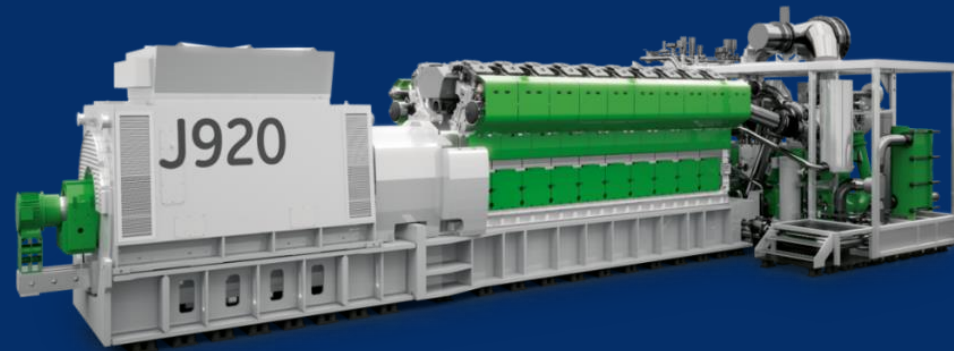


# High-efficient Gas engine CHP

Germany as an example – worlds biggest CHP market



Jenbacher

DP Europe Map



Countries Europe



# Germany: Biggest and most fragmented CHP market



Jenbacher installed base

**Biogas:**

> 1500 gas engines / 1.020 MW

**Natural gas CHP:**

> 750 gas engines / 760 MW

**Sewage gas:**

> 50 gas engines / 30 MW

**Coalmine gas:**

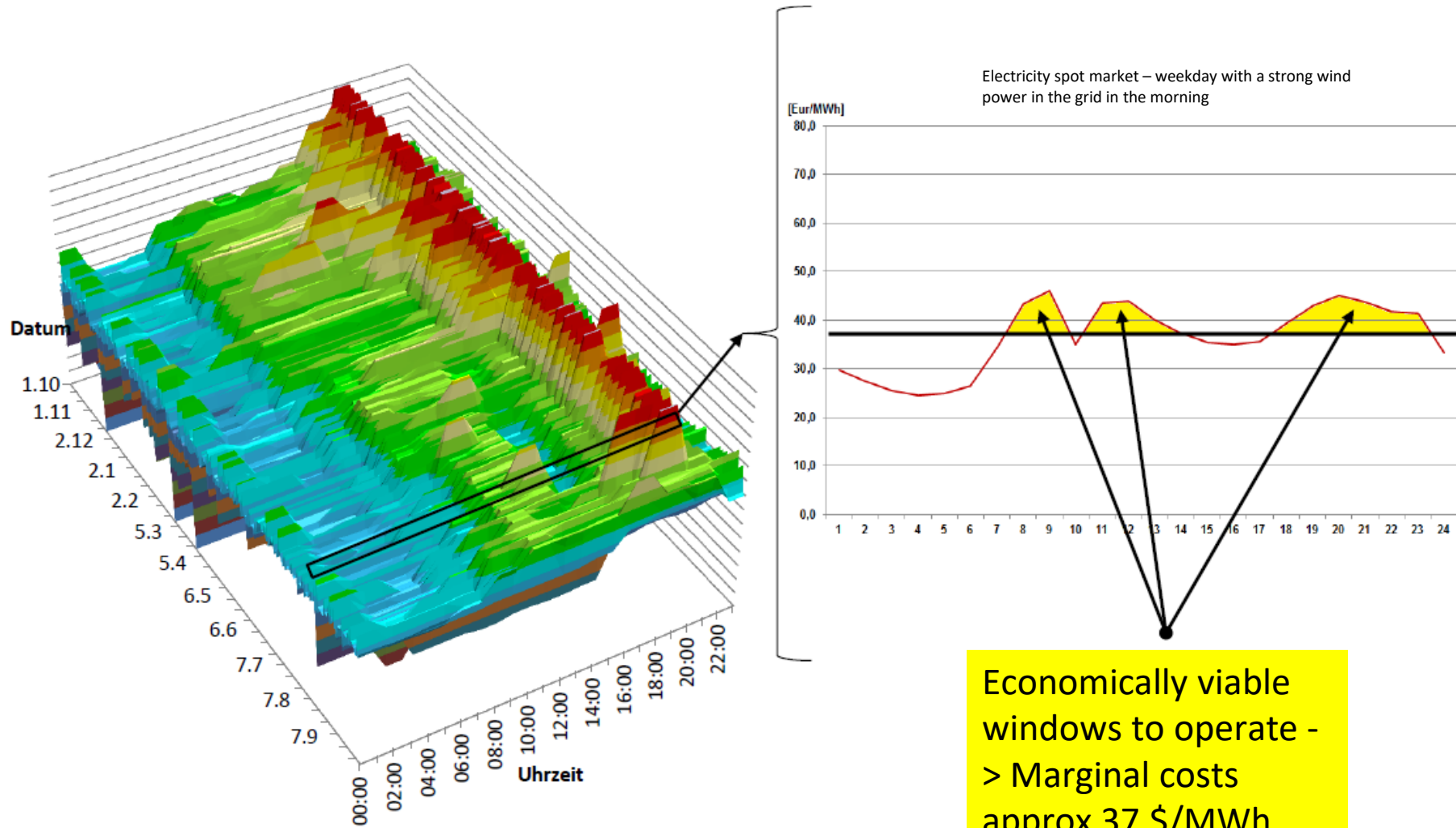
17 gas engines / 30 MW

**Landfill gas:**

5 gas engines / 2 MW

Jenbacher – Technology Leader in Gas Engine Technology

# Balancing power is key – Base load is dead



# Germany: Strong political will to drive energy efficiency concepts

## 1. Policy environment



### 1.1 CHP a key technology in achieving Energiewende goals

	Operational support				CAPEX grant	Full/partial fuel input tax exemption	Demonstration project (fuel cell micro-CHP)
	Feed-in premium	ETS plant bonus	Feed-in tariff	Avoided grid losses bonus			
Fossil CHP	✓	✓		✓		✓	
Renewable CHP			✓			✓	
Micro-CHP	✓			✓	✓	✓	✓
CHP & DHC					✓		

Several drivers foster CHP growth in Germany: the dedicated CHP law and binding target focus on improving energy efficiency in buildings, strong GHG emission reduction objectives, and the commitment to phase out nuclear energy by 2022. The main support scheme consists of a feed-in premium and EU ETS bonus for fossil-fuel CHP and a feed-in tariff offered to renewable-based CHP. In addition, micro-CHPs below 20 kWe benefit from a capital grant ranging between €1425-3325. In 2014 the CHP law will be reviewed to assess whether additional support is necessary to achieve the 25% CHP target.

### 1.2 Energy and climate targets: Clear objectives set on the pathway to 2050 (Energiewende)

	2020	2030	2040	2050
CO2 reductions compared to 1990	40%	55%	70%	80-95%
Renewable energy				
In electricity	35%	50%	65%	80%
Overall	18%	30%	45%	60%
CHP share in electricity production	25%			
Energy efficiency				
Reduction of electricity consumption	10%			25%
Primary energy consumption	20%			50%

### 1.3 2013 EEG/KWK-G : Support levels for CHP

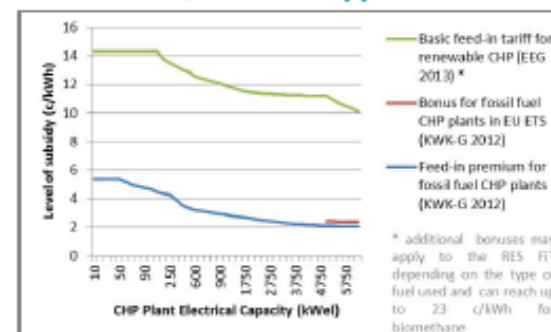
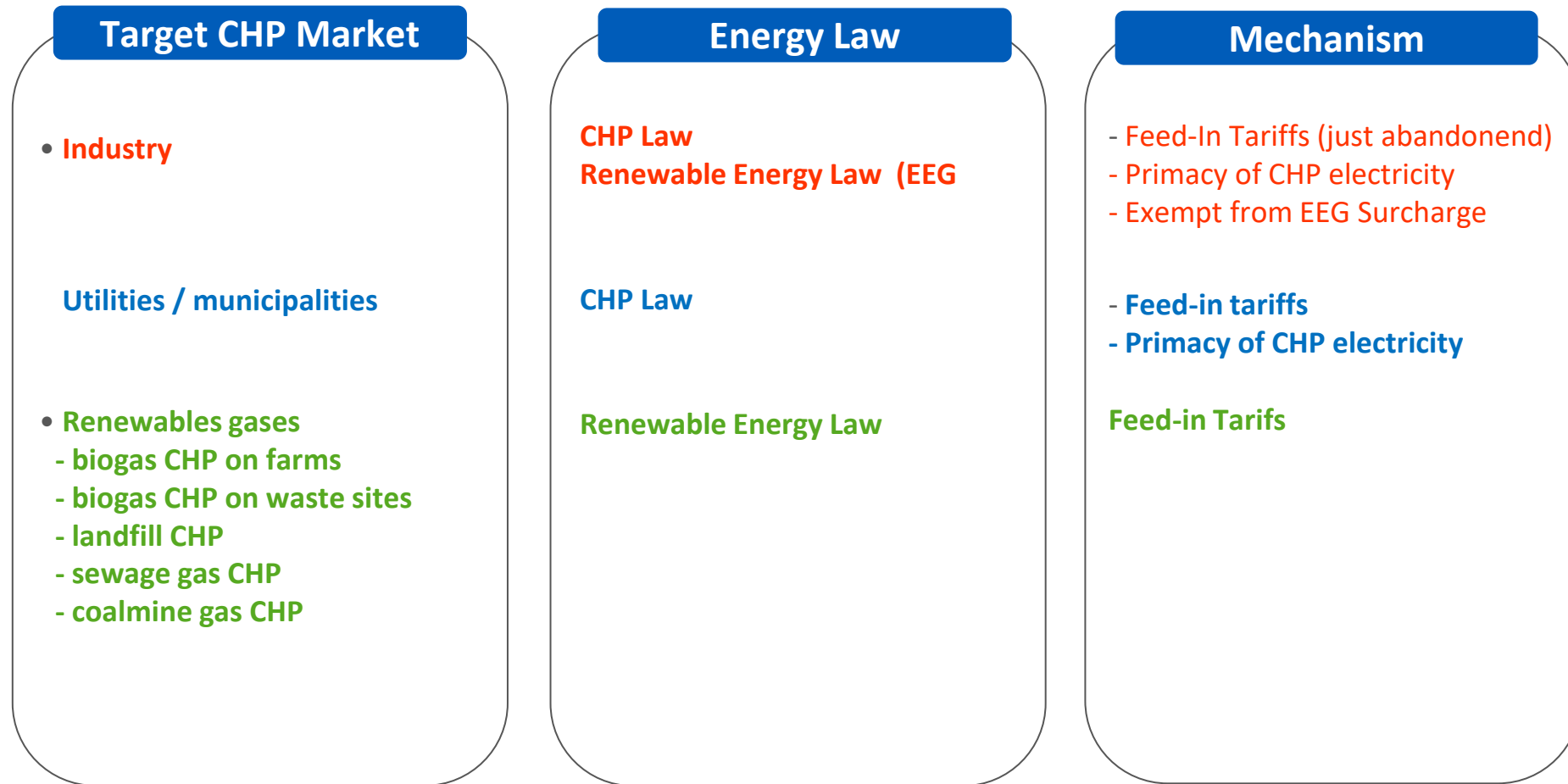


Figure 1 Approximate level of subsidy for CHP plants under the EEG and KWK-G in 2013

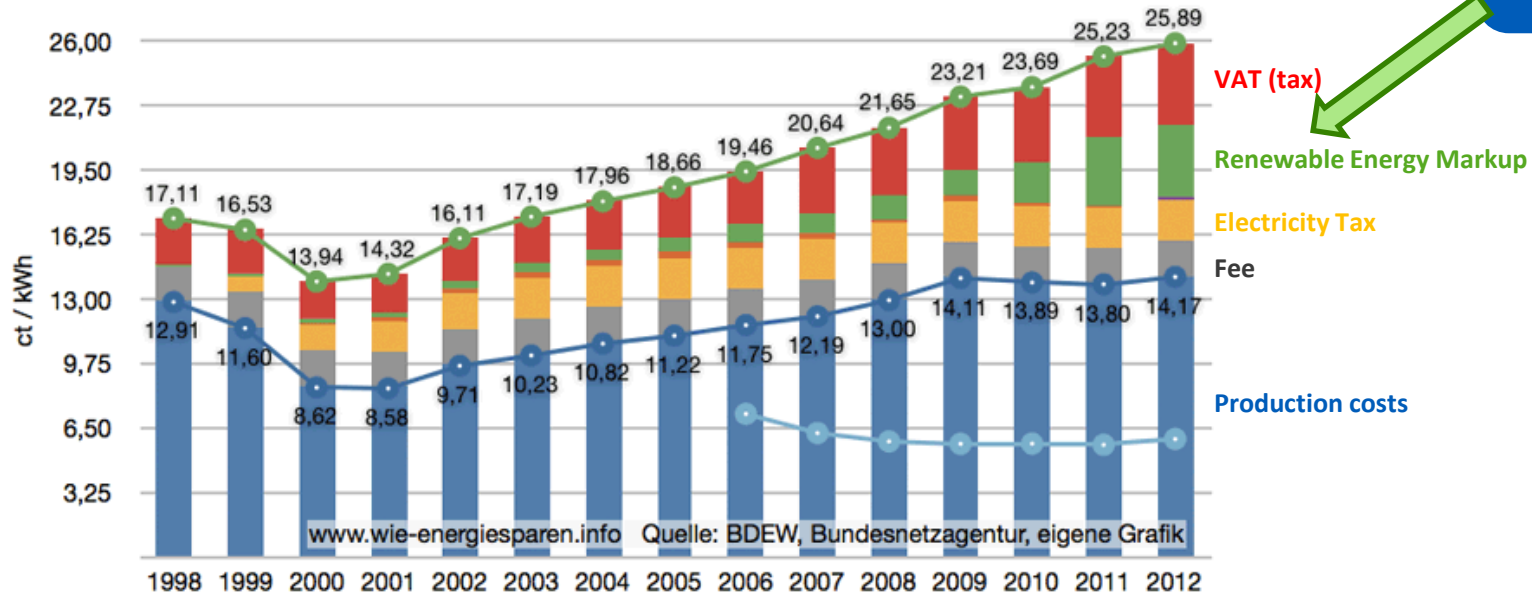
# Jenbacher Germany

## Policy shaping determines market size



Direct influencing through associations is key

# Electricity prices on the rise



Industry can save  
Mark-up when  
investing into own  
CHP plants



# Major CHP Application & Projects

Industrial CHP: Process heat



Food & Beverage: example breweries



Hospital CHP  
Electricity & cooling



CHP for building supply :  
Electricity & air conditioning  
example: Frankfurt Tower



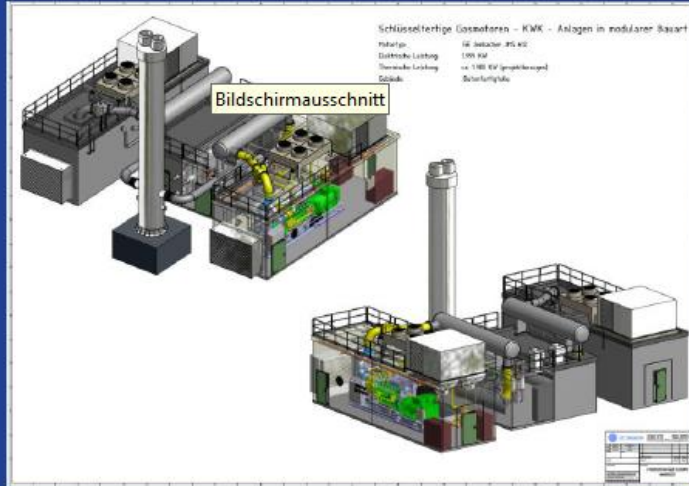
Airport Leipzig: electricity & air  
conditioning (absorbtion chillers)



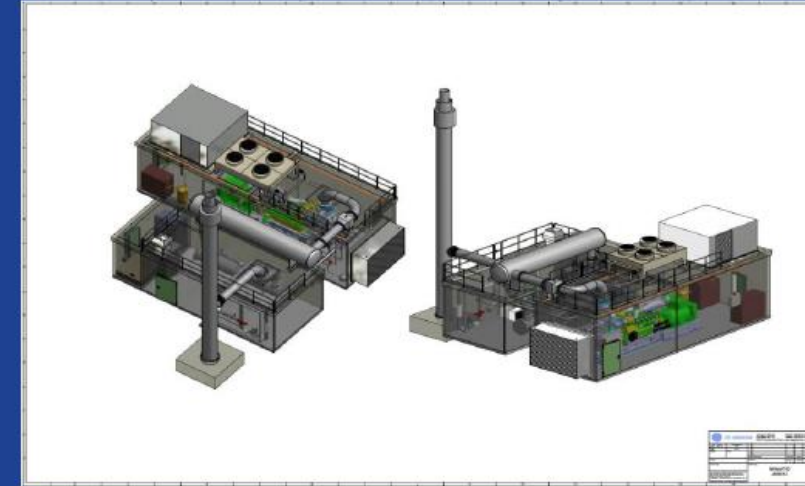


# Jenbacher PowerHaus Options

## Multi-engine Power Houses



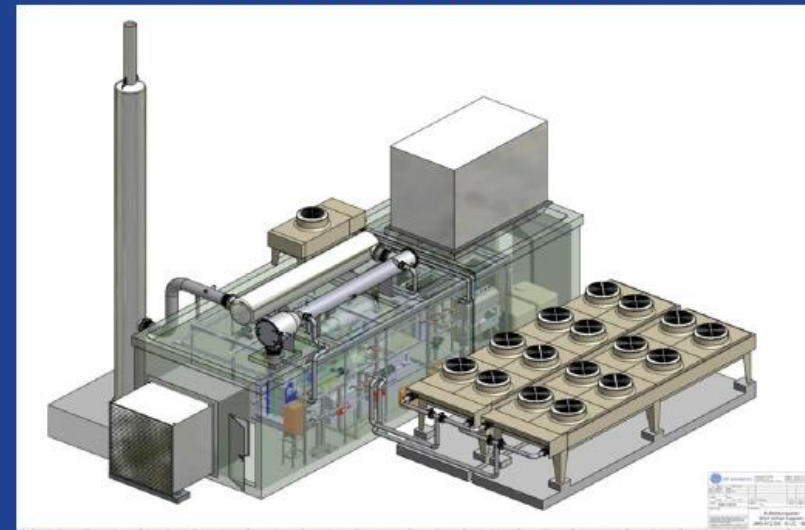
## ex: 2MW Power House



## Modular Unit



## Low noise design max. 48 dB in 10m



# Jenbacher Deutschland





MADEITAAS

Gas Power Generation