The Dresden District Heating System

1. Historical Developments between 1990 and 2012

2. Fit for future – the new energy plan of 2013
Initial situation in 1992

and 10 years later

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
An excellent modern power-plant has worked in Dresden since 1995. It seems to be visually a very clean technology by using natural gas.

The big amount of CO$_2$-emission is invisible and non-odorous.
Only at could days of wintertime you can see the exhausted emissions and the power of this plant with 260 MW<sub>el</sub>.
Decisions for the local energy policy in Dresden

1991/92  Installation of a municipal energy supplier (two separated companies for heat & power and for natural gas supply)

1994  Dresden joined the Climate Alliance

1997  Fusion of the two companies to the “DREWAG”

2010  The Network “EVD” as a Fusion of Suppliers is created

2013  Decision of the “New Energy Program Dresden 2030“
Structure of the Municipal Companies

Quelle: www.evd-dresden.de (17.04.2015)
The district heating system

Nearly 50 percent of all flats are connected to the central heating system.

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Development of the central heat & power-cogeneration

Supply Target: 2,100 GWh
Development in the CO$_2$-emission of the central heat & power-cogeneration

DREWAG heat supply and CO$_2$-emissions by heat

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
The Decrease of Population in the City of Dresden

Inhabitants with main resistance in the city

100 %  The „Wall-Fall-Effect“

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
The Decrease of Population in the City of Dresden

<table>
<thead>
<tr>
<th>Year</th>
<th>Inhabitants with main resistance in the city</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>500,000</td>
</tr>
<tr>
<td>1990</td>
<td>520,000</td>
</tr>
<tr>
<td>1991</td>
<td>540,000</td>
</tr>
<tr>
<td>1992</td>
<td>440,000</td>
</tr>
<tr>
<td>1993</td>
<td>460,000</td>
</tr>
<tr>
<td>1994</td>
<td>480,000</td>
</tr>
<tr>
<td>1995</td>
<td>500,000</td>
</tr>
<tr>
<td>1996</td>
<td>480,000</td>
</tr>
<tr>
<td>1997</td>
<td>460,000</td>
</tr>
<tr>
<td>1998</td>
<td>440,000</td>
</tr>
<tr>
<td>1999</td>
<td>460,000</td>
</tr>
<tr>
<td>2000</td>
<td>480,000</td>
</tr>
</tbody>
</table>

**The „Wall-Fall-Effect“**

- 100%: Incorporation of towns and villages nearby Dresden

**City of Dresden Environmental Office**
Fritz Pielenz

**Climate Alliance Annual International Conference**
22 – 25 April 2015, Dresden
Percentage of vacancy in homes (2006)

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Buildings with 10 levels in the centre of Dresden

Picture: © 2003-12, Thomas Kantschew
Demolition of buildings in the centre of the city

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Demolition of buildings at the periphery of the city

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Number of deconstructed flats in different urban districts

### Geförderter Wohnungsrückbau (Stadtumbau Ost) 2002 bis 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dresden insgesamt</td>
<td>7 323</td>
<td>253</td>
<td>271</td>
<td>862</td>
<td>1 282</td>
<td>761</td>
<td>862</td>
<td>716</td>
<td>421</td>
<td>538</td>
<td>910</td>
<td>447</td>
</tr>
<tr>
<td>OA Altstadt</td>
<td>588</td>
<td>-</td>
<td>-</td>
<td>168</td>
<td>356</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>OA Neustadt</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Blasewitz 1)</td>
<td>665</td>
<td>-</td>
<td>-</td>
<td>62</td>
<td>-</td>
<td>108</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>78</td>
<td>-</td>
<td>411</td>
</tr>
<tr>
<td>OA Leuben</td>
<td>396</td>
<td>-</td>
<td>90</td>
<td>-</td>
<td>220</td>
<td>-</td>
<td>-</td>
<td>86</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Prohlis</td>
<td>3 690</td>
<td>-</td>
<td>144</td>
<td>160</td>
<td>784</td>
<td>810</td>
<td>240</td>
<td>240</td>
<td>420</td>
<td>892</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Plauen</td>
<td>208</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>208</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Cotta/westliche Ortschaften 2)</td>
<td>1 736</td>
<td>253</td>
<td>37</td>
<td>472</td>
<td>142</td>
<td>423</td>
<td>52</td>
<td>268</td>
<td>89</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Anmerkungen: 1) einschließlich 26 Wohnungen aus Teilabriss
2) einschließlich 338 Wohnungen aus Teilabriss
### Gefördertes Wohnungsrückbau (Stadtumbau Ost) 2002 bis 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dresden insgesamt</td>
<td>7 323</td>
<td>253</td>
<td>271</td>
<td>862</td>
<td>1 282</td>
<td>761</td>
<td>862</td>
<td>716</td>
<td>421</td>
<td>538</td>
<td>910</td>
<td>447</td>
</tr>
<tr>
<td>OA Altstadt</td>
<td>588</td>
<td>-</td>
<td>-</td>
<td>168</td>
<td>356</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>OA Neustadt</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Blasewitz</td>
<td>665</td>
<td>-</td>
<td>-</td>
<td>62</td>
<td>-</td>
<td>108</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>78</td>
<td>411</td>
</tr>
<tr>
<td>OA Leuben</td>
<td>396</td>
<td>-</td>
<td>90</td>
<td>-</td>
<td>-</td>
<td>220</td>
<td>-</td>
<td>-</td>
<td>88</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Prohlis</td>
<td>3 690</td>
<td>-</td>
<td>144</td>
<td>160</td>
<td>784</td>
<td>810</td>
<td>240</td>
<td>240</td>
<td>420</td>
<td>892</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Plauen</td>
<td>208</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>208</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>OA Cotta/westliche Ortschaften</td>
<td>1 736</td>
<td>253</td>
<td>37</td>
<td>472</td>
<td>142</td>
<td>423</td>
<td>52</td>
<td>268</td>
<td>89</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Anmerkungen:
1) einschließlich 26 Wohnungen aus Teilabriss
2) einschließlich 338 Wohnungen aus Teilabriss
Some of the latest apartment-houses, built in GDR

Picture: © 2003-12, Thomas Kantschew
The deconstructed so-called homes „Sternhäuser“ in Dresden-Prohlis

Picture: Fotothek Stadtwiki Dresden, 21.04.2015
The priority-points of deconstruction in the City

Fritz Pielenz

22 – 25 April 2015, Dresden
The priority-points of deconstruction in the City – only in areas of district heating
First Retrofitting of Houses in the 1990’s

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Best practice project: „Factor 10“ – Retrofitting of old houses (Heat consumption: < 30 kWh/m² p.a.)
Best practice project: „Factor 10“ – Retrofitting of old houses (Heat consumption: < 30 kWh/m² p.a.)

Insulation Thickness: 24 cm
and best thermal construction of windows

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Supply of Heat in the City
(with correction of the influence of outdoor-temperature during the period of heating)

Heat per year (GWh)
Increase of the district heating system (km)

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
Innovative air-conditioning service by using thermal energy from the cogeneration of heat & power as a more efficient basis of cooling.
There are about 15 of such cooling systems in the City of Dresden.
Installation of this new technique started 20 years ago.

Relation of cooling power and necessary thermal power for such absorption systems.

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
2013: Integrated Conception for Energy and Climate Protection Dresden 2030

Dresden en route towards an energy-efficient city → a contribution to a long-term securing of competitive ability and attractiveness

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
The following increase of population in the City of Dresden

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
EFFICIENCY scenario – Heat supply: Shell model

Yellow: shell 1 – district heating, existing stock
Green: shell 2 – development area until 2022
Blue: shell 3 – target network area until 2030
White: shell 4 – decentralised supply

Source: DREWAG/Environmental Office, as of November 2012
New Tubes for District Heating

City of Dresden
Environmental Office
Fritz Pielenz

Climate Alliance
Annual International Conference
22 – 25 April 2015, Dresden
The heat supply in Dresden-Reick with a big heat reservoir
(can be visited at Friday)
The City of Dresden can looking forward optimistically and will do a significant contribution in the mitigation of climate change.

Thank you for your attention!

Contact: fpielenz@dresden.de
Best Practise in the City of Dresden

Energy-efficient sewage-water-treatment
The sewage treatment in Dresden

Main technical installations and plants approx. 1.700 km sewer network
Main sewage treatment works in Dresden-Kaditz with 650.000 PE (as of 2006 incl. wastewater from Heidenau and Pirna the capacity will increase to 740.000 PE)
6 smaller sewage treatment works

Personnel
377 employees and 41 apprentices as of 31.12.2004

Annual amount of treated wastewater
60 Mio. Cubic metres

Investments in Sewage treatment works and the sewer system
some 500 Mio. Euro since 1990
State-of-the-art energy concept in the sewage treatment

The power consumption is a main cost factor at the STW Dresden-Kaditz. The biggest consumers are the waste water pumps and the blowers of the aeration plant.

A photovoltaic plant with an annual energy production of 145 MWh was installed on the roof of the stormwater tanks in Dresden Kaditz.
A Kaplan-turbine in the outfall pipe uses the height difference of 5.6m and with an installed power of 138 kW generates approximately 650 MWh a year.
Company structure and shareholders

The company Stadtentwässerung Dresden GmbH is a joint venture of the capital of Saxony Dresden and GELSENWASSER AG. It is a prime example for a successful PPP-model in the waste water sector (PPP - public private partnership).

GELSENWASSER AG is the strategic partner of the City of Dresden since 2004. It is the largest privately owned company for water supply and wastewater management in Germany. The company has gained a wealth of experience and combines its know-how of more than 100 years of work with local authorities and industrial customers with the local experience of the wastewater service provider in Dresden.

This cooperation works very well and thus offers the citizen and industry in Dresden an excellent waste water service at consistently competitive prices.

In 2004 the City of Dresden offered 49% of the shares of Dresden Stadtentwaesserung GmbH in a European tender. GELSENWASSER AG won the bid which led to one of the largest part-privatisations in the history of the German Water industry.

www.stadtentwaesserung-dresden.de