplying 35 percent of the country's energy demand through renewable sources by 2020. Feldheim is capable of meeting its total energy demand via renewable sources.

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ANALYSIS | Tiny German village a model revolution

Feldheim, population 145, generates all its own heat and light

By Karen Pauls, CBC News Posted: Mar 08, 2013 5:33 AM ET | Last Updated: Mar 08, 2013 5:21 AM ET

Snart kommer en tredjedel av tysk strøm fra sol og vind

Tyskland er Europas snydspiss i grønn omlegging

Aftenposten

Contents

5 Interview with for[illegible] Governor **Eisako**

7 Interview with **Mr** Member of Europe[illegible]

8 Interview with Mayor **Michael Knape** of Treuenbrietzen/Feldheim, Germany


Auf Wiedersehen im
Energieautarken Ortsteil
Feldheim