



# **Cogeneration as Part of the National Energy Efficiency Strategy in Germany**

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## **Promoting innovative Cogeneration in Cities – Examples from Berlin and other Pilot Cities**

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# Introducing

## Field of activity

- Efficient energy conversion on the supply and demand site, esp. CHP and efficient use of electricity

## Concrete actions

- Energy Efficiency Action Program (Energy Summit 2007), basis for the Integrated Energy and Climate Protection Program of the F. Gt.
- Amendment of CHP Act
- Mini-CHP-Impulse Program
- Impulse Program for Commercial Cooling Devices
- Social Efficiency Initiative
- Campaign “Climate looks for Protection”
- Member of Supervisory Board and Advisory Council of NOW



# Content

1. Energy Efficiency as part of the Integrated Energy and Climate Program of the Federal Government
2. The Treaty of the Coalition Parties
3. CHP in Germany, Potentials
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5. Mini-CHP-Impulse Incentive Program
6. Some finally remarks



1.

# Energy Efficiency as part of the Integrated Energy and Climate Program of the Federal Government (IECP)



## The IECP

### Related to Energy Efficiency, esp. CHP:

- **Amendment of the CHP Law**
  - > double the share of CHP electricity up to 25 % in the year 2020
  - > saving at least 20 Mill. t CO<sub>2</sub>
- Amendment of the Renewable Energy Law (feed in tariff)
  - > bonus for generation in CHP
- Renewable Energy Heat Law (new)
  - > CHP as compensation for r. e. like biomass
- Energy Saving Ordinance
  - > CHP has to be taken into account
- CO<sub>2</sub> Rehabilitation Incentive Program
- Other Incentive Programs (e. g. Climate Protection Initiative)



## 2.

# The Treaty of the Coalition Parties



## 2.1 Climate Policy Targets

- Limiting the global temperature increase by 2° Celsius related to pre industrial time
- Retaining an outrider by protecting the climate
- Taking into account the international agreed target to reduce greenhouse gas emissions by at least 80 % in the year 2050



## 2.2 Energy Policy Targets

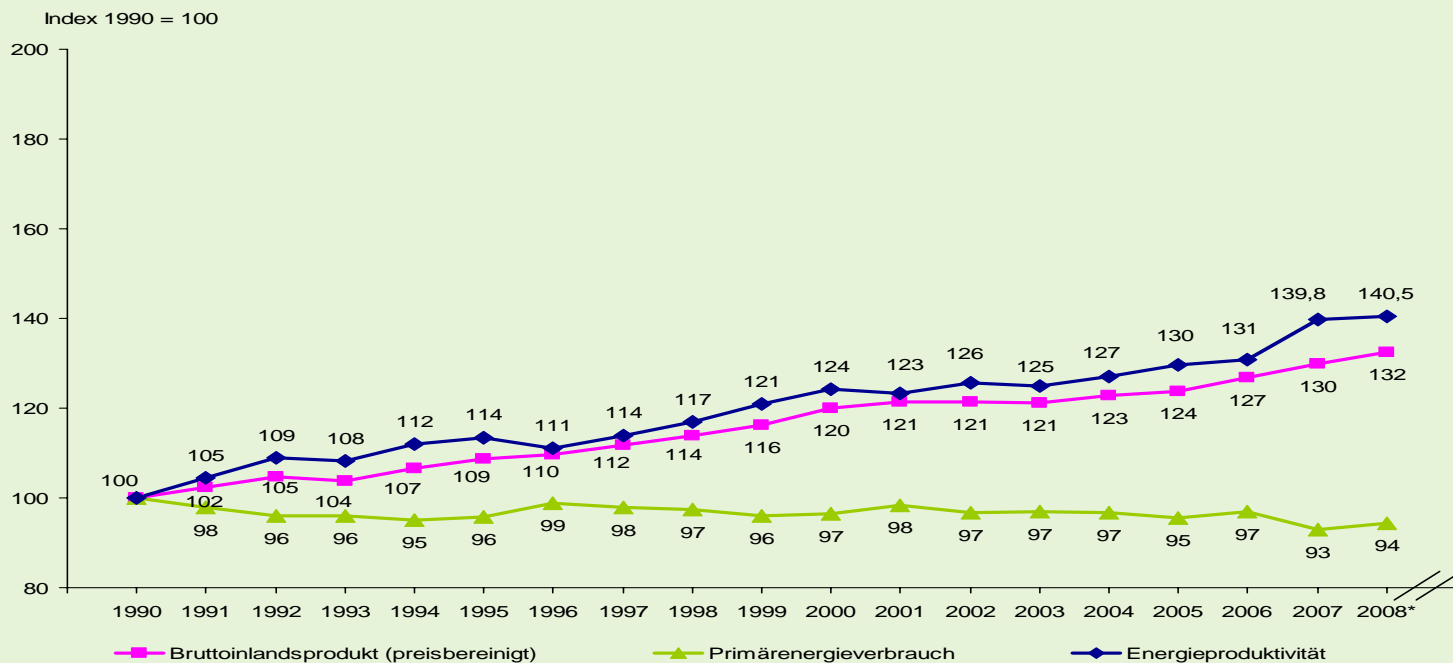
- Developing renewable energies consequently
- Energy efficiency: Further increase and “raise the enormous potentials”
- Review of the IECF in 2010 and adjusting, if the targets are not met
  - > CHP Law is part of it
- *Other subjects*
  - > *Decentralised energy supply in rural areas*
  - > *Law of project planning (structural design)*



# Most important energy efficiency target

- Federal Government: Doubling the Energy Productivity (200 %) *past: 1.8 % per year; needed: 3 % per year*

Energieproduktivität und Wirtschaftswachstum



Quelle: Statistisches Bundesamt, Arbeitsgemeinschaft Energiebilanzen

\* vorläufig



**3.**

# CHP in Germany, Potentials



## Present Situation

### **Electricity and heat generation (in 2004):**

- electricity generation: 611 TWh
- waste heat: 1,040 TWh (37 % electrical efficiency)
  - > there from 150 TWh (14 %) are used (CHP)
- Heat use (separate generated): 1,024 TWh

> waste heat and separate generated heat are  
on the same magnitude



## Economic Potentials of (large) CHP

- Heat: 328 TWh/a (share of need circa 32 %)
- Electricity: 357 TWh/a (share of gross gener. circa **57 %**)
- Considerable **saving** of **PE 173 TWh<sub>HD</sub>/a** compared to the best techniques of the separate generation

*Investigated: Cities with more than 20,000 inhabitants*



## CHP: What we want to do

- Development of potentials in all sectors and size groups
- New CHP-Plants
- Modernisation of existing CHP-Plants (increase of electricity figures)
- Development of heat sinks (heat networks)
- Decentralisation of Energy supply
- Revolution in the heating cellar (replacement of boilers by Micro-CHP)
- Remove obstructions
- Information und motivation



4.

## Amendment of CHP Act



# Amendment of CHP Act

- Continuation on the current level (at most 750 Mill. € per year) by revolution on the electricity clients
- Incentives for CHP electricity generation in new or modernised plants
- Also industrial plants are included (in principle self used electricity)
- Initial operation between 2009 and 2016
- Renewable and CHP electricity are of the same grade
- Support about 6 (industry 4) years resp. 30,000 total use hours, up to 50 kW 10 years
- Support of heating networks (Per 1 mm diameter 1 € per meter, up to 20 % share of investment, per action up to 5 Mill. €/a)



## Amendment of CHP Act

- Ending of the support of existing and modernised CHP plants as ruled in CHP Act 2002.
- No change in the support systematic (surcharge, share in the costs, payment with the annual bill)
- Compliance with the high efficiency criteria of the EU-CHP-Directive
- Surcharge: > 2 MW: 1.5 Cent per kWh  
> 50 kW: 2.1 Cent per kWh  
< 50 kW: 5.11 Cent per kWh
- Review in 2011 (!)
- No time limit (annulment)



**5.**

# Mini-CHP-Impulse Incentive Program



## Mini-CHP-Impulse Program of the Federal Environment Ministry

- Sector up to 50 kW<sub>el</sub>
- Project support
- open for all technologies and fuels
- High additional use for the environment
- High save of primary energy consumption
- High efficiency of support (20€ per saved 1 t CO<sub>2</sub>)
- Heat lead operation



# Mini-CHP-Impulse Program

## Basis support

<b>Power Min [kW].</b>	<b>Power Max. [kW]</b>	<b>Support in Euro per KW<sub>el</sub> cumulative about the size groups</b>
<b>&gt; 0</b>	<b>&lt; 4</b>	<b>1.550</b>
<b>&gt;= 4</b>	<b>&lt; 6</b>	<b>775</b>
<b>&gt;= 6</b>	<b>&lt; 12</b>	<b>250</b>
<b>&gt;= 12</b>	<b>&lt; 25</b>	<b>125</b>
<b>&gt;= 25</b>	<b>&lt; 50</b>	<b>50</b>



# Mini-CHP-Impulse Program

## Example

Mini-CHP-Plant with 35 kW<sub>el</sub>)

Power	Formula	Result
$> 0 < 4 \text{ kW}_{\text{el}}$	$1.550 \text{ €} * (4\text{kW} - 0\text{kW}) =$	<b>6.200 €</b>
$\geq 4 < 6 \text{ kW}_{\text{el}}$	$775 \text{ €} * (6\text{kW} - 4\text{kW}) =$	<b>1.550 €</b>
$\geq 6 < 12 \text{ kW}_{\text{el}}$	$250 \text{ €} * (12\text{kW} - 6\text{kW}) =$	<b>1.500 €</b>
$\geq 12 < 25 \text{ kW}_{\text{el}}$	$125 \text{ €} * (25\text{kW} - 12\text{kW}) =$	<b>1.625 €</b>
$\geq 25 < 50 \text{ kW}_{\text{el}}$	$50 \text{ €} * (35,3\text{kW} - 25\text{kW}) =$	<b>515 €</b>
<b>Total support</b>		<b>11.390 €</b>



# Mini-CHP-Impulse Program

**Bonus support:**

<b>Power Min [kW].</b>	<b>Power [kW]</b>	<b>Max.</b>	<b>Support in Euro per kW<sub>el</sub> cumulative about the size groups</b>
<b>&gt; 0</b>	<b>&lt; 12</b>		<b>100</b>
<b>&gt;= 12</b>	<b>&lt; 50</b>		<b>50</b>



**6.**

Some finally remarks



## Relevant Trends

- Environmental awareness is increasing
- Difficult to build large new (coal fired) power plants
- Prices for energy carrier are rising
- The living space is rising (compensation of the improving energy performance of buildings)
- The gross domestic product will increase (hopefully)



## General Aspects

- Substantial contribution to energy supply
- Makes sense with a view of the at least 80 % GHG reduction target in 2050
- Production of energy close to consumer
- Low net loss, low effort for distribution
- By storage of heat flexible electricity lead operation (useful addition of fluctuating renewable energy)
- Efficient usage of the energy stored in the fuel
- In virtual power plants energy demand includes
- Use of surplus heat by sorption plants to produce coldness
- Energy saving by CHP should become a business segment (e.g. energy services)



**Thank you for your attention**

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“Power of  
Imaginations is  
more important  
than Knowledge”

