

Unintended Consequences for District Energy/CHP

IDEA Seattle, June, 9th 2014



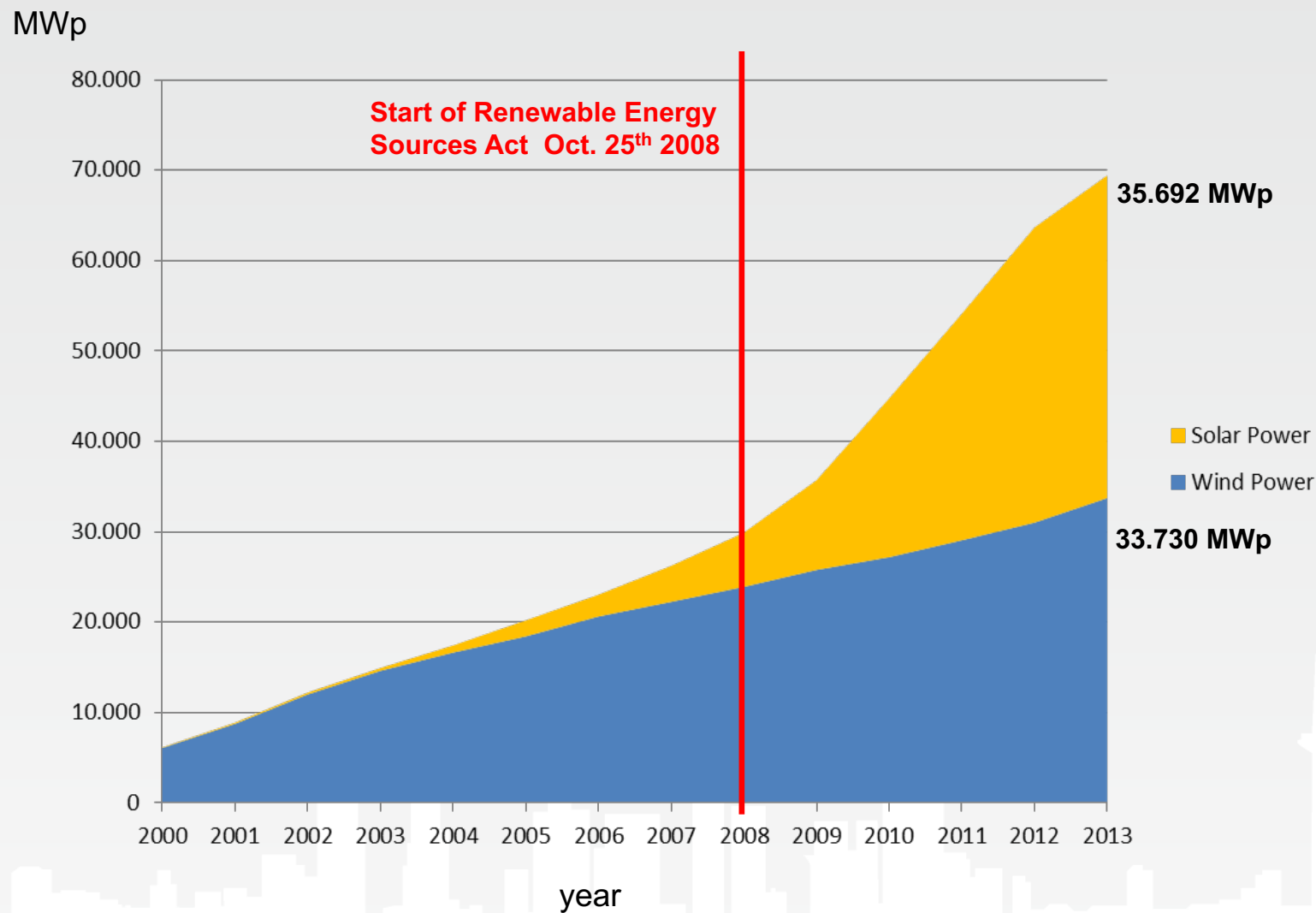
Werner R. Lutsch,
Managing Director/CEO of AGFW and
Vice President of Euroheat & Power

Seattle, June 2014

„Energiewende“ in Germany

- **AGFW** is the independent and impartial association in Germany promoting energy efficiency, (district) heating, cooling and CHP at national and international levels
- **AGFW** reunites 500 (regional und municipal) district energy suppliers, consultants, personalities and industrial operators of this industry (component and system manufacturers, manufacturing and assembling companies, testing institutes, ...) in Germany and Europe
- **AGFW** represents over 95 % of the heat load connected to German district heating systems – the largest scale in Western Europe.
- **AGFW** means more than four decades of experience in this field. Established 1971 we have a long and distinguished track record of delivering energy efficiency solutions to our members and to the society

Installed capacity Solar and Wind Power



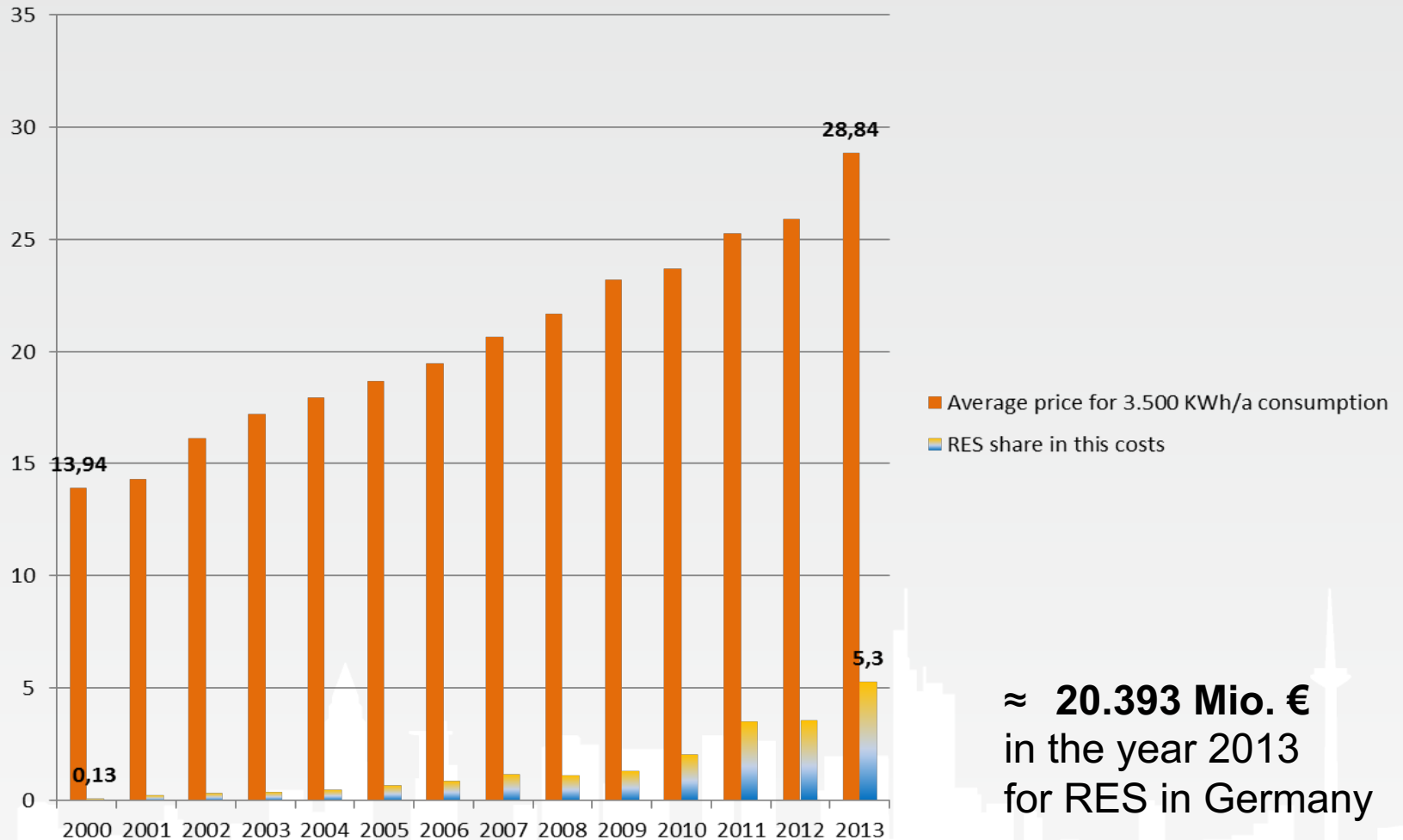
The Renewable Energy Sources Act (German EEG)

According to Section 1 para. 1 EEG 2012, the purpose of the law is to facilitate the sustainable development of energy supply, particularly for the sake of **protecting the climate and the environment, to reduce the costs of energy supply** to the national economy (also by incorporating external long-term effects), ... and to promote the further development of technologies for the **generation of electricity from renewable energy sources**. To this end, the Act aims to increase the share of renewable energy sources in the German electricity supply.

Grid operators pay **for 20 years** a premium for RES electricity (**9,61 to 62,40 ct/kWh**) on top of the market price.

Electricity price for private households

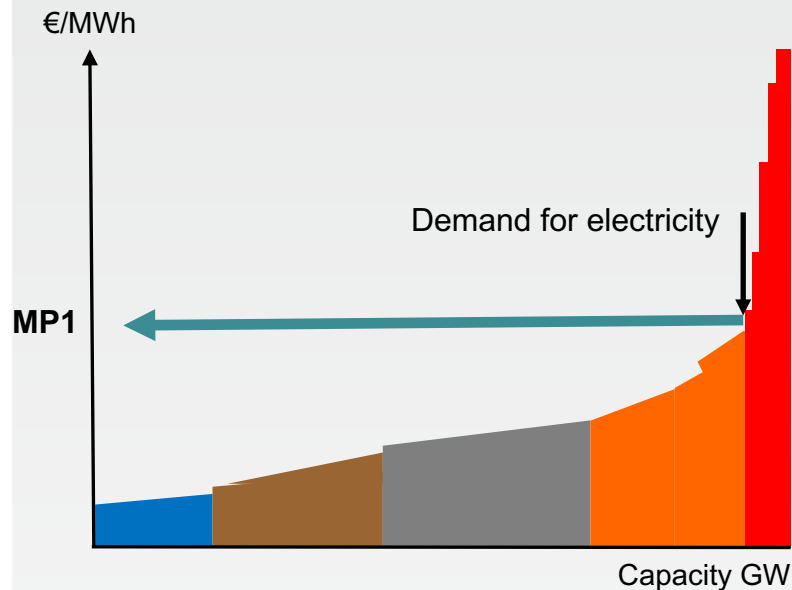
€ ct/kWh



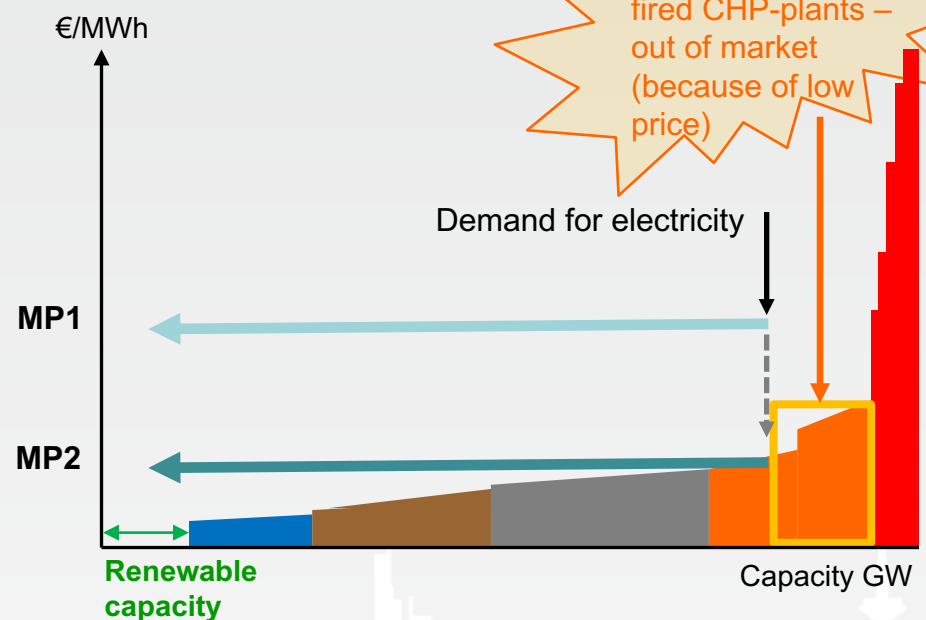
≈ **20.393 Mio. €**
in the year 2013
for RES in Germany

Electricity price according to the Merit Order curve

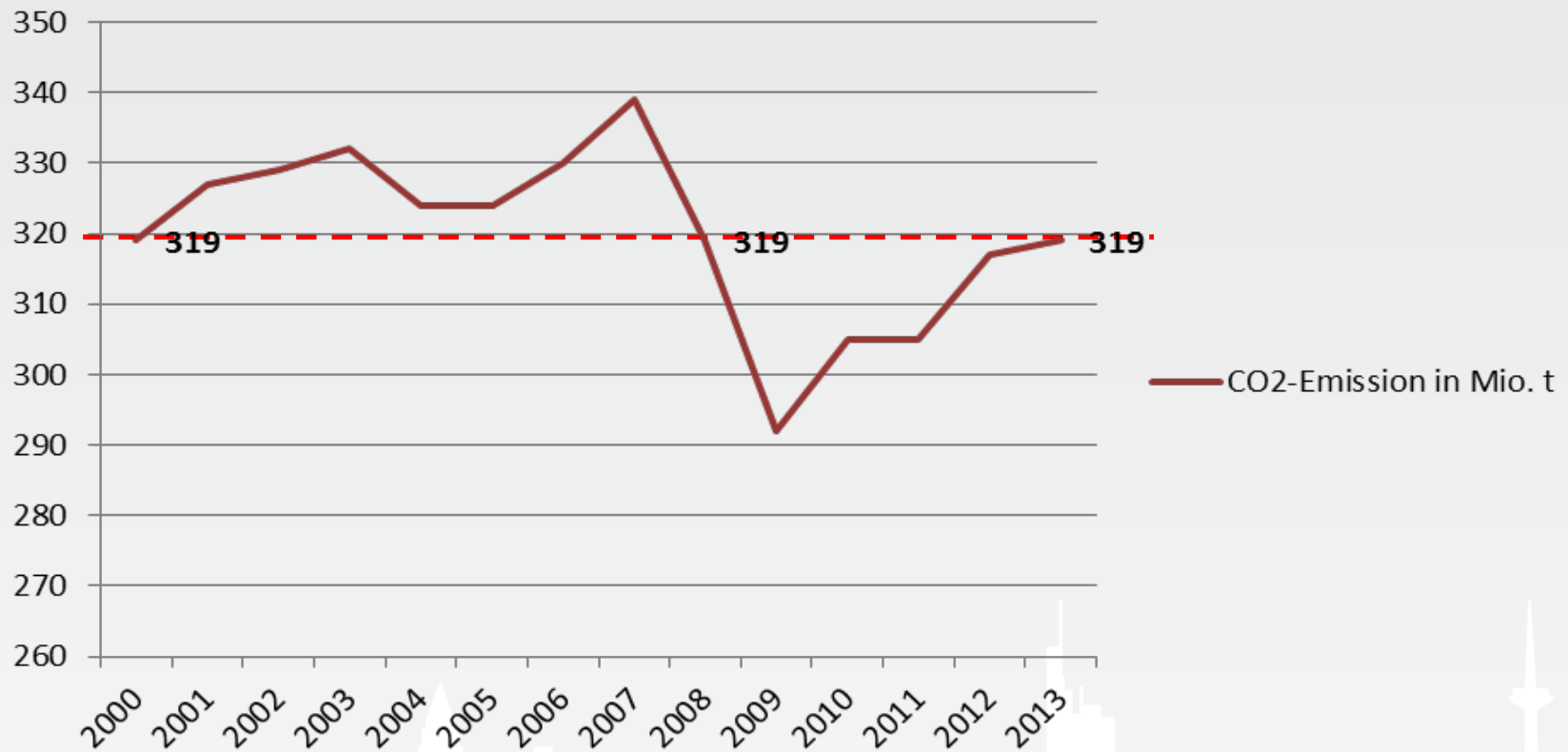
■ nuclear
 ■ lignite
 ■ hard coal
 ■ natural gas
 ■ oil



MP1 = market price for electricity demand if low or no renewable generation (no sunshine, no wind)

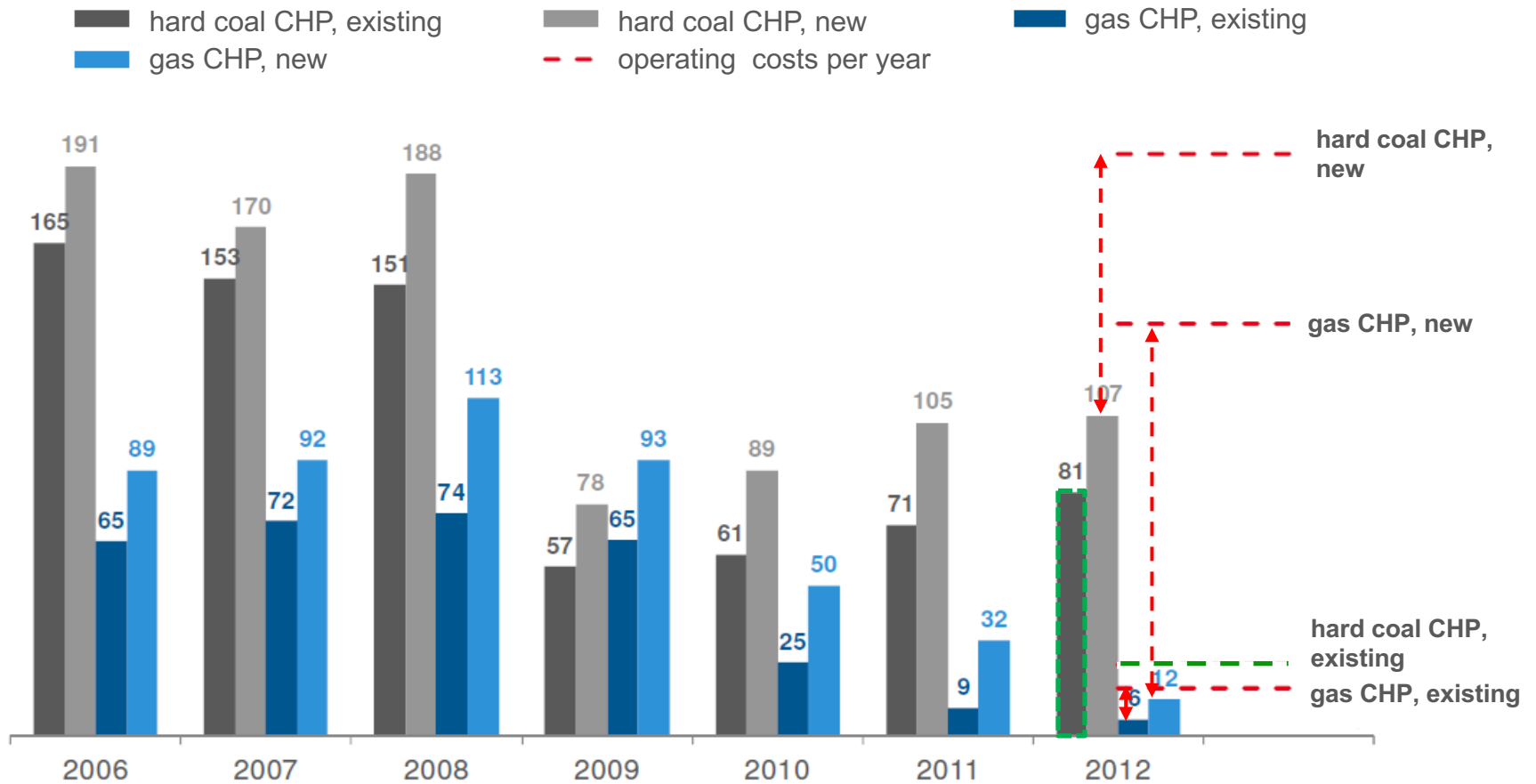


MP2 = market price for electricity demand with renewable generation and fixed feed in tariff – outside of the market mechanism

Development of CO₂-EmissionsCO₂-Emission in Mio. t

* CO₂-Emissions for electricity production in the year 2000, 2008 and 2013 = 319 Mio. t

Contribution margin [€/kW/a] of different CHP plant technologies



Lessons learned

The current regime leads to

**... an extremely fast and steep development of Solar- and Wind-Power
but**

... the same high CO₂ emissions like 15 years ago

... the lowest electricity market prices at the EEX (electricity stock exchange)

... the highest consumer prices for electricity ever

**... a lot of wasted money, bankruptcies and unemployed people in the
Solar Technology branch in Germany**

and

... competition between Renewable Energy and Energy Efficiency

Let's make it different

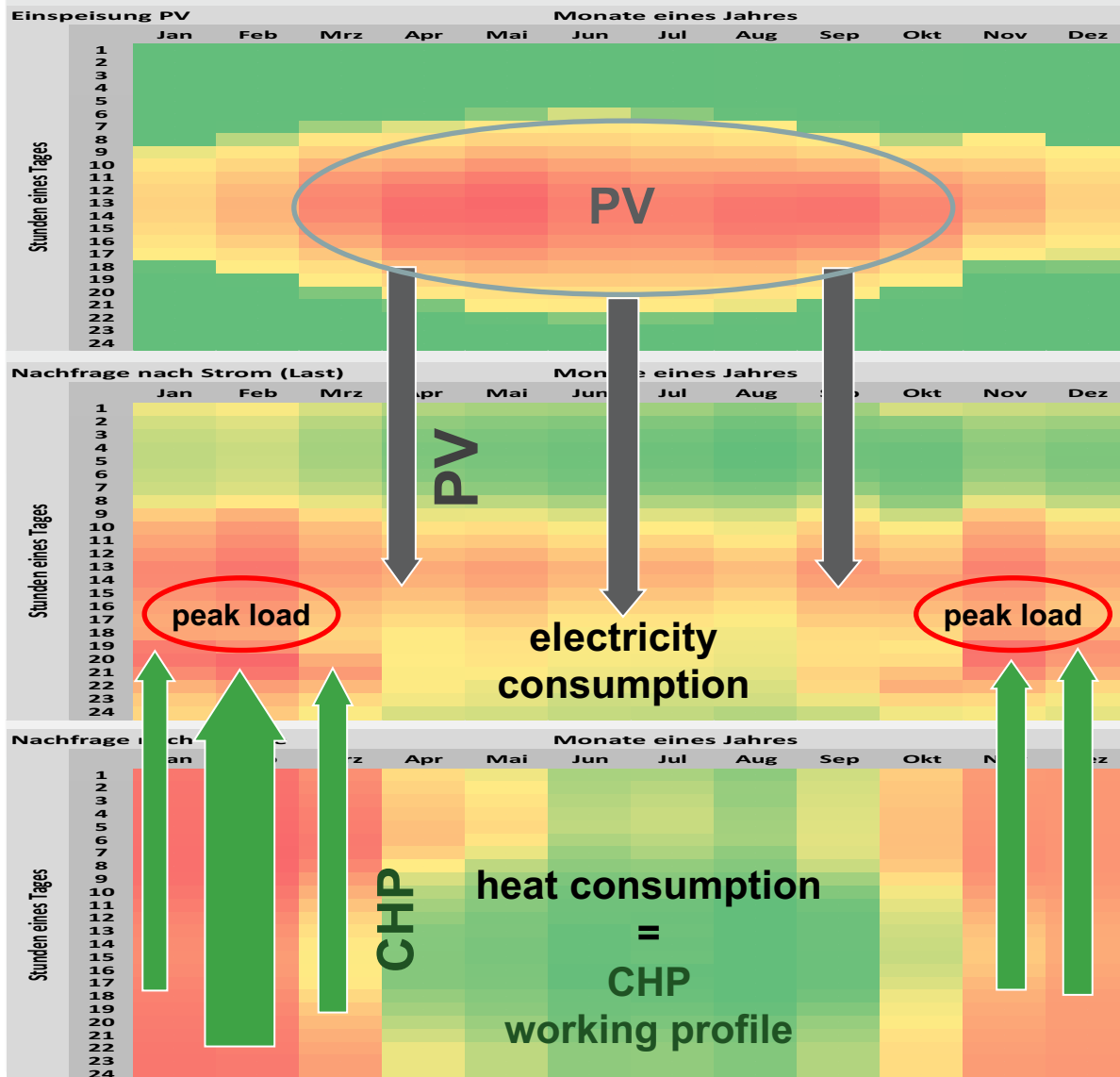
CHP and DHC combine efficiency, flexibility and renewability for the heating and electricity market to form a smart, multi-functional instrument.

This technology is able to...

- ... give more flexibility to the renewable electricity market**
- ... provide integration services via power-to-heat**
- ... support CO₂ reduction targets**
- ... secure renewable energy sources for the heat market**
- ... create cost effective solutions for the heat market**
- ... create local jobs and added value to our communities**
- ... shape the energy conception (Energiewende) citizen-friendly**

CHP and DHC are the key to the German energy conception (Energiewende)

Renewables and CHP – an ideal couple

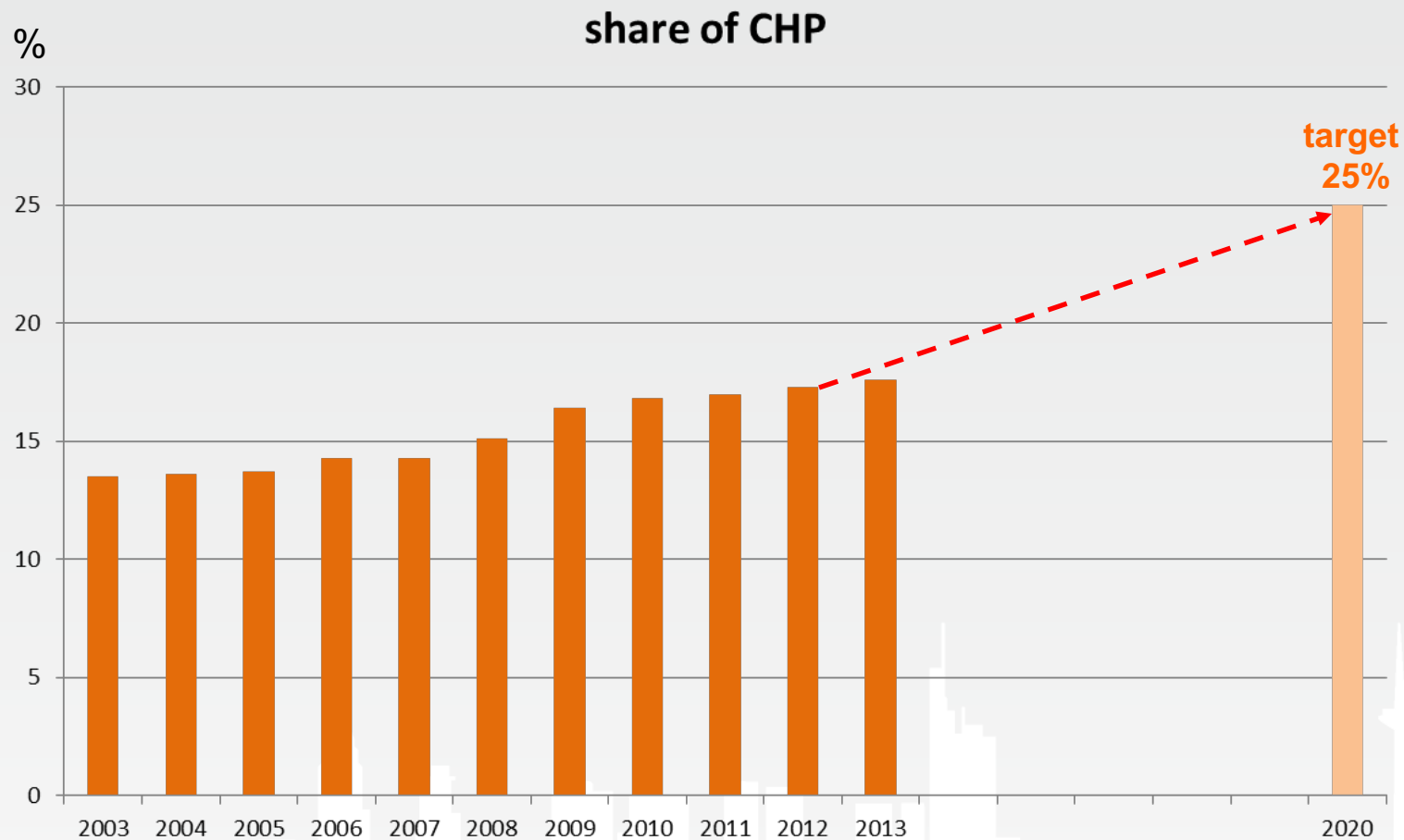


Feed in regime of Solar Power during the summer and at noon

Peak load of electricity consumption - during the winter and times without sunshine (night).

CHP-plants connected to the district heating grid are ideal to compensate during the peak load times.

Development of CHP share in the electricity market



The CHP Act (German KWKG) - today

- » Increasing the **share of CHP** electricity in Germany to **25%** until 2020
- » Grid operators pay a **fixed premium for CHP** electricity (**1,5 for convent. CHP to 5,11 ct/kWh for Micro-CHP**) on top of the market price for a limited time
- » Additional premium for CHP plants that take part in the EU Emissions Trading System (+ **0,3 EUR ct/ kWh**)
- » Support for district heating (DH) grids (**30% of the construction costs**) based on CHP as heat sinks within this support system
- » Costs for the support are **shared among all electricity consumers** (currently **0.002 – 0.05 ct/kWh**)
- » Support for **thermal storage** (heating and/or cooling) used in conjunction with CHP plants for the integration of renewable energy sources in the energy system

The CHP Act (German KWKG) – thoughts for tomorrow

Potential of CHP electricity production

- » Even in a power system which is more and more dominated by fluctuating RES electricity, a **large potential for CHP** still exists in the long run
- » The technically realizable potential for CHP electricity production varies, according to the different scenarios, between 71 TWh and 140 TWh in 2030 and 48 TWh to 107 TWh in 2050
- » Requirement for the realization of this potential is the **installation of heat accumulators** to enhance the flexibility of the electricity production in order to enable CHP installations to react to a more and more fluctuating residual load and still provide heat to its customers
- » The installation of **power-to-heat** could enhance the financial situation of CHP installations due to better chances to compete on the balancing electricity market
- » The current **level of support** has to be reviewed in order to evaluate whether the incentive is sufficient enough to attract investments

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because it's clean and helps,
to save CO₂ for a better environment.

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your kind
attention!

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