

# Commercialization of Micro-Cogeneration Technologies – the German Approach

Workshop

"Building Integration of Micro-Generation Technologies"

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Peter Tzscheuschler

Institute for Energy Economy and Application Technology

Technische Universität München

- Situation in Germany
- Cogeneration Law
- Burden Sharing
- Economic Situation

- Focus on Micro-CHP
  - Combined generation of heat and power
  - Power output up to  $5 \text{ kW}_{el}$



Senertec  
Dachs



Vaillant  
ecoPOWER



Remeha  
eVita

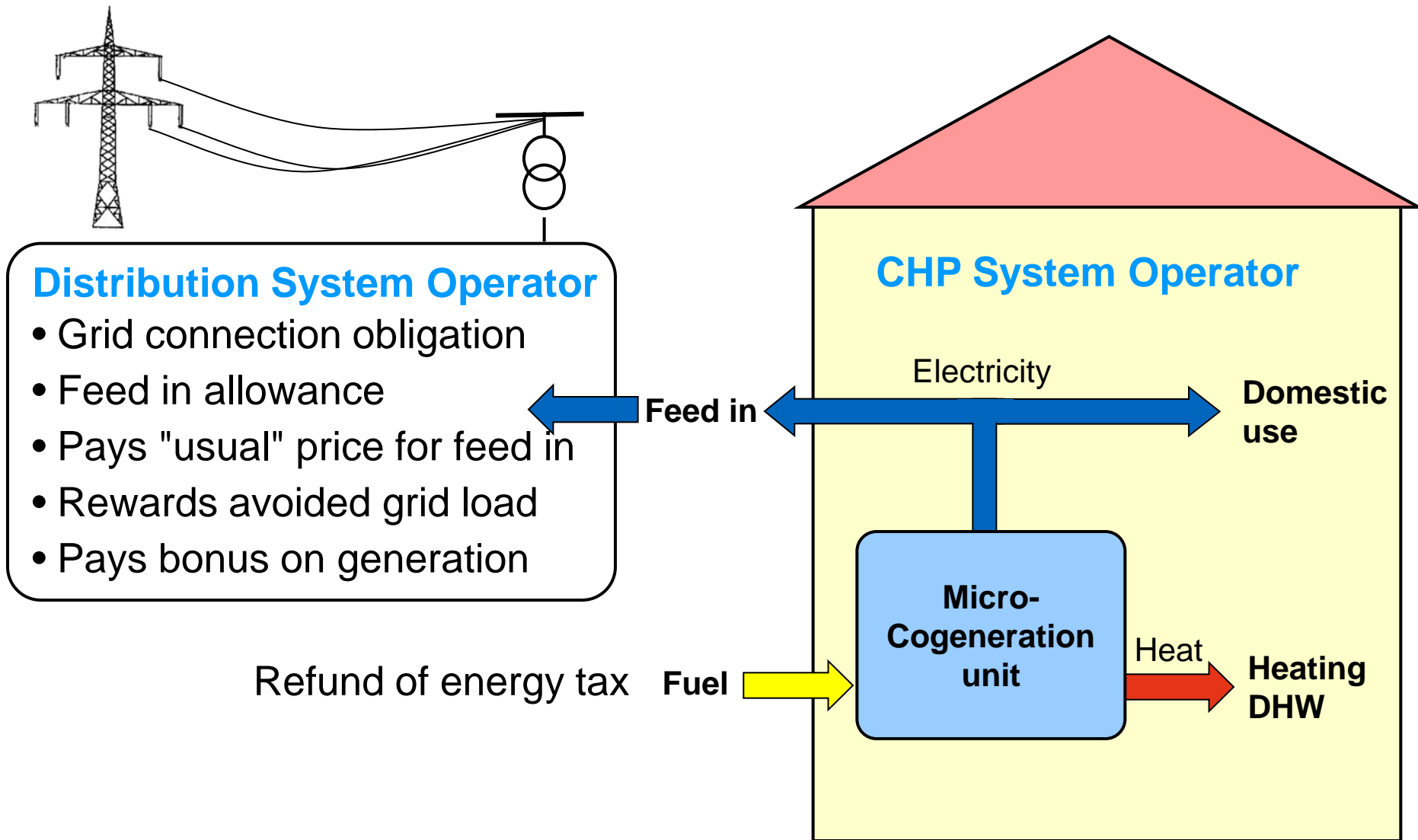


Sanevo  
Whispergen

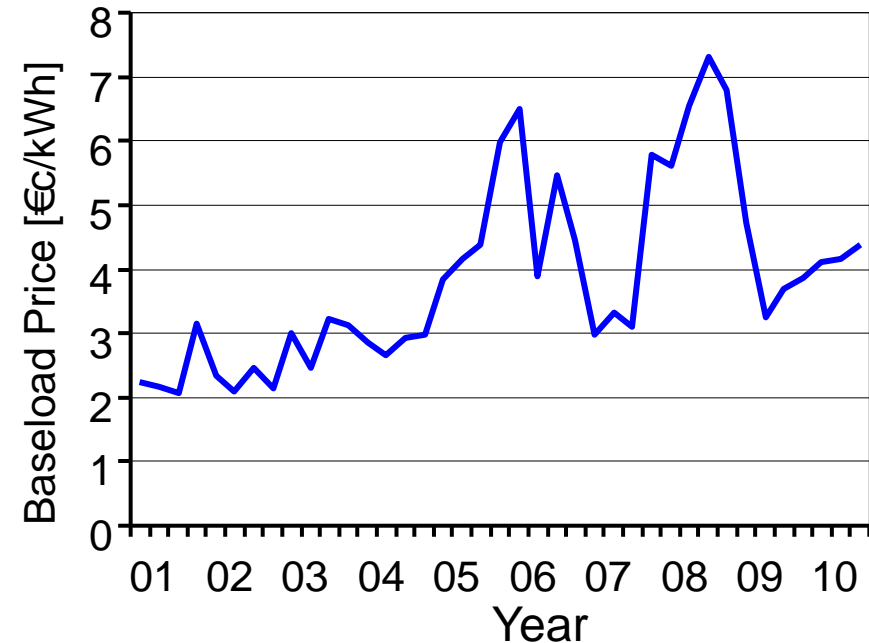
- Situation of electricity supply in Germany
  - Liberalized electricity market
    - competition within generation and sales
    - transport and distribution networks are regulated
- Political Targets
  - "Integrated Energy and Climate Protection Concept" 8/2007
  - "Energy Concept" 9/2010
  - > GHG reduction of 40% by 2020 related to 1990 (80% in 2050)
  - => Electricity generation from renewable resources
    - 35% by 2020, 80% by 2050 (16% in 2009)
  - => Electricity generation by Cogeneration
    - 25% by 2020 (12% in 2009)



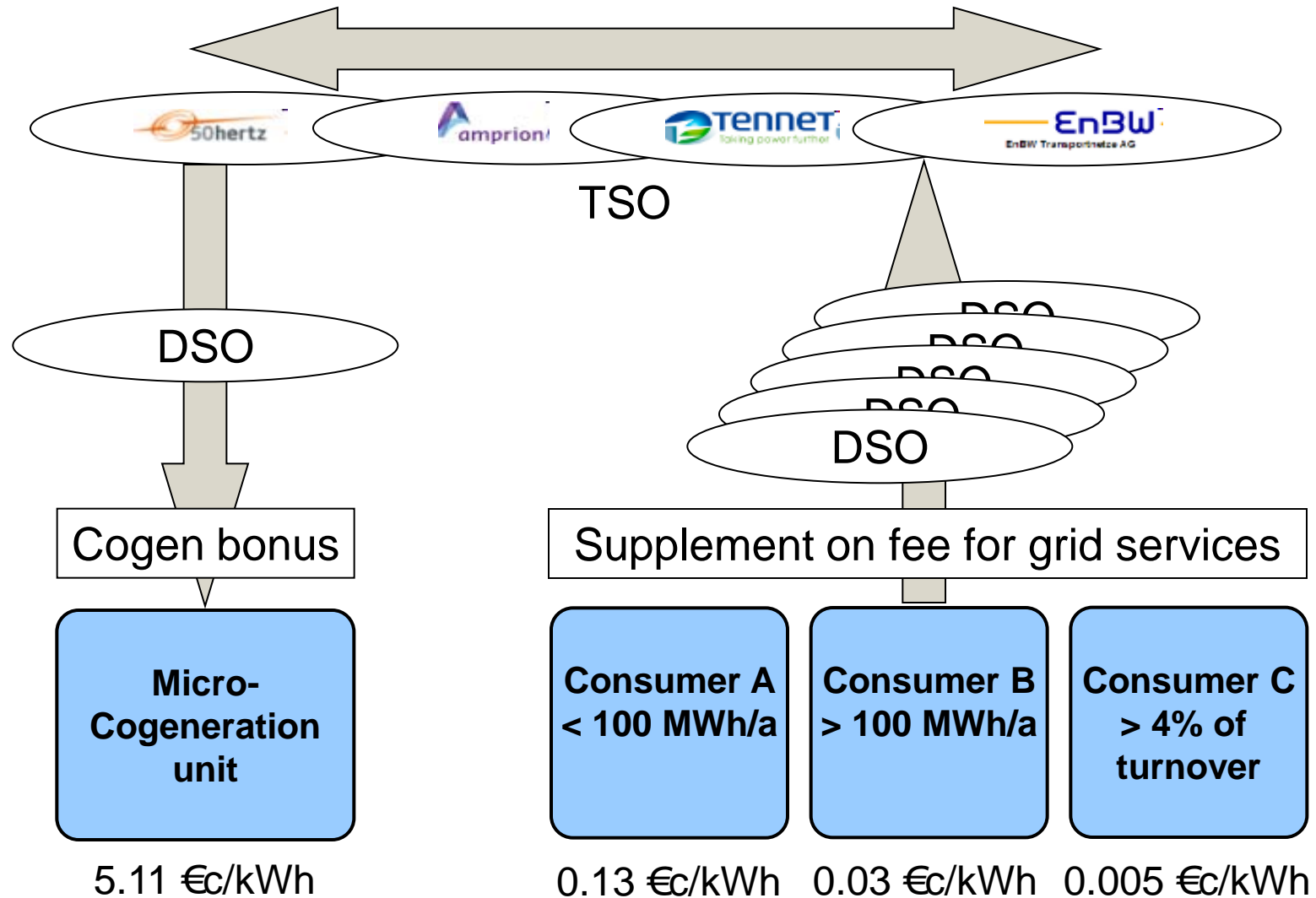
- KWKG: Law for conservation, modernization and expansion of Cogeneration
- Size ranges:  $< 50 \text{ kW}_{\text{el}}$ ,  $< 2 \text{ MW}_{\text{el}}$ ,  $> 2 \text{ MW}_{\text{el}}$ ,
- Preconditions for Subsidies
  - highly efficient -> no dumping of heat
- Regulates
  - roles of stakeholders
  - Subsidies
  - Burden sharing
- Duration: 10 years



- "Usual" price for feed in -> baseload price on EEX last quarter
- Avoided grid load
  - 0,5 to 1,2 €/kWh depending on the DSO
- Bonus on generation
  - 5.11 €/kWh
- Refund of energy tax:
  - 0.55 €/kWh<sub>Gas</sub>
- Total
  - 8 to 14 €/kWh<sub>el</sub> for feed in
  - 25 – 26 €/kWh for own use (20 €/kWh for avoided purchase)





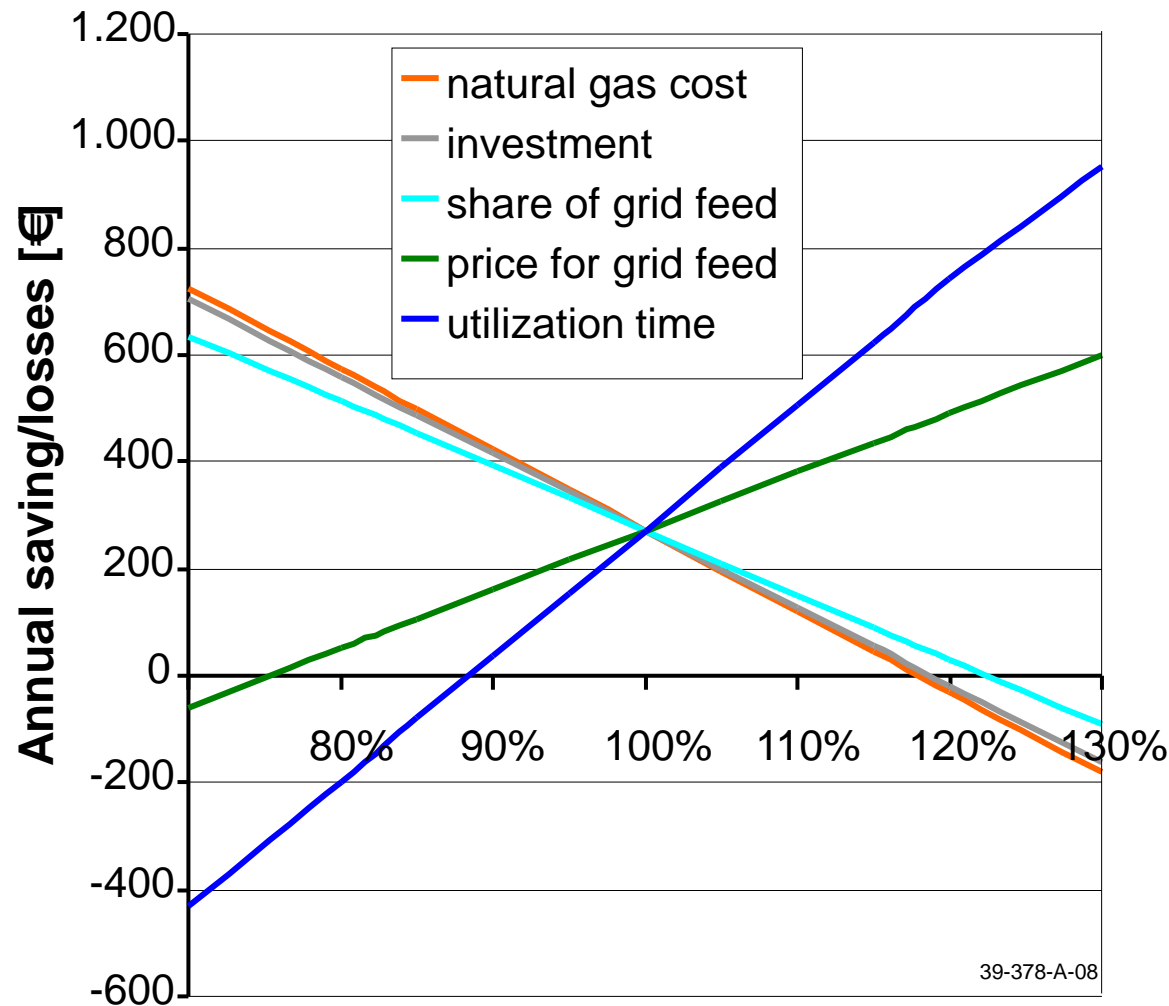


## • Technical Data

- $P_{el}$ : 5 kW
- $P_{th}$ : 12.5 kW
- $\eta_{ges}$ : 90 %
- $T_U$ : 4.000 h/a
- to grid : 50 %

## • Cost (100% Point)

- investment: 19,000 €
- interest rate: 5 %
- natural gas: 6.5 €/kWh
- Cogen Bonus: 5.11 €/kWh
- electricity: 18 €/kWh
- grid feed: 11 €/kWh



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- More systems approaching the market,
  - cheaper ICE systems
  - stirling systems
  - fuel cell field tests
- More contracting solutions with micro CHP
  - Virtual power plant (Lichtblick swarm power plant)
- Application of renewable Energies
  - Development of wood fired Systems



Thank you for your Attention

