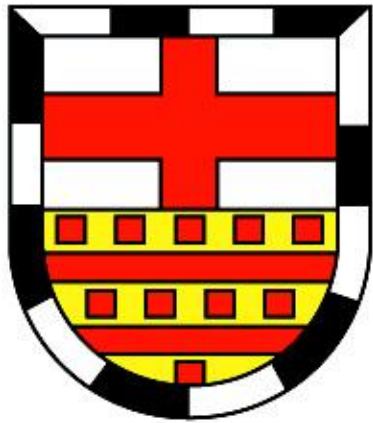




# **EnergyLandscape Morbach**



**Community Morbach**  
Andreas Hackethal, Mayor

# TOKIO 2014



File Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe

Google Maps

https://www.google.de/maps/dir/Tokio,+Japan/Morbach/@45.7586008,70.8028134,z/data=!4m3!3m2!1m5!1m1!1s0x605d1b87f02e57e7:0x2e01618b22571b89!2m2!1d39.6917064!2d35.6894875!1m5!1m1!1s0x47be27590047939d

Anmelden

Tokio, Japan

Morbach

Die Route von "Tokio, Japan" nach "Morbach" konnte nicht ber...

Google

Kartendaten © 2014 Basarsoft, Google, MapIT, ORION-ME Bedingungen Datenschutz 500 km

16:14 26.05.2014

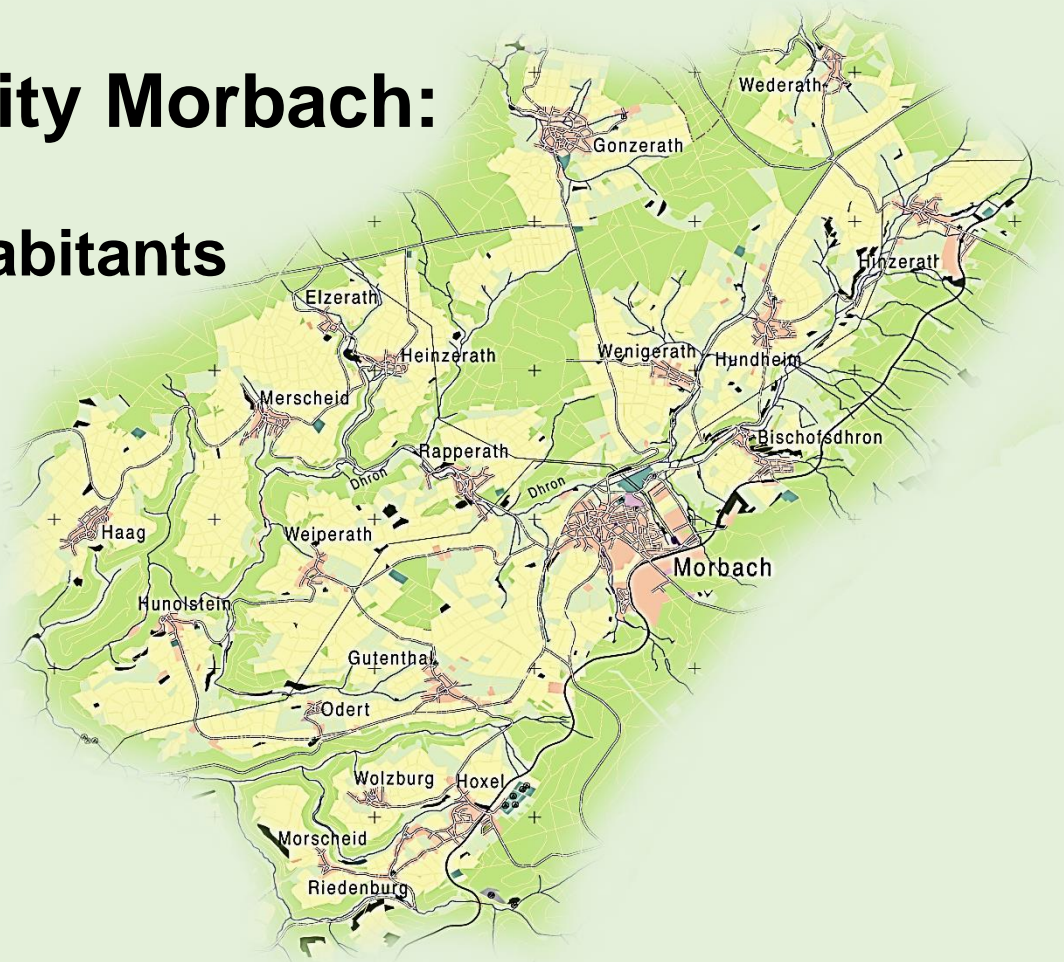


## **Community Morbach:**

**11.000 inhabitants**

**20 villages**

**121 km<sup>2</sup>**

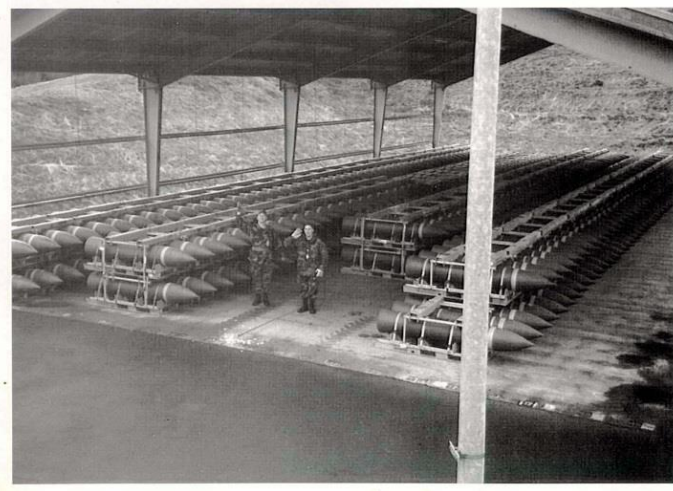




# Former Ammunition Depot U.S. Air Force

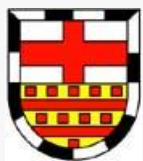


*1954 - 1995*





## From Bomb Depot to Energy Park



**14 Wind Turbines:**  
ca. 35 - 40 Mio. kwh / year

**20 000m<sup>2</sup> Photovoltaic:**  
2 Mio. kwh / year

**Biogas Plant:**  
4 Mio. kwh electricity / year  
5 Mio. kwh heat / year

**Wood-Chip Heating Plant:**  
3 Mio kwh heat / year



TOKIO  
2014



# Conversion



Funded by



# Material and Energy Cycles

## Example Biogas:



**EnergieLandschaft**  
**Morbach**



**waste-heat is used  
in a beer-brewery**



**bio-waste from the  
brewery is used in the  
biogas-plant**





## Morbach: Renewable Energy and Tourism



Energielandschaft  
Morbach



**Guided Tours in the Energy Landscape Morbach:**  
**2003 – 2013: ~ 45.000 Visitors from 104 countries**





## Regional Added Value



### **Renewable Energy: Regional wealth creation:**

- **Lease income and taxes for the community**
- **Residents can invest in energy generation (e.g. Wind Turbines, Photovoltaic)**
- **Job creation; new companies, construction and maintenance mainly by local businesses**
- **Development of local agriculture, forestry and sawmills**
- **Development of tourist trade: hotels, restaurants**



## Whole Morbach Community will be an Energy Landscape



### Morbach Mission Statement:

- **A (virtual) energy-autonomous region based on renewable energy by 2020**
- **CO<sub>2</sub> reduction by 50% in 2020 (reference year 2000)**



## Whole Morbach Community will be an Energy Landscape



### Procedure:

- Material flow analysis
- Identify stakeholders in the community
- Targets by politicians / stakeholders
- Information events for citizens
- Long-term action plans
- Implementation of technical projects
- Milestone monitoring



## Material Flow Analysis



### Material Flow Analysis in Morbach

- **Data collection and accounting of energy consumption and greenhouse gas emissions (Electricity, Heat, Fuel, Waste, Water)**
- **Economic effects / Cash outflow**
- **Potentials for energy savings and efficiency (Private households, Public buildings, Trade / Industry)**
- **Potentials for development of available renewable energies (Wind, Sun, Biomass, Bio waste, Geothermic, Water)**
- **Regional added value**



Material Flow Analysis in the whole community

**Electricity demand of Morbach**

20 villages

11.000 inhabitants:

**17 Mio. kWh/a**

Industry and trade:

**~ 200 Mio. kWh/a**

**Total demand (2013):**

**~ 217 Mio. kWh/a**

**Electricity production (renewables) in Morbach**

Windpower:

**~ 40 Mio. kWh/a**

Photovoltaic:

**7 Mio. kWh/a**

3 Biogas Plants:

**8 Mio. kWh/a**

**Savings of  
33.000 tons  
CO<sub>2</sub>/a**

**Total production (2013):**

**~ 55 Mio. kWh/a**



# Material Flow Analysis



## Annual cash outflow from Morbach

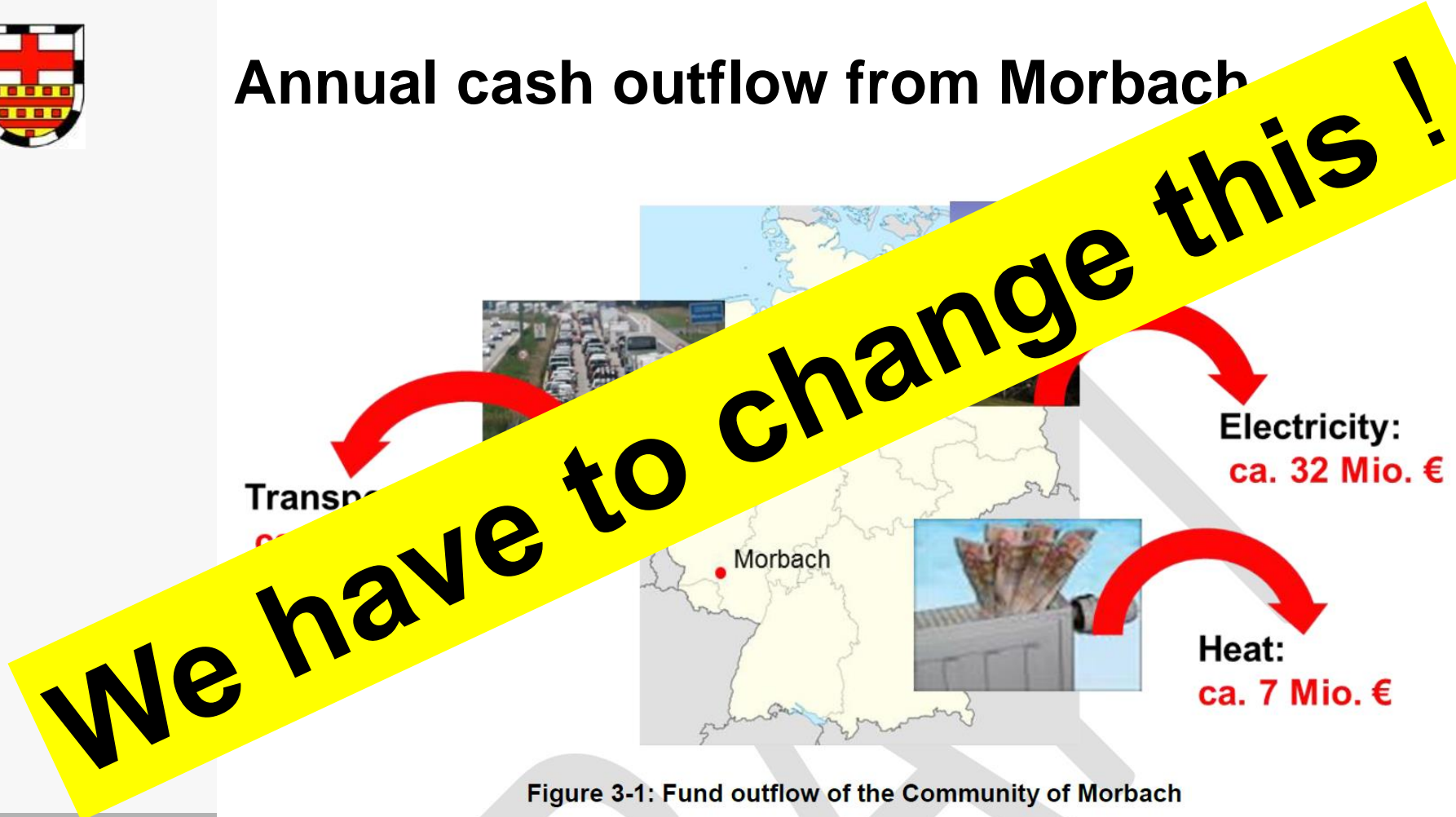


Figure 3-1: Fund outflow of the Community of Morbach



## Activity Progress Morbach



The community of Morbach has no influence on:

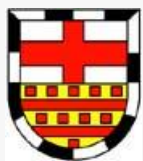
- Traffic / Public Transport (managed by district)
- Waste Management (managed by district)



grey: district Bernkastel Wittlich  
red: community Morbach



## Activity Progress Morbach



The community of Morbach has no potentials in:

- Hydropower (no larger water flows)
- Geothermal Energy

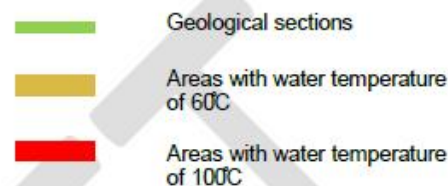
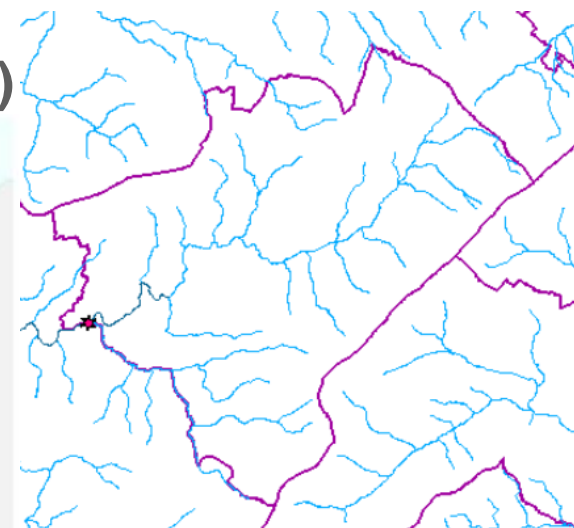


Figure 5-18: Structure of a geothermal information system for Germany<sup>85</sup>





## Action Plan Morbach / Photovoltaic

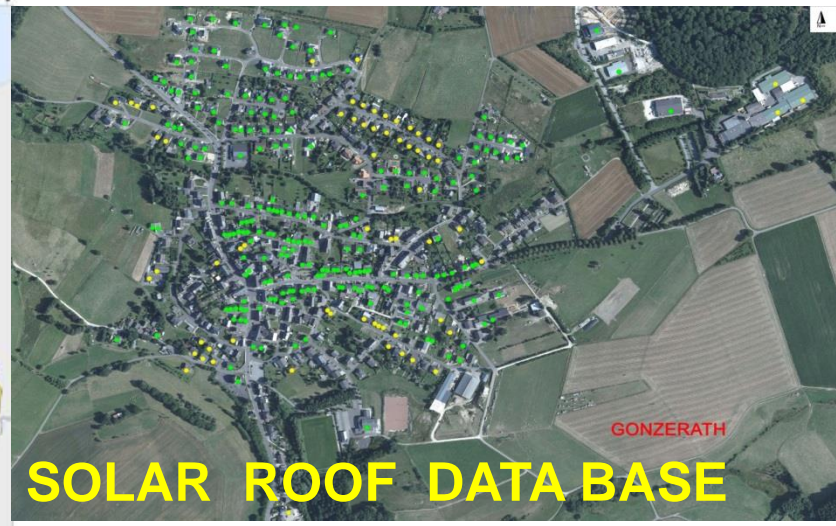


Figure 5-4: Annual average solar irradiation in kWh/m<sup>2</sup> 67



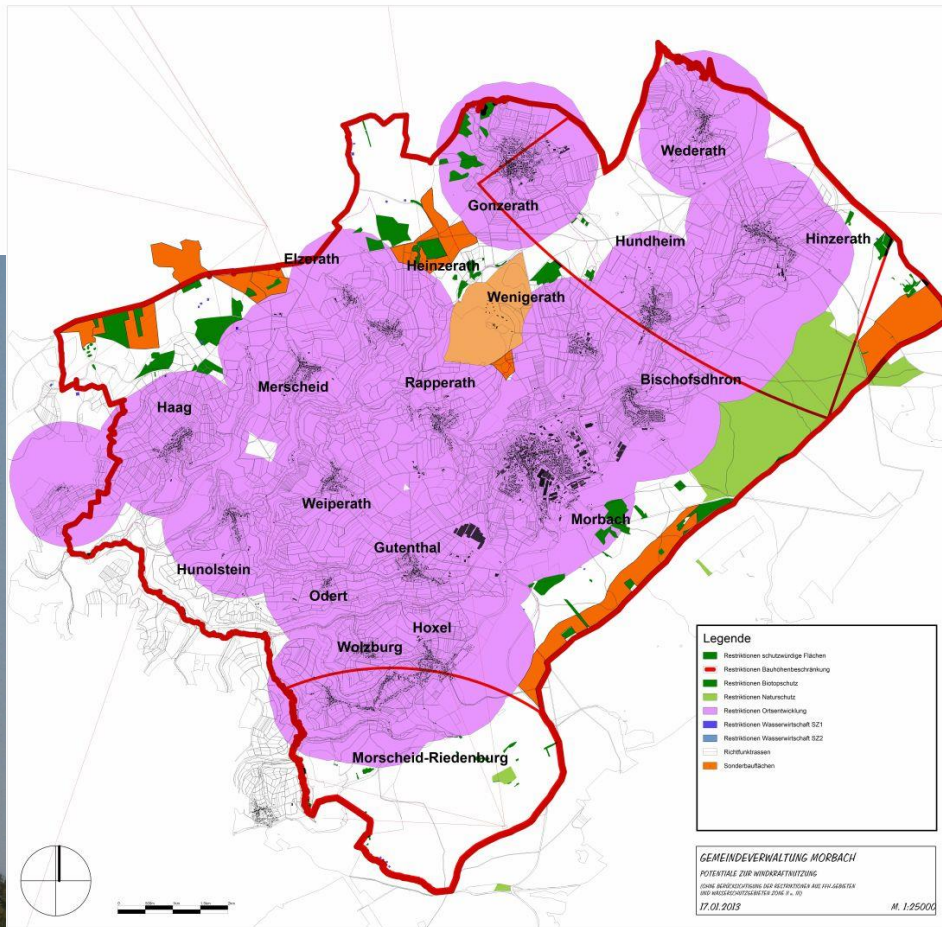
## Action Plan Morbach / Wind power



### Wind power potential

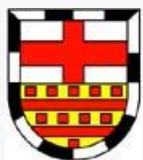


GEMEINDE MORBACH - GRUNDLEGENDE RESTRIKTIONEN ZUR NUTZUNG DER WINDKRAFT





# First District Heating Network / Woodpellets

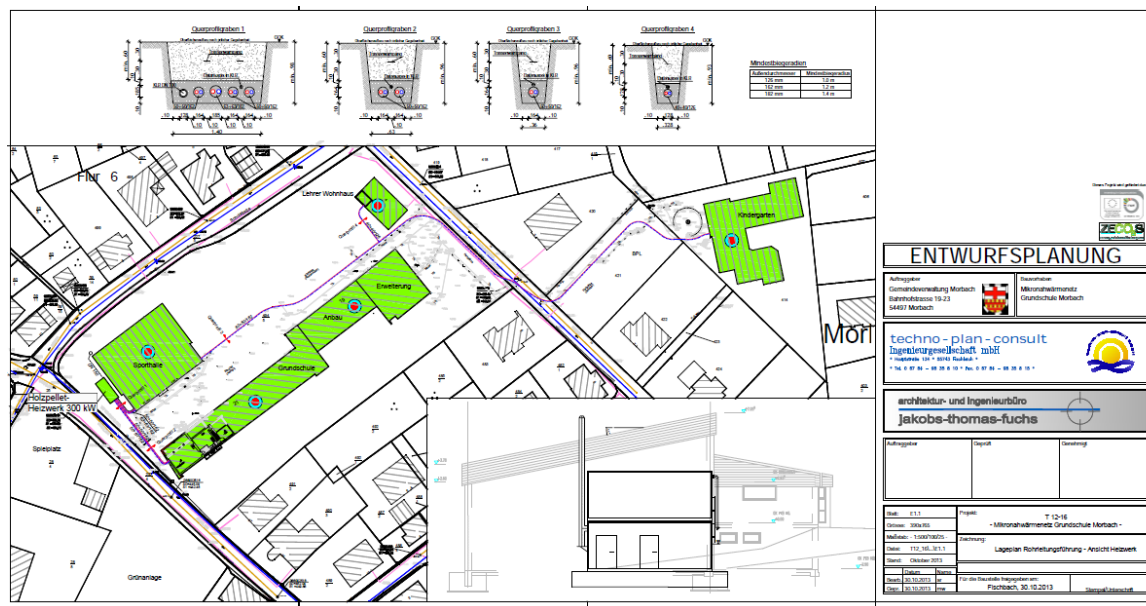


**Micro district heating system for Primary School, Teacher's House, Sports Hall, Kindergarten**

**CO<sub>2</sub> savings with this project:**

**120 tons / year \***

\*current CO<sub>2</sub> emission factors of UBA (German Federal Environment Agency)





## Second District Heating Network (planned)



**An existing company in Morbach (food wholesale) has 2.4 million kW/h excess heat from the operation of refrigeration and freezer compartments.**

**Can this waste heat be used for heating a secondary / high school and – in summer - an outdoor pool ?**

With this project CO<sub>2</sub>-savings of 725 tons/a are possible.





## Action Plan Morbach / Energy-saving



### **Energy-saving: LED-Streetlighting in Morbach**



**luminous flux: 2.310 lm**



**LED:  
20% of all 1800  
streetlightings  
until 2015**

**System performance: 24 W**



# Municipal Funding Programs



- Strengthen the village centers
- Energy savings and use of renewable energy

FÖRDERPROGRAMM  
DER  
GEMEINDE MORBACH



ZUR  
STÄRKUNG  
DER ORTSKERNE

FÖRDERPROGRAMM  
DER  
GEMEINDE MORBACH



ZUR  
ENERGIEEINSPARUNG  
UND  
ZUR NUTZUNG  
ERNEUERBARER ENERGIE



## Action Plan Morbach / Climate Change



### Adjustment to forecasted climate changes:

- Forest compilation, tree selection taking account forecasted climate changes
- Moorland / swamp restoration (natural CO<sub>2</sub> storages)
- System of water retention polders, sufficient for “100-year flood events”





## Tokio 2014



*“If you want to reach  
new shores,  
you must have  
the courage to leave  
the safe harbor”*

*Anonymus*

