
Elements of a Greenhouse Gas Natural Society

City of Neuburg an der Donau:

„Application of Industrial Waste Heat for District Heating Systems“



*28,500 inhabitants, 81 km²
ca. 6,400 buildings
ca. 11,500 households
ca. 1,170,000 m² of living area
local Agenda 21
„RES PUBLICA“ – mission
statement*



Dipl.-Kfm. (Univ.) Manfred Rößle

- Agenda 21 (workgroup urban development / energy)
- BürgerSolarKraftWerke ND-SOB (CEO)
- f10 ForschungsZentrum ND (CEO)
- Wärmeversorgung ND GmbH (CEO -till 2013)



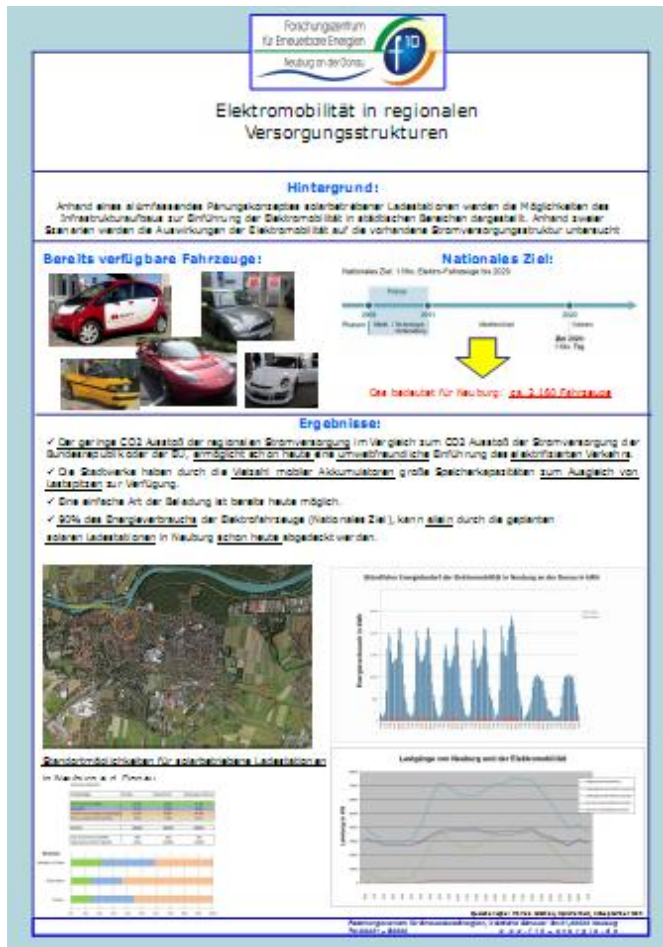
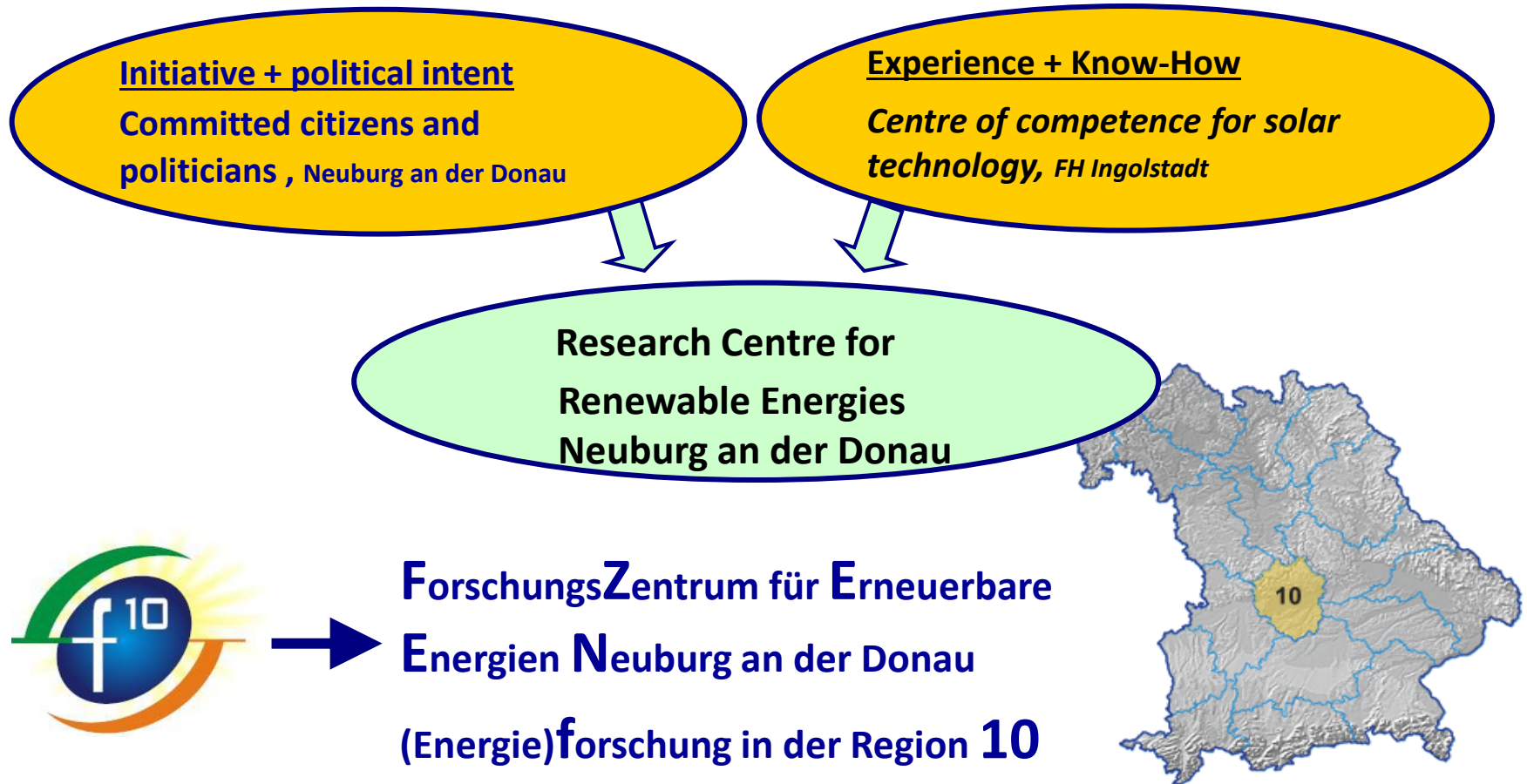
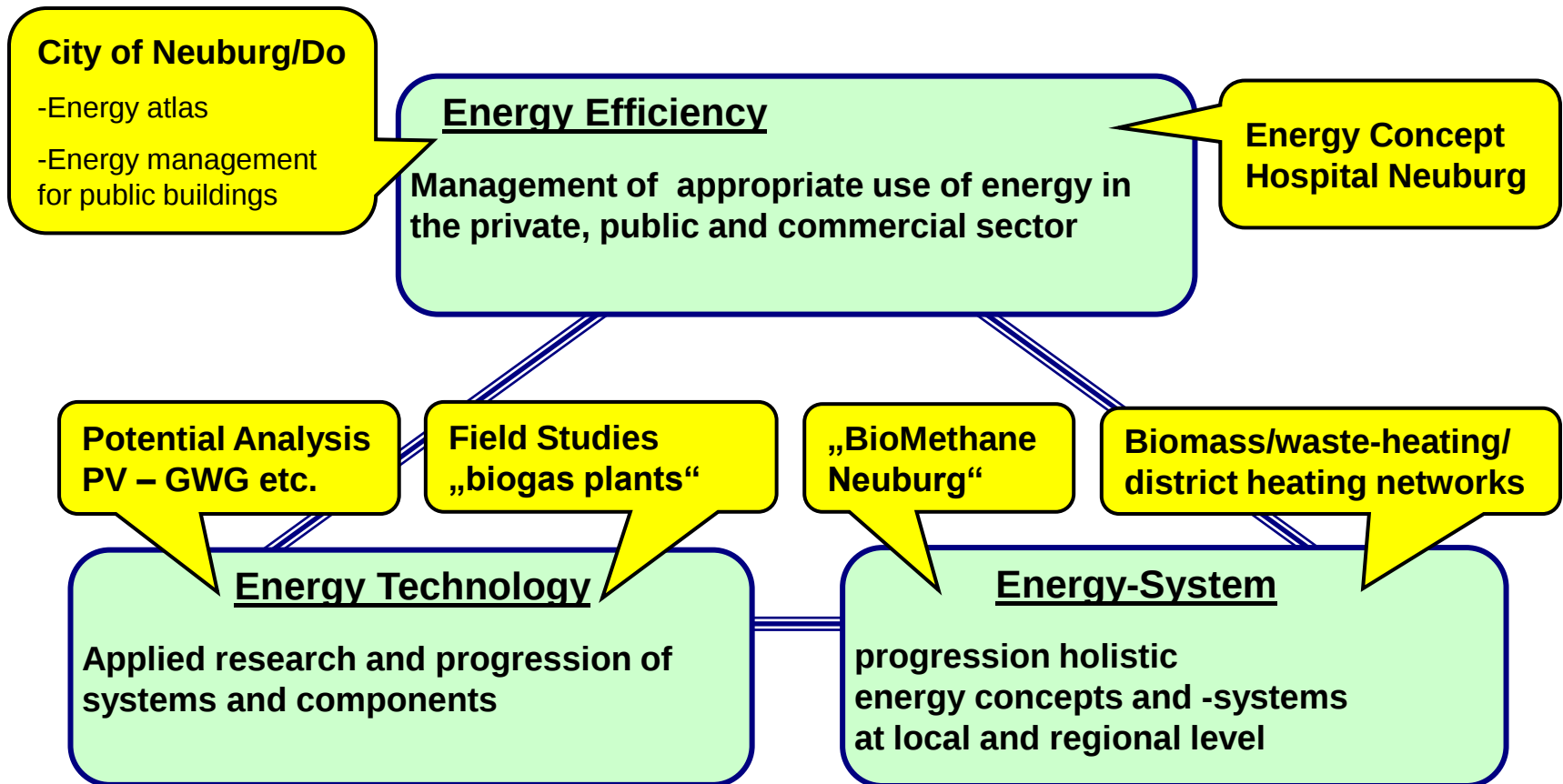
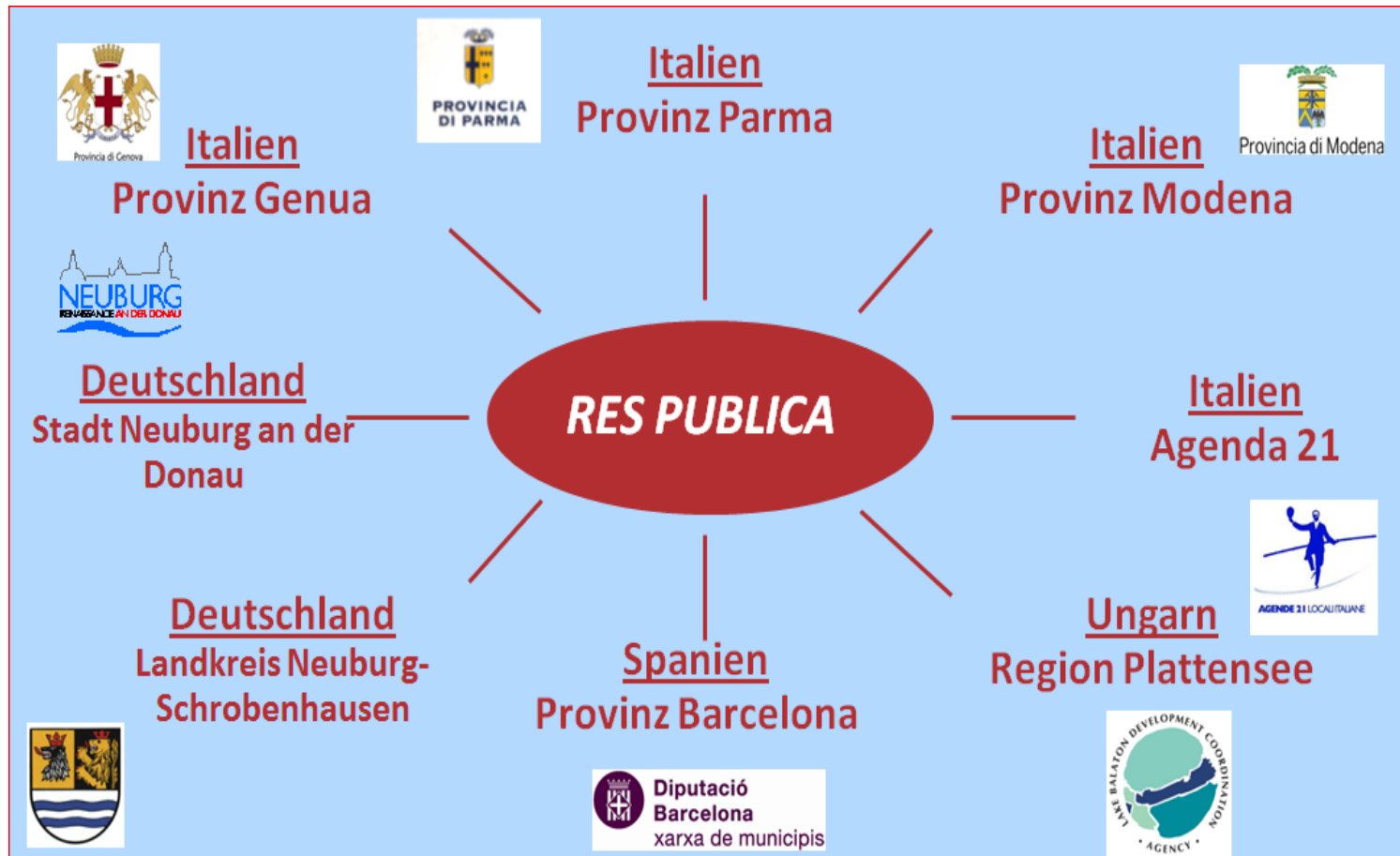


Bild: Stadt Neuburg

Environmental days 2011 – electric mobility on the Danube







Task of the city of Neuburg/Donau

- ➔ **Development of an internationally applicable method for promotion of renewable energy in municipalities**
- ➔ **Development and implementation of a local energy program:**

Neuburger Energieprogramm - "Für die Zukunft"

8 sessions, 33 participants

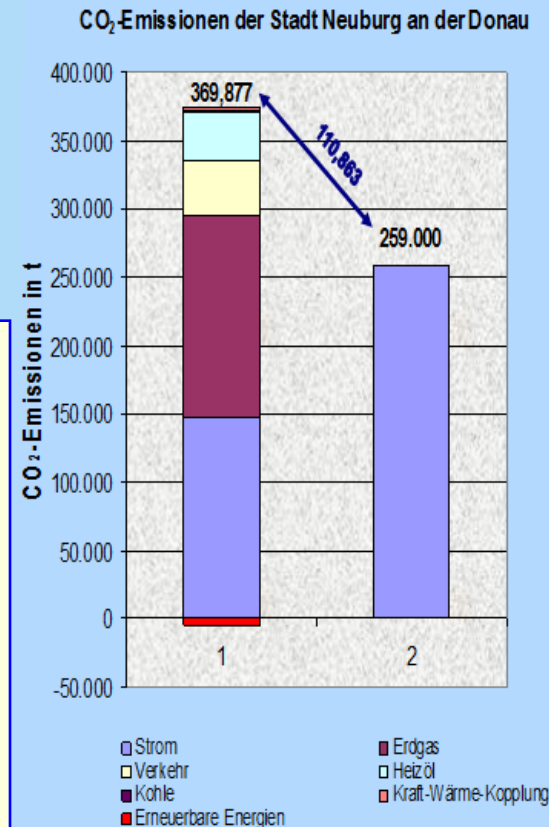
politics, citizens and companies of Neuburg, f10, municipal utility, banks, energy consultants, housing development, agriculture, city marketing, agenda 21, administration

Energy model of Neuburg

**Neuburg on course -
establishing the energy
turnaround!**

30 % CO₂ savings until 2020 by:

- **Reduction of energy consumption**
 - **Rehabilitation factor 10**
- **Increase of energy efficiency**
 - **Consistent use of ind. waste heat**
- **Use of renewable energies**
 - **Biomass from short rotation crops**



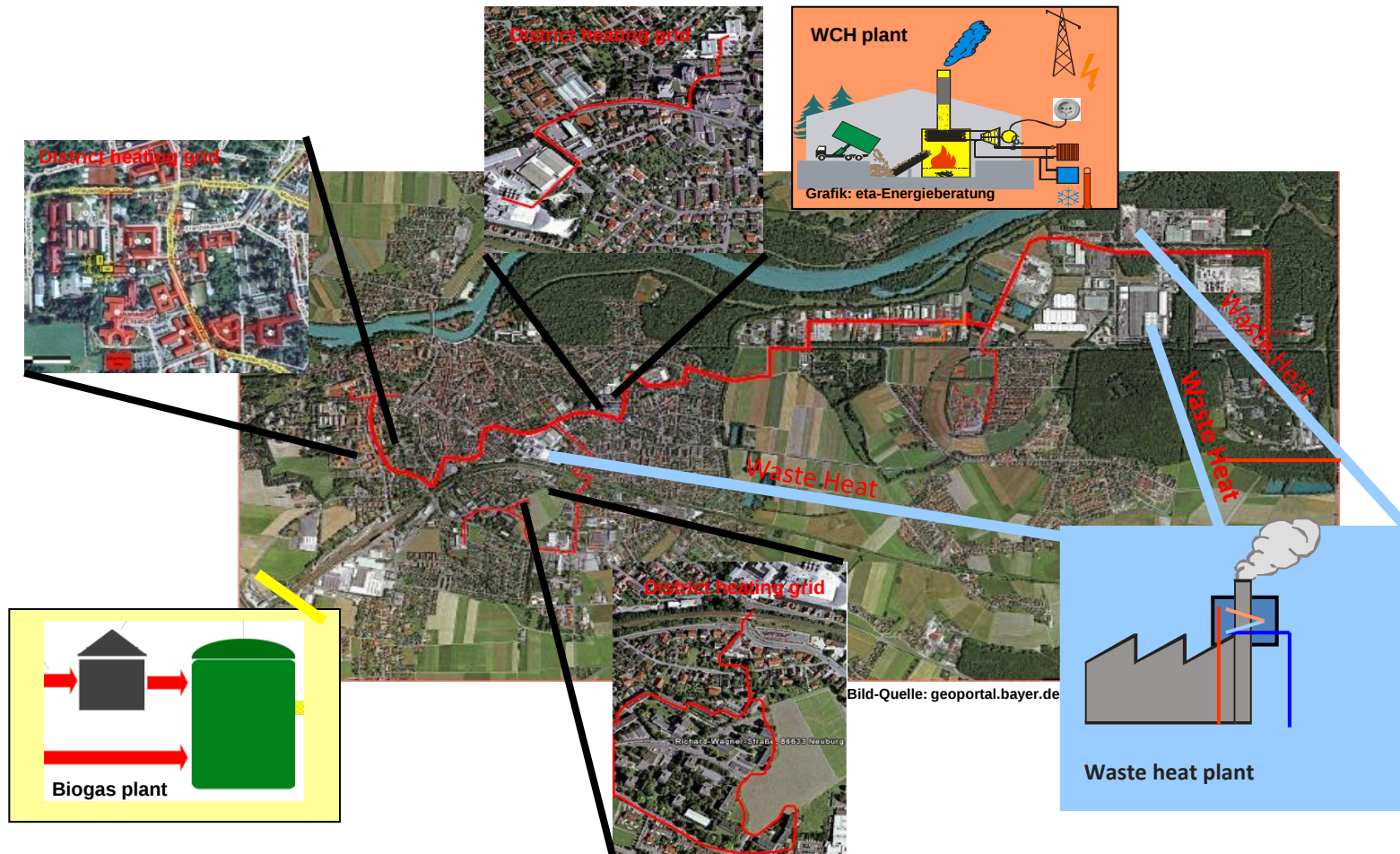




Bild-Quelle: geoportal.bayer.de

Deutsche Rockwool

Waste heat potential:

- Step 1: 19,000 MWh
(950 single-family homes)
- Step 2: 15,000 MWh
(750 single-family homes)

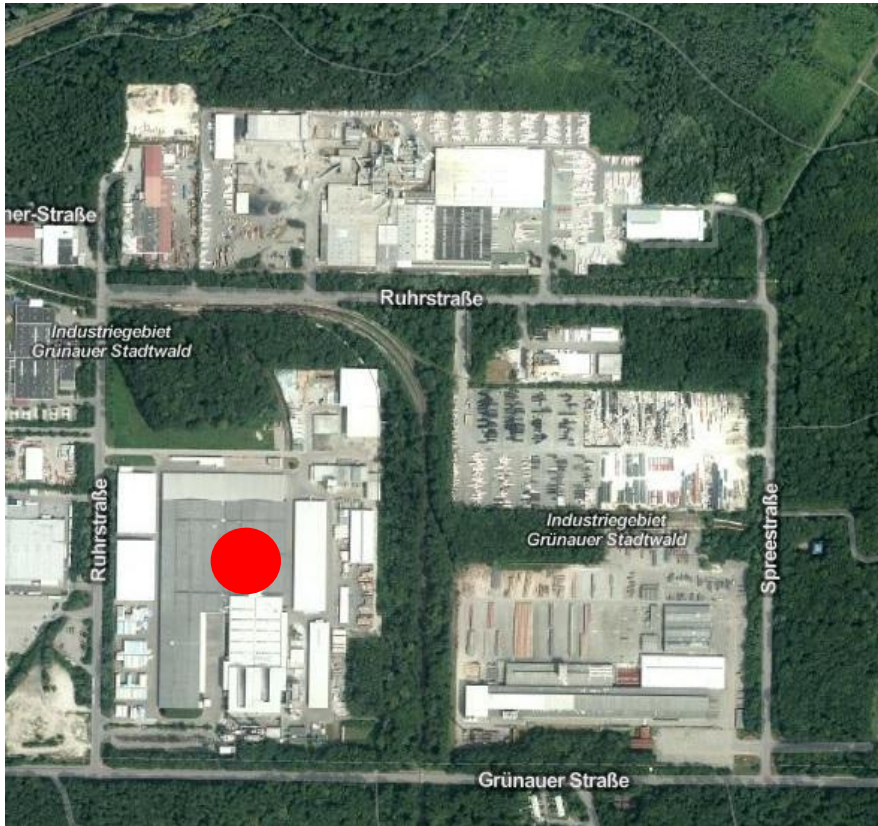


Bild-Quelle: geoportal.bayer.de

Saint Gobain

Waste heat potential:

- Step 1: 26,000 MWh
(1,300 single-family homes)
- Step 2: 14,000 MWh
(700 single-family homes)



Bild-Quelle: geoportal.bayer.de

Further Waste heat potentials

- Knauf – Perlite
- Hoffmann Mineral

Amount of heat potential
respectively technical
feasibility not clarified
conclusively.

Theoretically possible district heating grid provision in urban areas:

- 70% of Neuburg's urban area can be developed.
- **35% of the heat demand can be provided by using waste heat.**
- The annual heat sale potential in
 - Industry,
 - Commerce,
 - Public facilities and
 - Residential buildingsis approximately

270,000 MWh

This corresponds to an annual heating oil amount of about

30,000,000 litres

In the potential development area, the annual costs for the provision of heat are based on full costs (investment, maintenance and repair, fuel):

€ 18,000,000

This money is currently flowing to suppliers of fossil fuels in the world

Wouldn't it be nice if this money stayed in your region every year?

Heat energy with a very low primary energy factor results in significant cost reduction even with complying the legal requirements (EEWärmeG, EnEV) for new buildings and redevelopment.

Redevelopment (Study result)

Multi-family house	115,000 €
Single-family house	13,300 €
Mid-temperature heating system €/m ²	9,500 €

Savings potential development area:
approx. 60,000,000 €

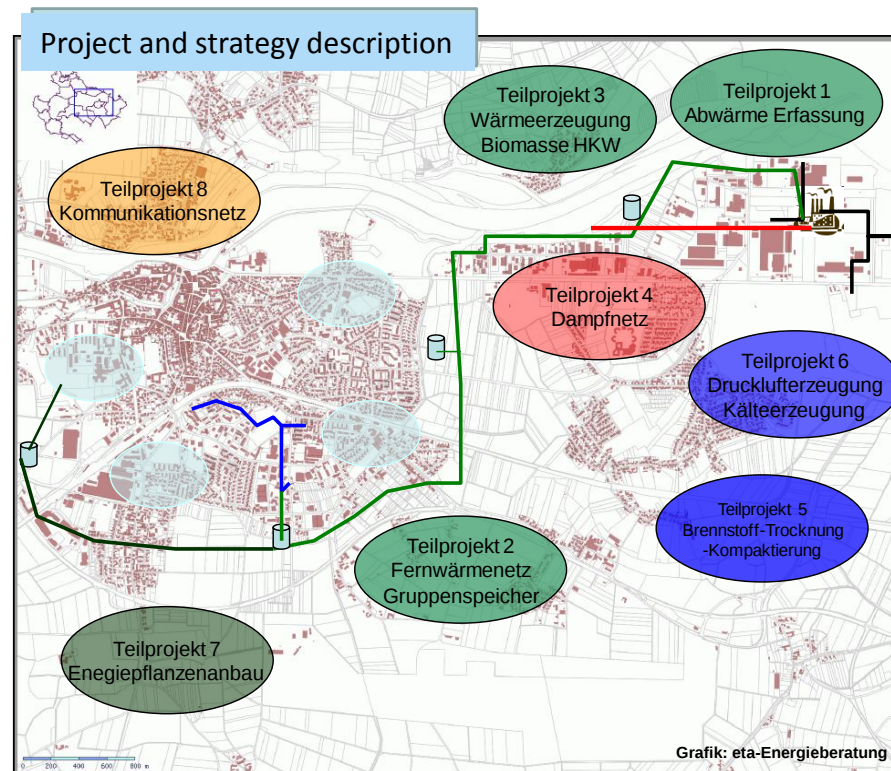
Considering a development rate of 2% per year on average:

Savings approx. 1,200,000 € per year

**Wouldn't it be nice if this money
can be saved and used by the
citizens for other purposes?**

Waste heat and district heating concept of Neuburg

Planned district heating grid with wood-chip heat plant and industrial waste heat



Heat-sale:
up to 270 GWh/a

Waste heat: **>100 GWh/a**

Wood chip heat plant:
70-80 GWh/a

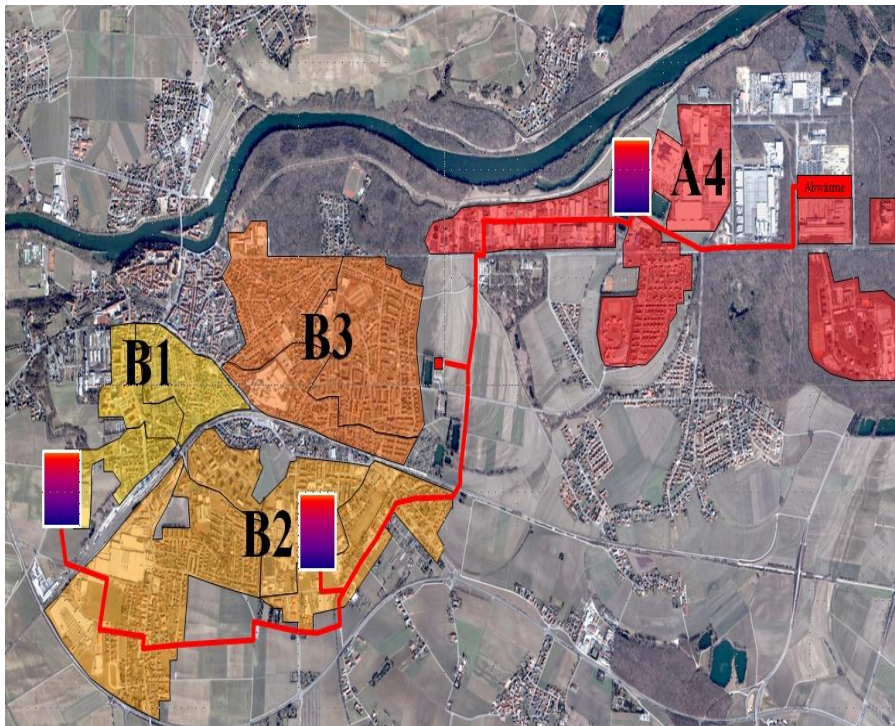
Cogeneration plant for medium and peak power:
70-80 GWh/a

Final length of heat grid:
63 km

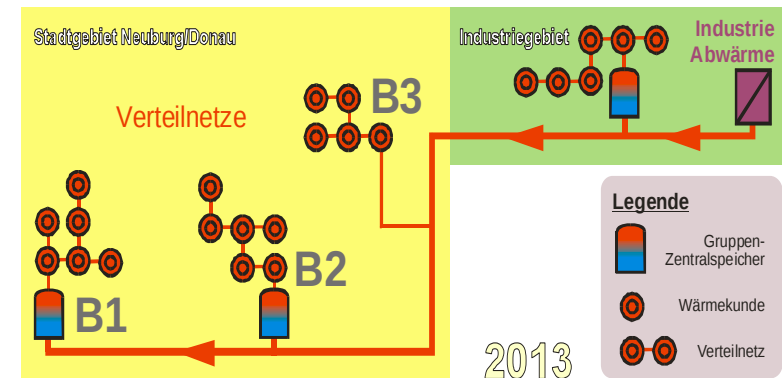
CO₂-savings: **> 113,000 t/a**

Investment: **> 140 Mio €**

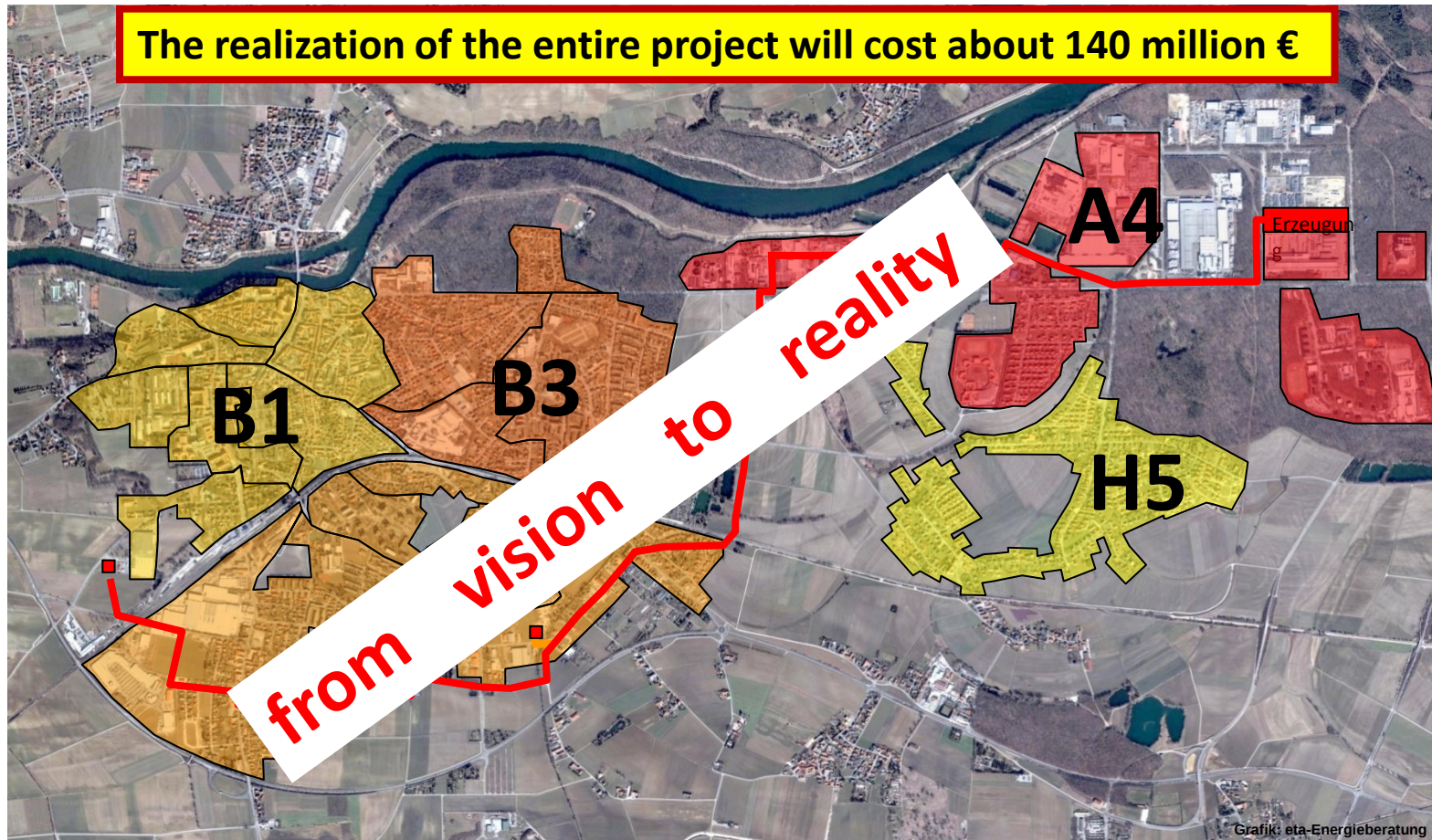
Grant application by BMU – January 2011



Grafik: eta-Energieberatung



- Different flow temperatures as required
- Intermediate buffer to heat
- Optimized layout of pipe diameter
- Reduced grid losses



Realization

- Subproject Industrial Area A4 -

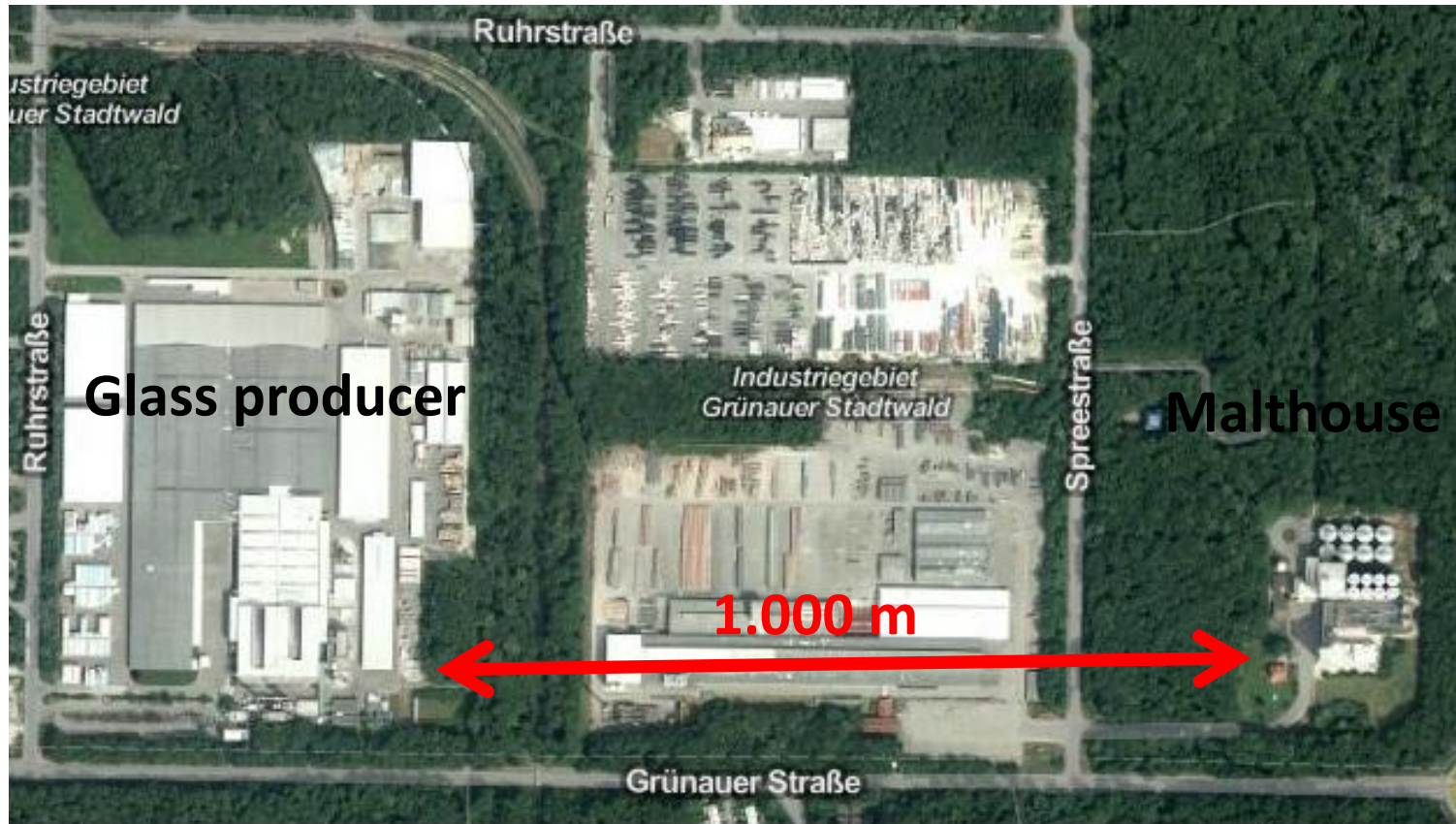


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Realization

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Bild-Quelle: J. Braml

Realization

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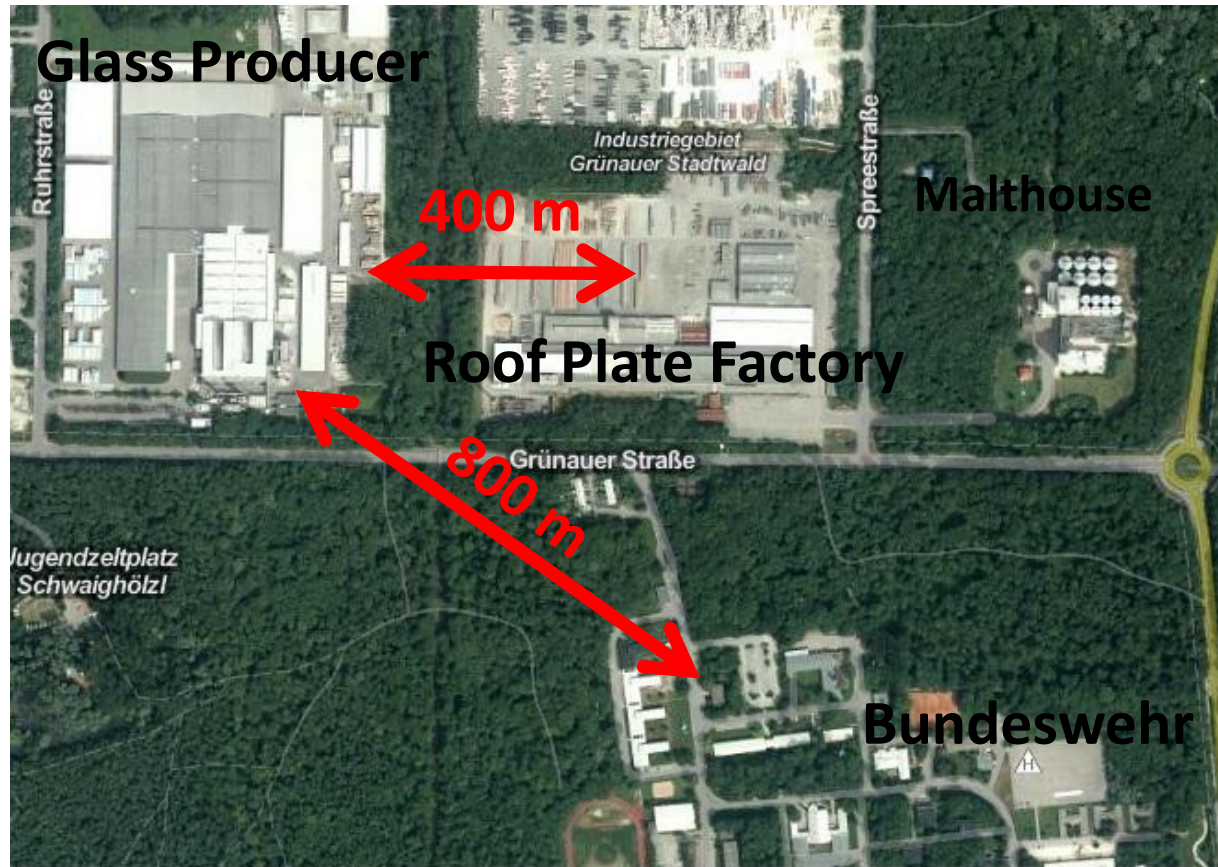


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Realization

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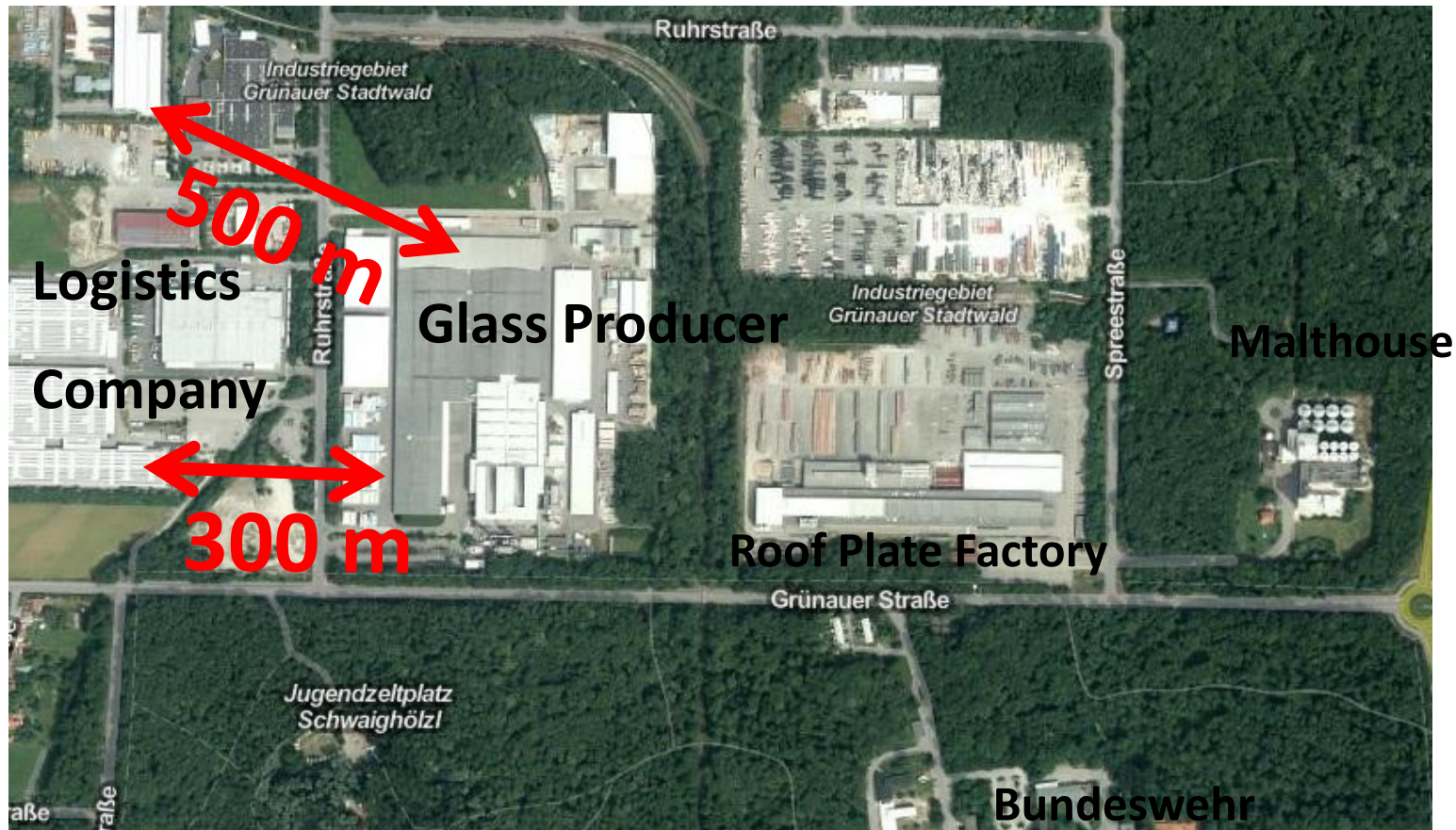


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Realization

- Subproject Industrial Area A4 -

Good neighborhood since 1974 (id est almost 40 years)



Bild-Quelle: geoportal.bayer.de

Malthouse

Annual heat demand
ca. 25,000 MWh per year
(approx. 2,800,000 litres heating oil)



Bild-Quelle: geoportal.bayer.de

Glass Producer

Annual heat demand
ca. 40,000 MWh per year
(approx. 4,500,000 litres heating oil)

**Why was this project not implemented
years (decades) ago?**

Realization

- Subproject Industrial Area A4 -

Reasons which militate against realization:

- Companies primarily consider “only” their own interests
- Concentration on the core business
- Who invests in the realization?
- Who takes the responsibility if a third party will default on its obligations (e.g., heat dissipation)?
- Who will build the plant(s)?

The same questions are being asked today, as well as 40 years ago.

Realization

- Subproject Industrial Area A4 -

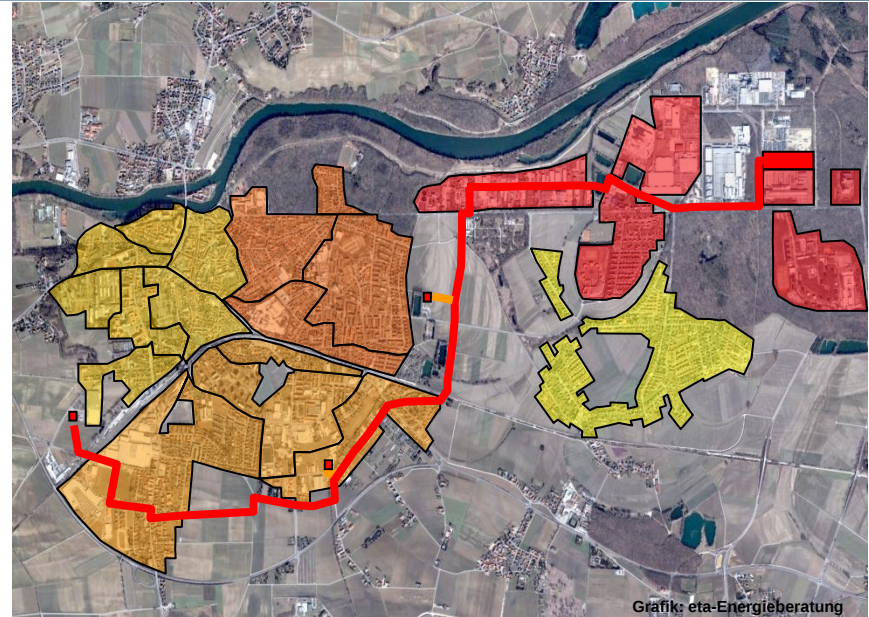


- Cost reduction of heat consumption
- Increase of energy efficiency
- Image improvement by environmental protection

- Income from heat supply
- Increase of energy efficiency
- Image improvement by environmental protection

The same questions are to be solved in a similar way for all other customers:

- Industry
- Commerce
- Public buildings
- Private households
- Owner communities



Consequence:

We do not have **one** Project, but a **variety** of small projects.

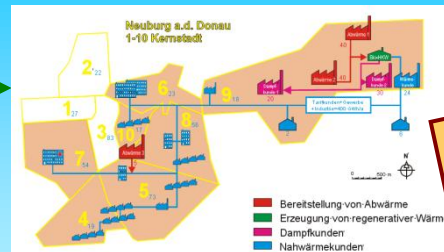
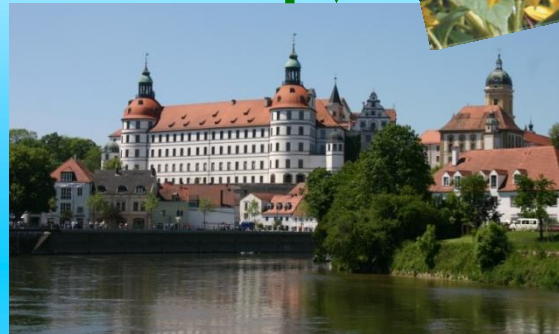
But: We have **one** clear goal.

The higher the citizens' acceptance for using a heating grid system, the

- **better the use of waste heat**
- **higher the regional “self-supply” (self-power generation, energy crops , ...)**
- **faster the achievement of climate protection goals**
- **greater the regional value (economic cycle)**
- **safer the future price stability for heat**

Basic prerequisites for successful shaping and purposeful execution:

- **high acceptance of potential heat customers and**
- **broad political consensus for project implementation.**



**Our goal :
30 %CO₂-savings
by the year 2020.**

Bilder: Stadt Neuburg
Grafik: eta-Energieberatung