



## KWK Modellstadt Berlin

### Energy Efficiency in Energy Consumption

Achim Neuhäuser

Berliner Energieagentur GmbH

Promoting innovative cogeneration in cities – Examples  
from Berlin and other pilot cities  
EU Sustainable Energy Week 2010

Brussels, March 25th 2010



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### BEA – Facts and Figures

#### **Foundation**

- in 1992 as Public-Private Partnership

#### **Shareholders**

- Federal State of Berlin
- Vattenfall Europe
- GASAG
- KfW Banking Group

#### **Disposes of**

2.5 million € of capital stock

#### **Annual Turn-Over**

approx. 6.5 million €  
370 K€ Company earnings (EBIT)

#### **Know-how**

50 members of staff

#### **Energy Services**

- Contracting
- Consulting
- International Know-How Transfer

#### **Based in**

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### BEA – Facts and Figures

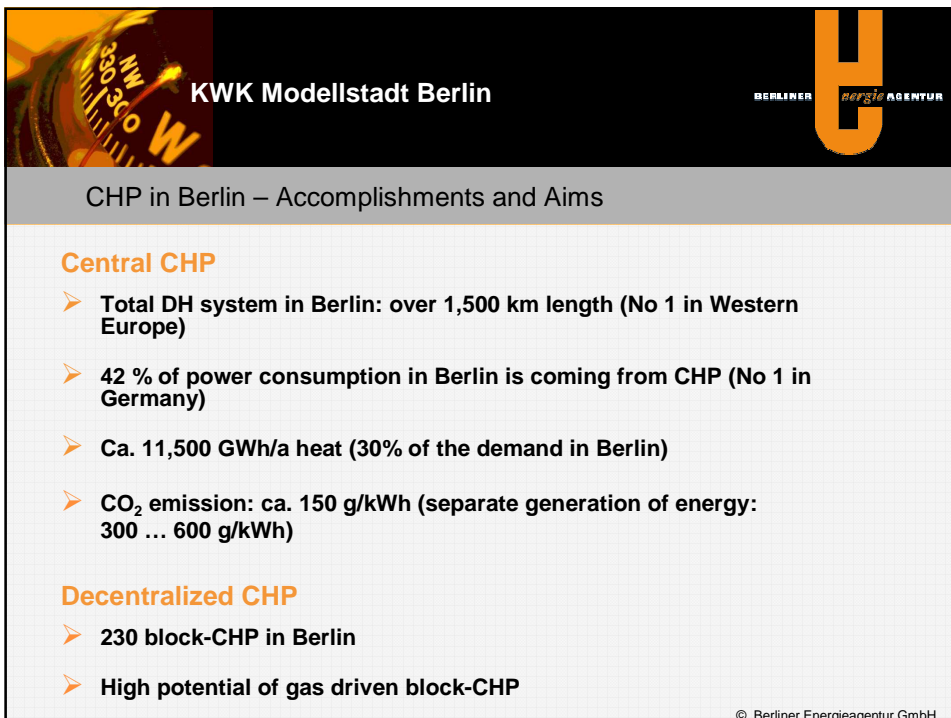
**Energy Services**

- **Contracting:**  
Planning, financing, construction, and operation of CHP and Heat stations, of special supply components such as emergency power, cooling energy and compressed air, solar energy as well as lighting systems
- **Consulting:**  
Advice on all aspects of efficient energy use for customers from industry and commerce as well as the housing, service and public sector
- **International Know-how Transfer:**  
Transfer of successful models of efficient use of energy and of the deployment of renewable energy to developing markets

**Generation Data**

- at about 60 sites in the region of Berlin
- 27 CHP-units (incl. 5 micro CHP), annual electricity generation ca. 5,600 MWh
- direct electricity supply for around 1,500 households in Berlin
- CO<sub>2</sub> savings of ca. 2,240 t/a

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### CHP in Berlin – Accomplishments and Aims

**Central CHP**

- **Total DH system in Berlin: over 1,500 km length (No 1 in Western Europe)**
- **42 % of power consumption in Berlin is coming from CHP (No 1 in Germany)**
- **Ca. 11,500 GWh/a heat (30% of the demand in Berlin)**
- **CO<sub>2</sub> emission: ca. 150 g/kWh (separate generation of energy: 300 ... 600 g/kWh)**

**Decentralized CHP**

- **230 block-CHP in Berlin**
- **High potential of gas driven block-CHP**

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CHP and District Heating

### Example of Heizkraftwerk Mitte


- Plant operator: Vattenfall Europe Berlin
- Construction phase: 1994-1996
- Gas and Steam Cogeneration Plant
  - 398 MW heating capacity
  - 440 MW electric capacity
- Utilization ratio: 90%
- Very high CHP coefficient > 1



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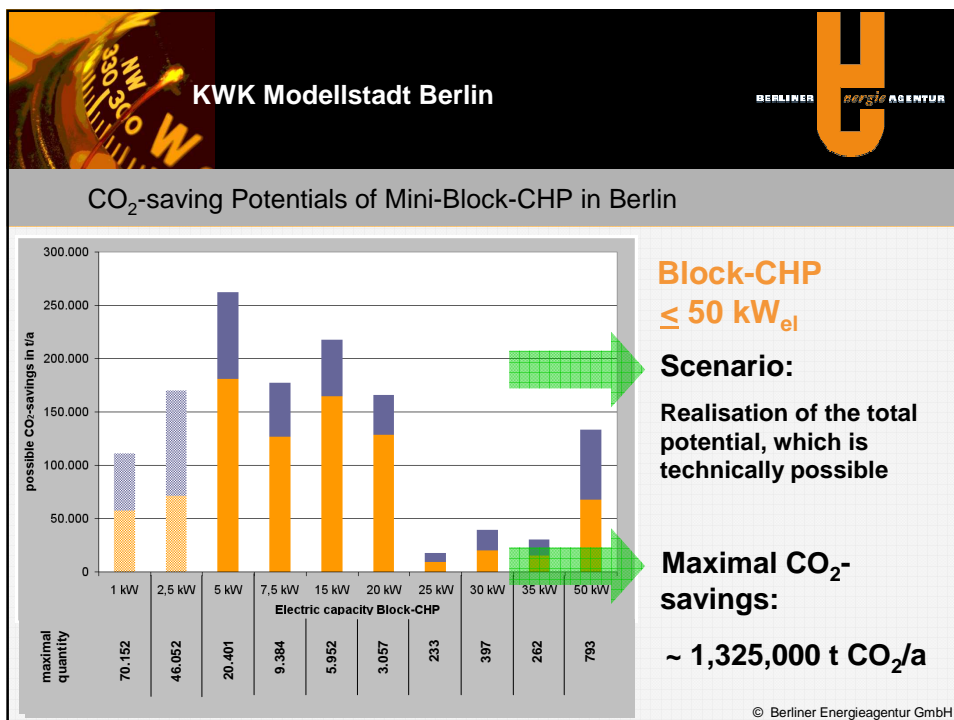
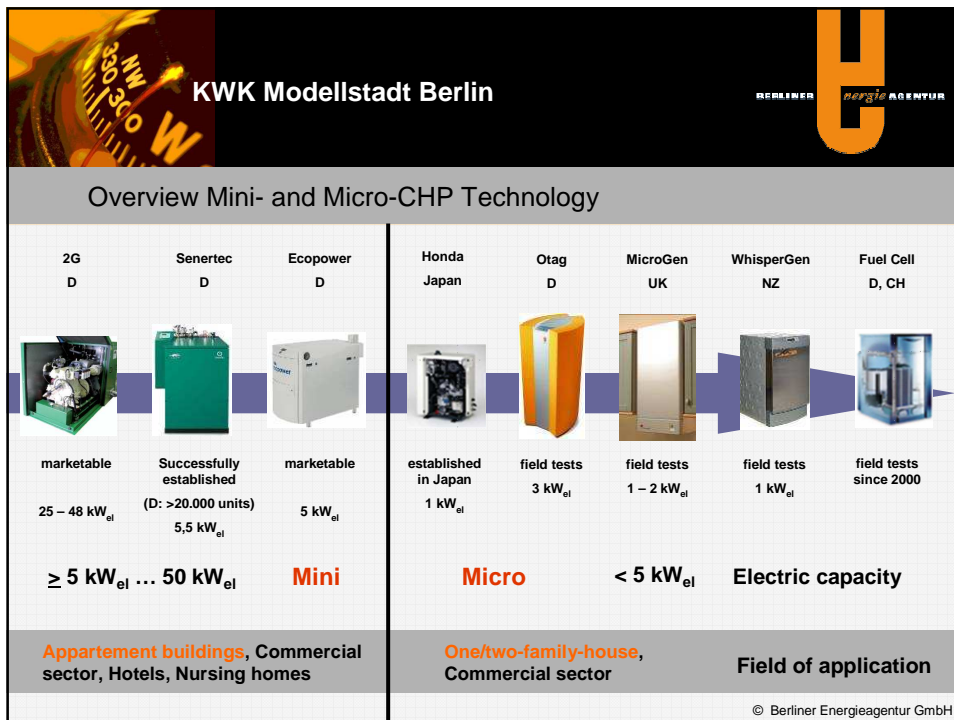
District Heating and Cooling

### Example of Trigeneration at Potsdamer Platz

- 3 absorption chillers in combination with the local DH-system
- District cooling system: 7.5 km main length
- Total cooling capacity: 36.6 MW, ca 46,000 MWh/a
- Absorption chillers: 7.5 MW ca. 9,400 MWh/a cold production
- DH-heat: 11.25 MW, ca. 12,500 MWh/a
- Driven by gas and steam cogeneration plant Heizkraftwerk Mitte
- CO<sub>2</sub> saving potential: up to 3.000 t/a




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### Combined Heat and Power – Good Practice

- **Residential Building Cooperative „Bremer Höhe“, Berlin**
  - 516 residential units and 16 businesses
  - Roof-heating stations with boiler system and CHP modules to provide heat and power
- **CHP-units**
  - 1 x 34 kW<sub>el</sub> / 80 kW<sub>th</sub>
  - 2 x 18 kW<sub>el</sub> / 43 kW<sub>th</sub>
- **Condensing boiler**
  - 531 kW and 2 x 950 kW heat
- **Environmental effects:**
  - Amount of energy savings 600 MWh p.a.
  - Carbon Dioxide savings: 225 t p.a.




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### Urban Strategies and Action Plans

**CHP Pilot City Berlin**

**Starting position: Berlin – CHP hot spot**

- ➔ 42 % of power consumption (No 1 in Germany)
- ➔ 1,500 km district heating grid (No 1 in Western Europe)

**Need for action: Knowledge and interest**

- ➔ Sensitize all relevant stakeholders
- ➔ Initiate interest in innovative CHP energy solutions

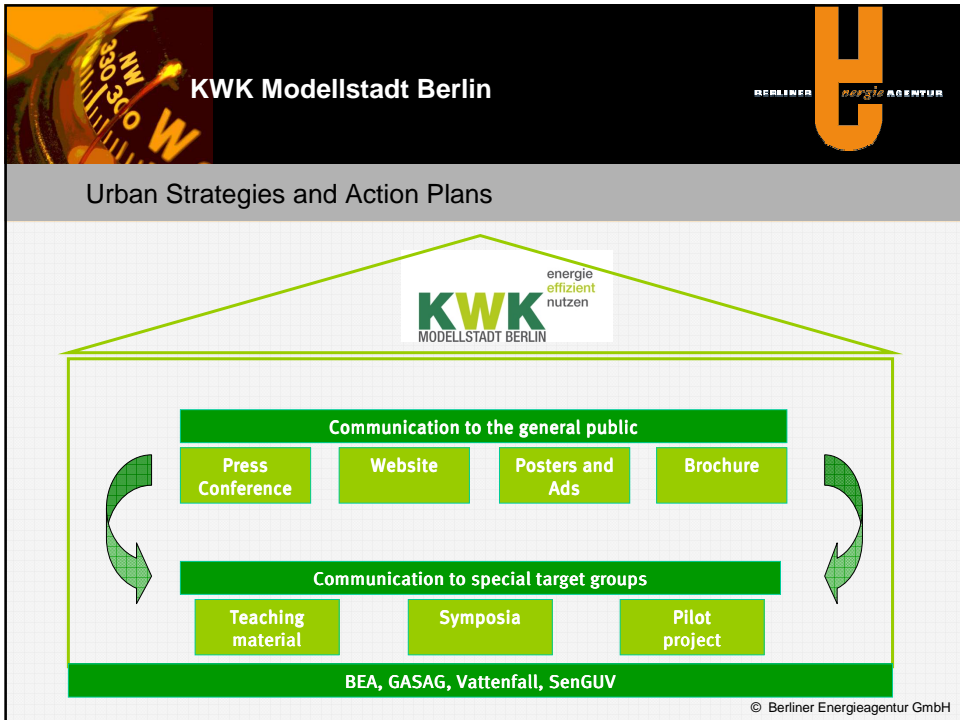
**Approach: broad information campaign**

- ➔ Place CHP as enabler for climate protection
- ➔ Trigger eagerness for knowledge





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Kraft-Wärme-Ressourcen doppelt nutzen

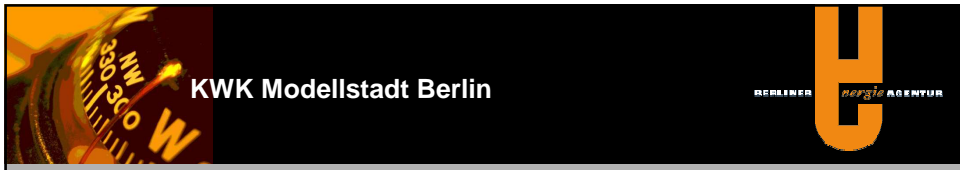
Kraft-Wärme-Ressourcen doppelt nutzen

Kraft-Wärme-Kopplung  
Ressourcen doppelt nutzen

energie effizient nutzen  
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CHP in Berlin – What's next?

**Aims**

- Increase use of regenerative fuels
- Expansion of the DH network, remarkable increase of the decentralized CHP
- 60 % of CHP-power consumption in Berlin (until 2020)
- Substitution of CO<sub>2</sub>-intensive heating technologies
- Combination of smaller units in virtual power stations

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*For more information:*

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