Energy efficiency – business approach

POWER RING 2007

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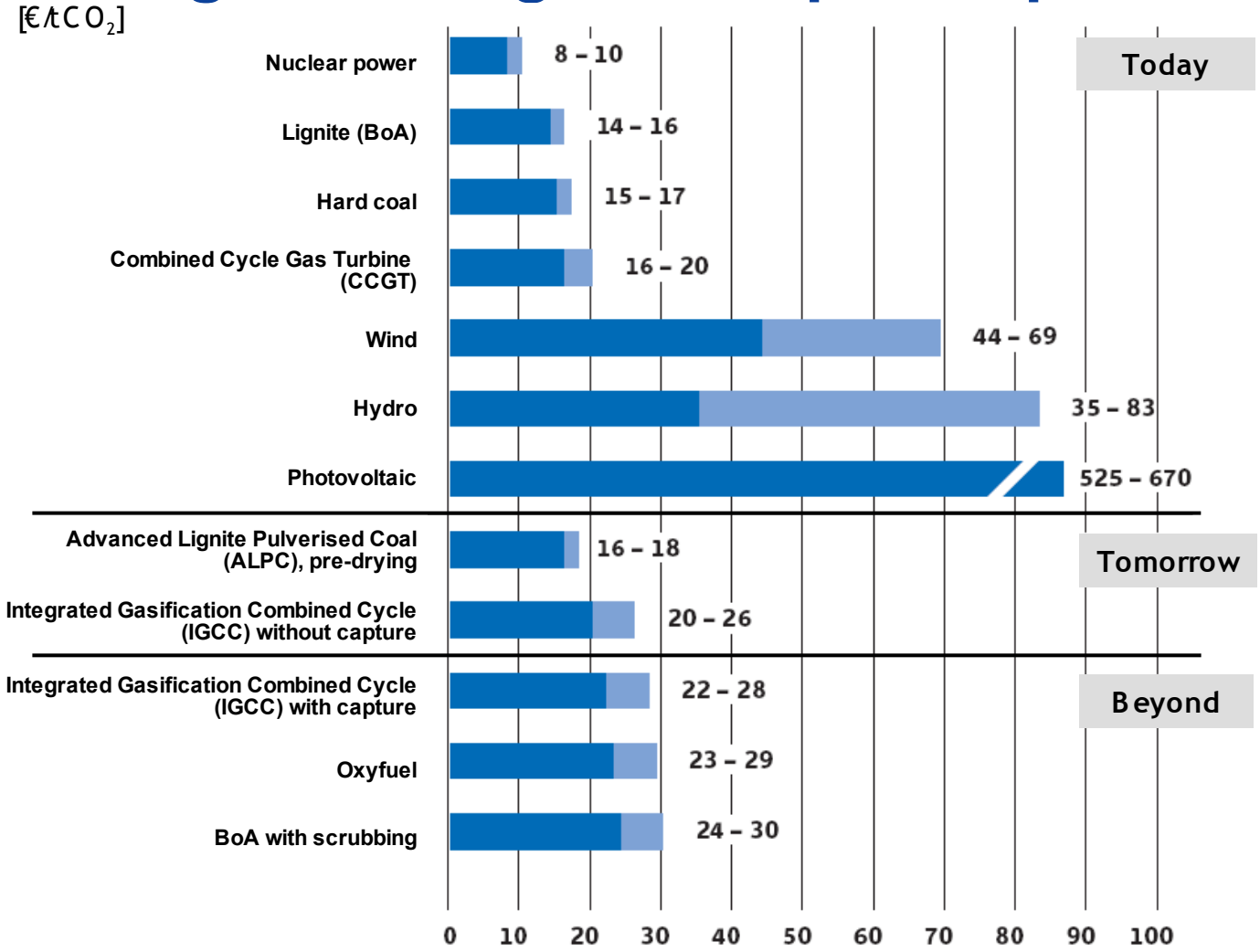
Energy efficiency
polish power plants versus EU average

- Efficiency of polish power plants are approx. **8-10% below the EU level** -> approx. **20%** higher fuel consumption
- **40%** of polish power plants will not meet the EU requirements regarding SO_2 emissions in 2008
- **90%** of polish power plants will not meet the requirements regarding NO_x in 2016

	PL	EU-27	PL versus EU-27 (EU-27 = 100%)
energy intensity per capita **[toe / Person]**	**2,43**	**3,70**	**66 %**
GDP energy intensity **[toe / GDP in m EUR]**	**438,4**	**184,3**	**238 %**
CO2-intensivity of GDP **[t CO2 / GDP in m EUR]**	1 374,9	403,5	341 %

Source: DG TREN, Trends to 2030 – update 2005

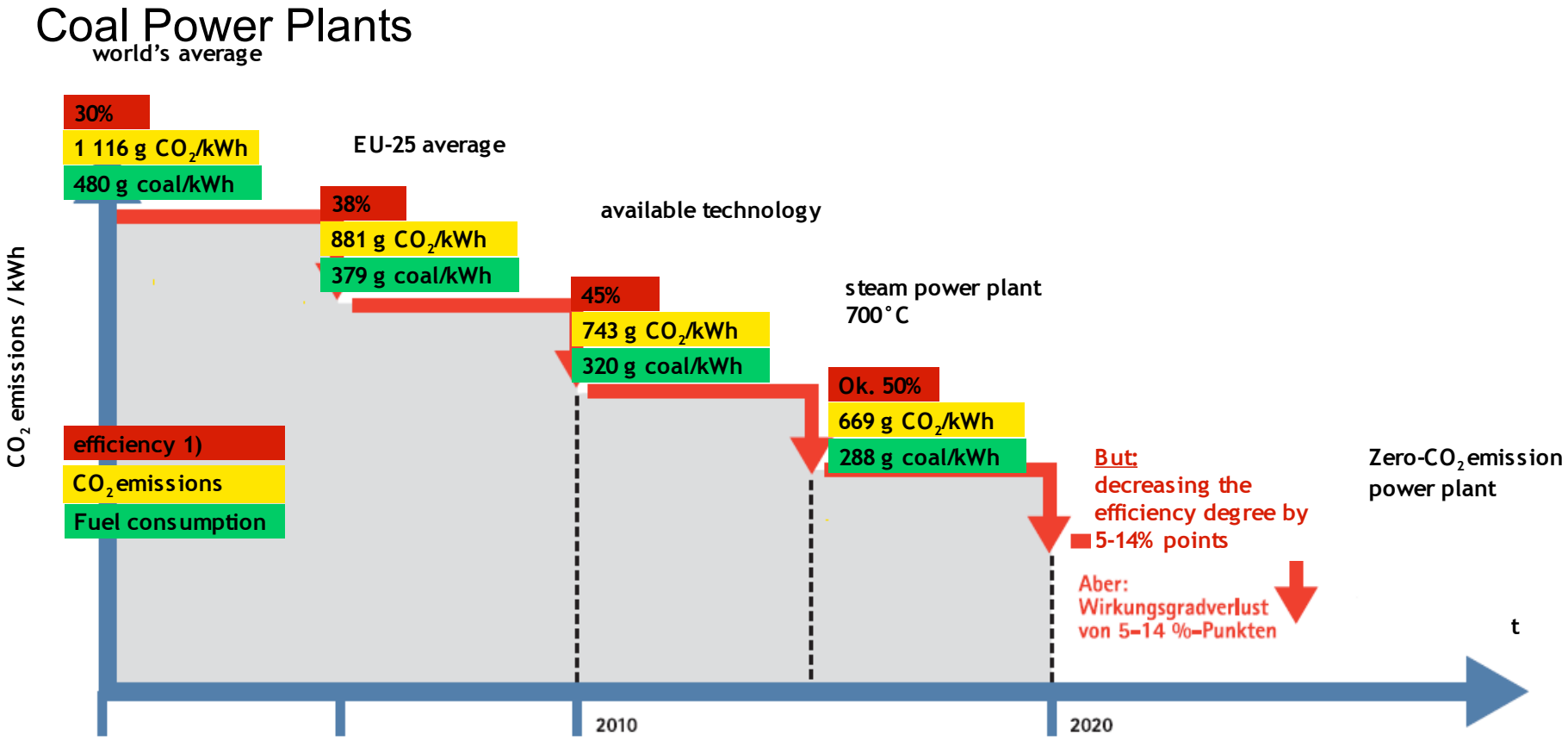
CO_2 avoidance costs through building of new power plants [1)]



1) Calculation of costs: i) related to old lignite units, ii) Allocation of CO_2 certificates is not taken into account, iii) Subsides for renewables are not considered, iv) Rough estimation of costs of sequestration, v) A comparison with prices of European emission allowances is not possible on basis of this illustration

Source: RWE Fact & Figures 2006 based on RWE Power

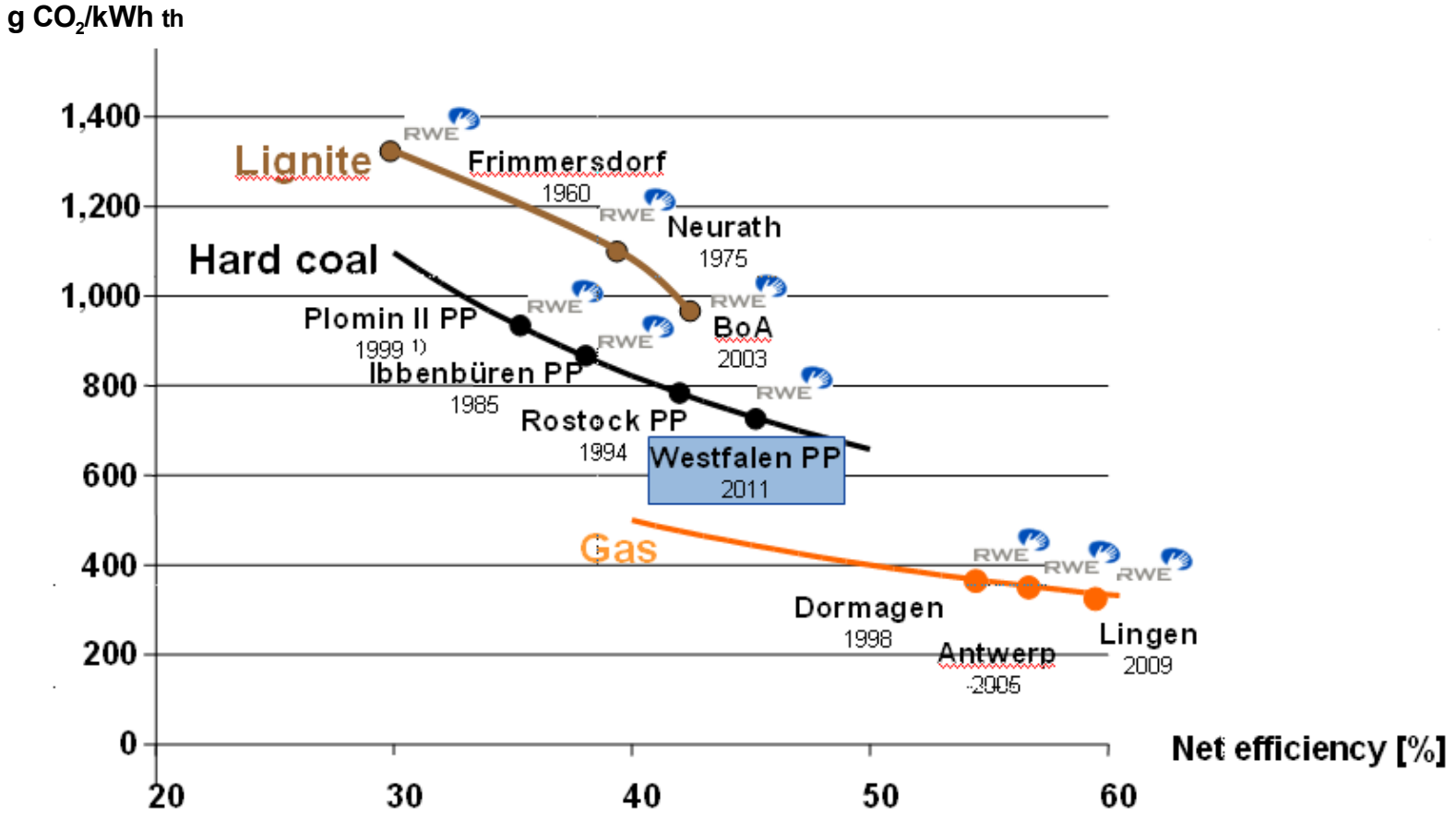
Reduction of CO_2 by increasing of the efficiency



1) Average for hard coal power plants

Source: Alstom, VGB

Technological evolution: Environmental & climate change protection



There is substantial technological progress in climate change protection by hard coal-fired units

1) Plomin relatively high due to its small size compared to other plants in Europe that were commissioned in the late 1990s

Conscious energy – RWE Stoen program www.swiadomaenergia.pl

- On 1st October 2007 RWE Stoen started in cooperation with KAPE a long-lasting information campaign „conscious energy" addressed to final customers.

Conscious energy:

- Information campaign
- Advisory in energy usage
- Guideline how to decrease the energy intensity of domestic energy consumption

Conscious energy

Renewable Energy - Poland

Purchase obligation of renewable energy

year	obligation [%]
2007	5,1
2008	7,0
2009	8,7
2010	10,4

- Generation in 2006 approx. 4,2 TWh
- Demand for renewable energy in Poland is rapidly increasing from 5,8 TWh in 2007 to 13,4 TWh in 2010, which makes respectively 5,1% and 10,4%.
- Big deficit of renewable energy in Poland expected
- Limited connection capacities of new renewable projects

Current investments of RWE Group in polish renewable sources

- 2 wind farms in the north part of the Poland (Tychowo, Suwałki)
  - 70 MW = 168 000 MWh (~ 50 000 households)
  - commissioning: 2010
  - further projects planed

Energy efficiency increase by modernisation of power units – BoA 2&3 in Neurath

- Investment 2 bn. EUR
- Commissioning: 2010
- 2 Blocks (x 1.100 MW)
- Efficiency 43,2% (old units ~ 31%) -> **3 m tonnes less emissions per year**
- Additional 4% reduction is expected by implementing waste-heat utilisation

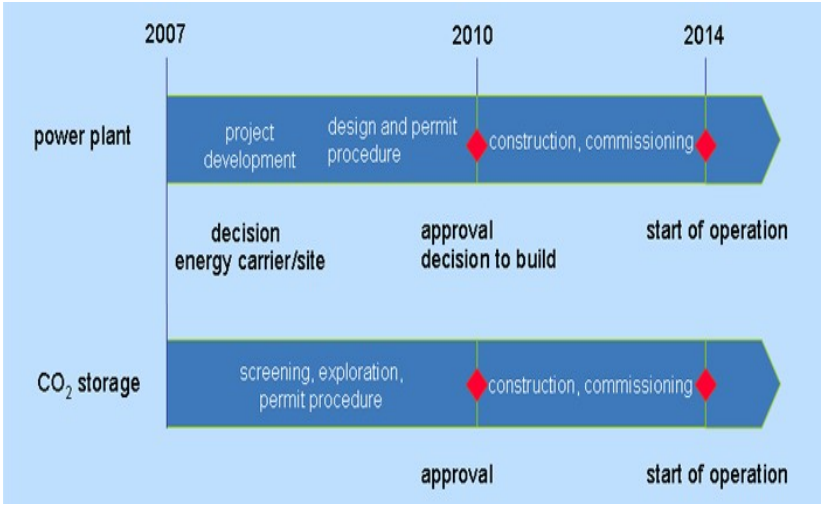
Results:

- After closing of the old power units the **CO_2 emissions will decrease by around 6 millions tonnes**
- **Reduction of energy intensity** by **30%**

If all power plants around the globe would work with the BoA technology, over 1 billion tones of CO_2 could save every year.

Energy efficiency increase by implementation of new technologies – zero-CO_2 power plant with integrated coal gasification and CO_2 capture and storage

- Investment 1 bn. EUR
- Commissioning: 2014



Technical data	
Gross capacity	450 MW
Net capacity	360 MW
Net efficiency	40%
Stored CO_2 quantity	2.3 mill. t p.a.

- Gasification of coal is combined with the capture of CO_2 and electricity is produced in downstream gas and steam turbines
- CGCC is the only technology that can already be implemented on a large scale today

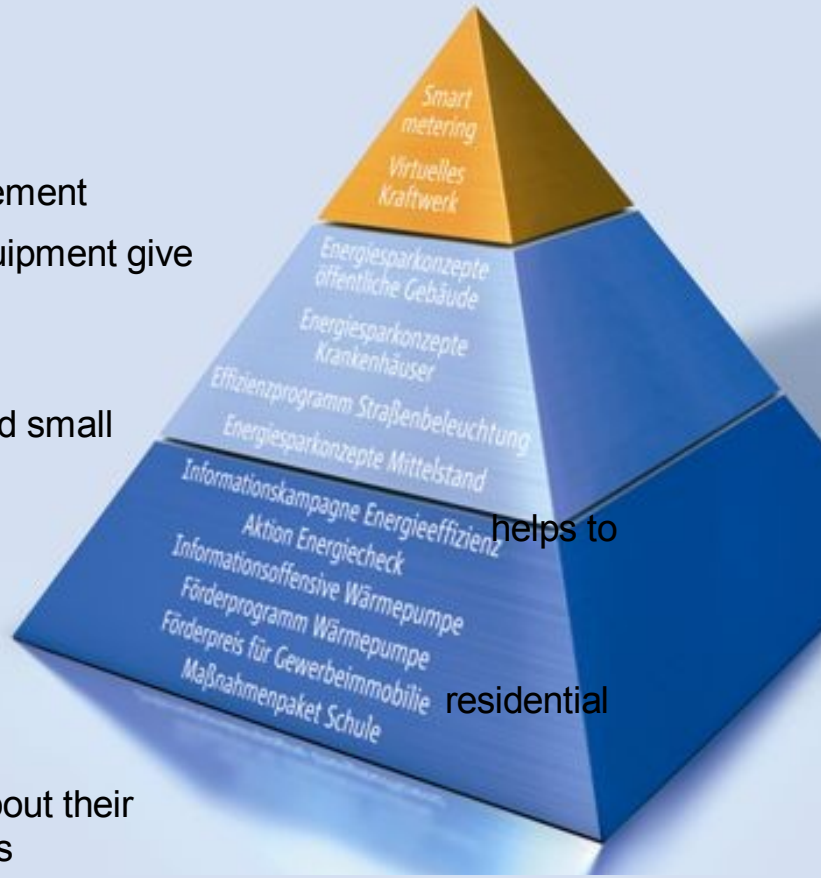
Further renewable energy sources

- 700 m EUR will be invested until 2011
  - wind energy
    - 2 windparks in Poland 70 MW (168 000 MWh/a)
    - onshore-windpark in France
    - 30 turbines in France (3MW). **CO_2 reduction of 100 000 t/a**
    - 30 wind power plants in Great Britain (Irish Sea). **CO_2 reduction of 160 000 t/a**
    - further projects in Spain and Portugal
  - energy from water -> almost 70 m EUR in run-of-river power station
  - biogas -> e.g. Gravenbroich (716 kW – serves around 1600 clients)

Energy efficiency program of RWE Group
150 m EUR investment in energy efficiency

Three action fields:

- ***Research and technology***
  - New approaches to energy marketing / management
  - Guiding principle: innovative processes and equipment give customers cost control and choice
- ***Implementation and advice***
  - Increased energy efficiency in municipalities and small and mid-sized enterprises
  - Guiding principle: Support for the public sector overcome the modernisation backlog
- ***Education and information***
  - Information and promotion programmes for and small business customers
  - Guiding principle: Only customers who know about their energy conservation potential can cut their costs



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