

Energy in Europe

Dash for Gas versus Widespread Modernisation

Brussels, 24th January 2011

EURACOAL

European Association for Coal and Lignite

General Assembly

Coal producers, coal power generators, coal traders, research institutes

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Discussions, opinion forming, work targets

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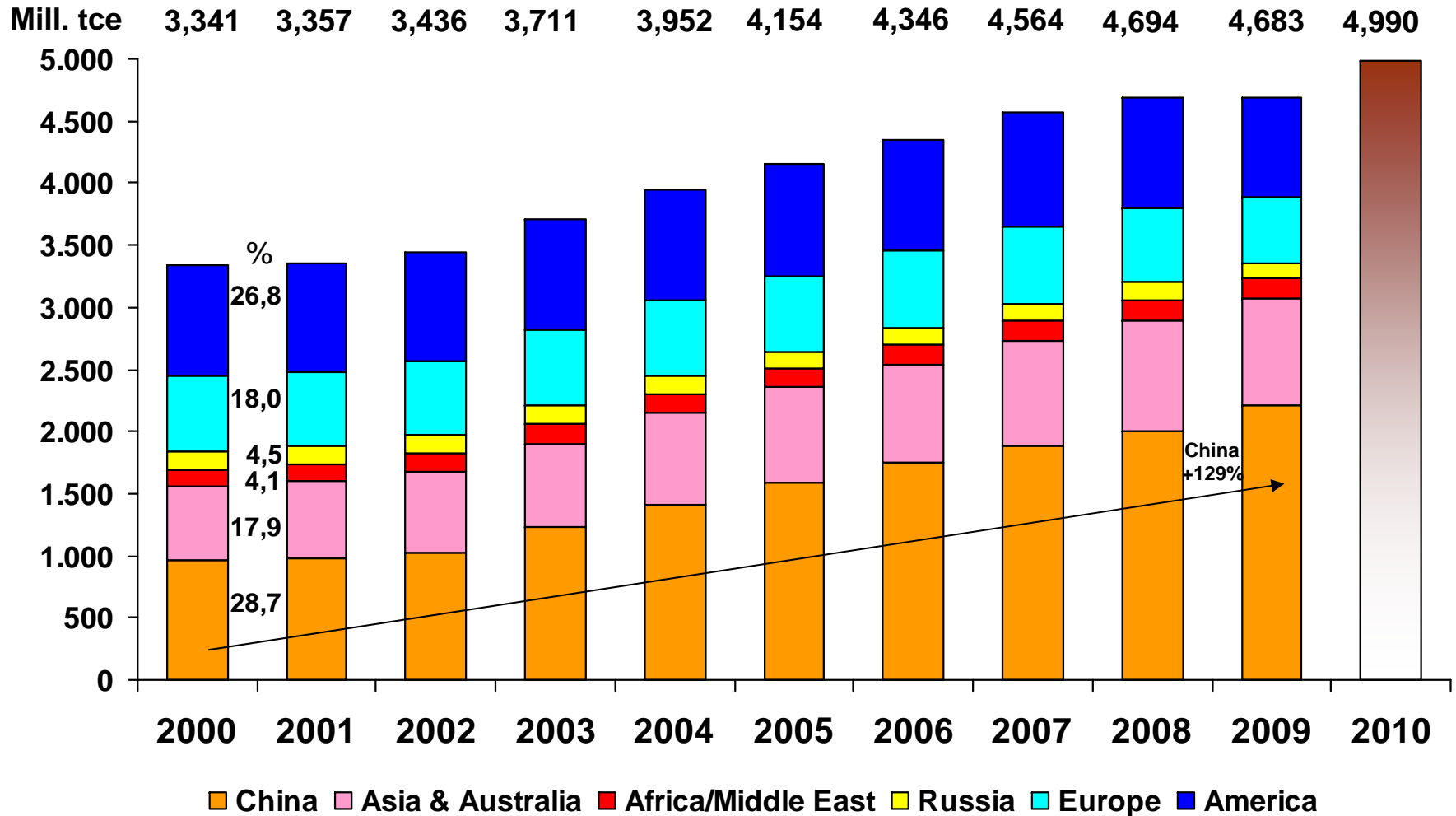
Nigel Yaxley – Gitta Hulik

24.01.2011

Slide 1

World coal consumption

+ 40 % growth from 2000 to 2010

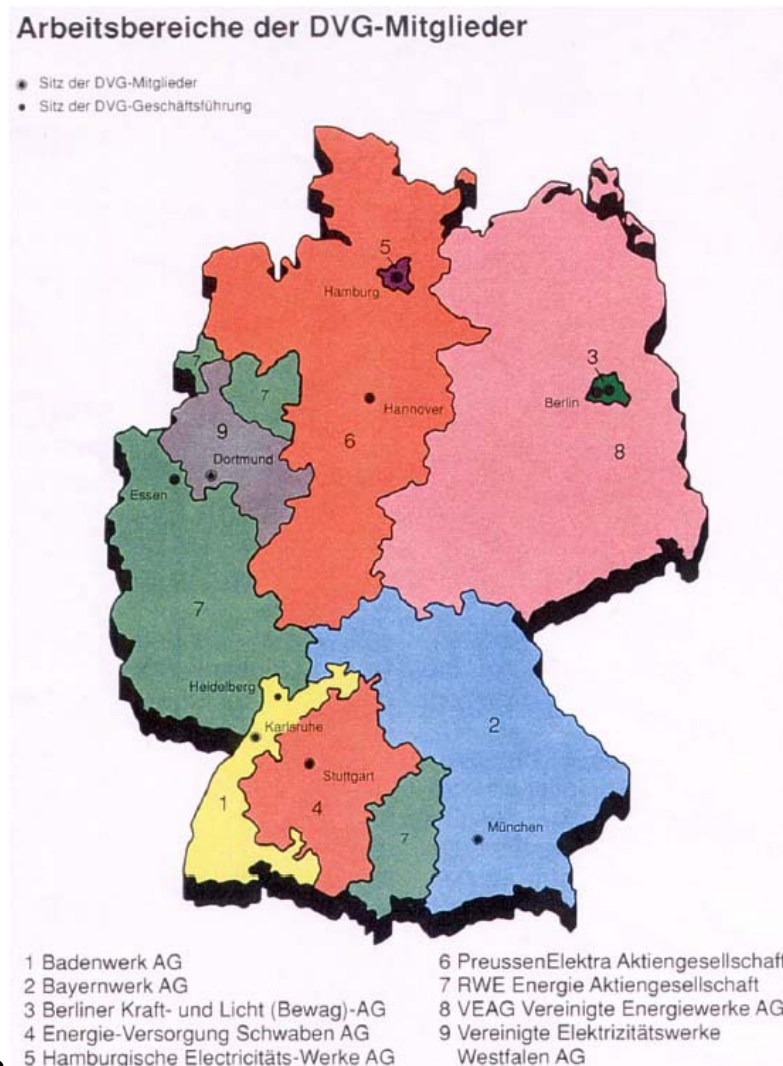


Source: BP, Statistical Review of World Energy, June 2010

Schätzung 2010 VdKI

Slide 2

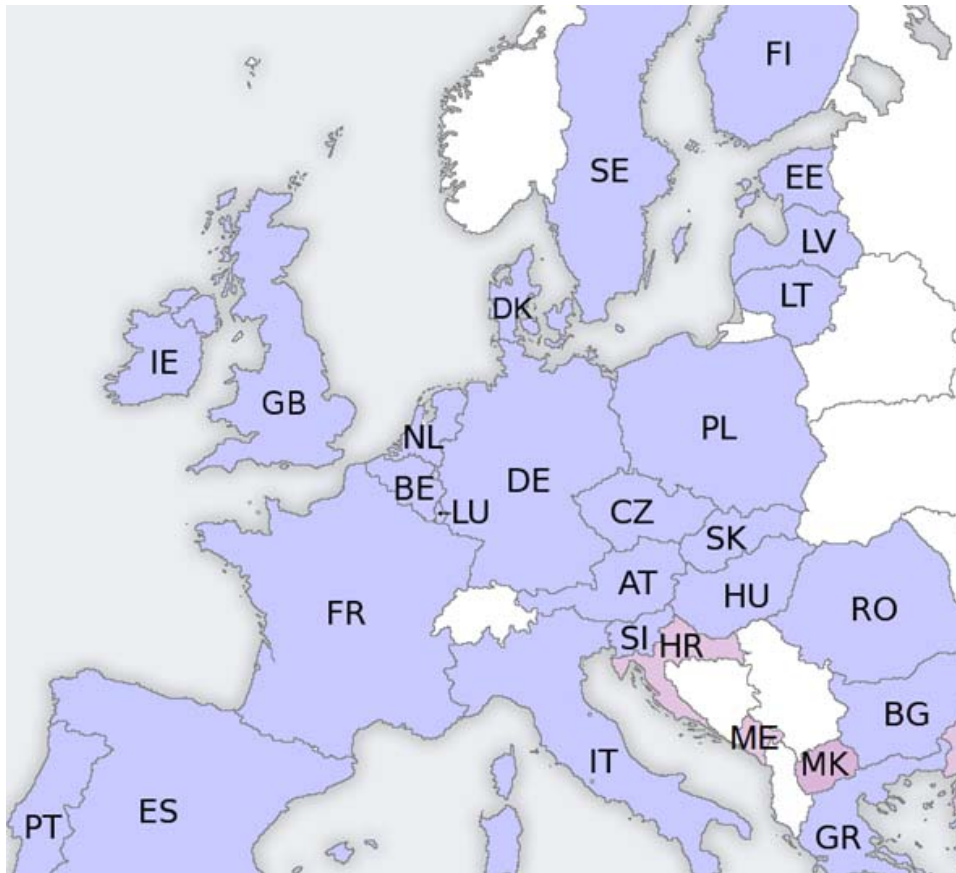
Europe in the past – for example Germany – 7 major utilities



- Electric power supply provided by regional monopolies
- Price controlled by states
- Low level of integration

Source: Uni Hannover, Grundlagen der elektrischen Energieversorgung, Prof. Oswald

Europe today – on the way to a single market

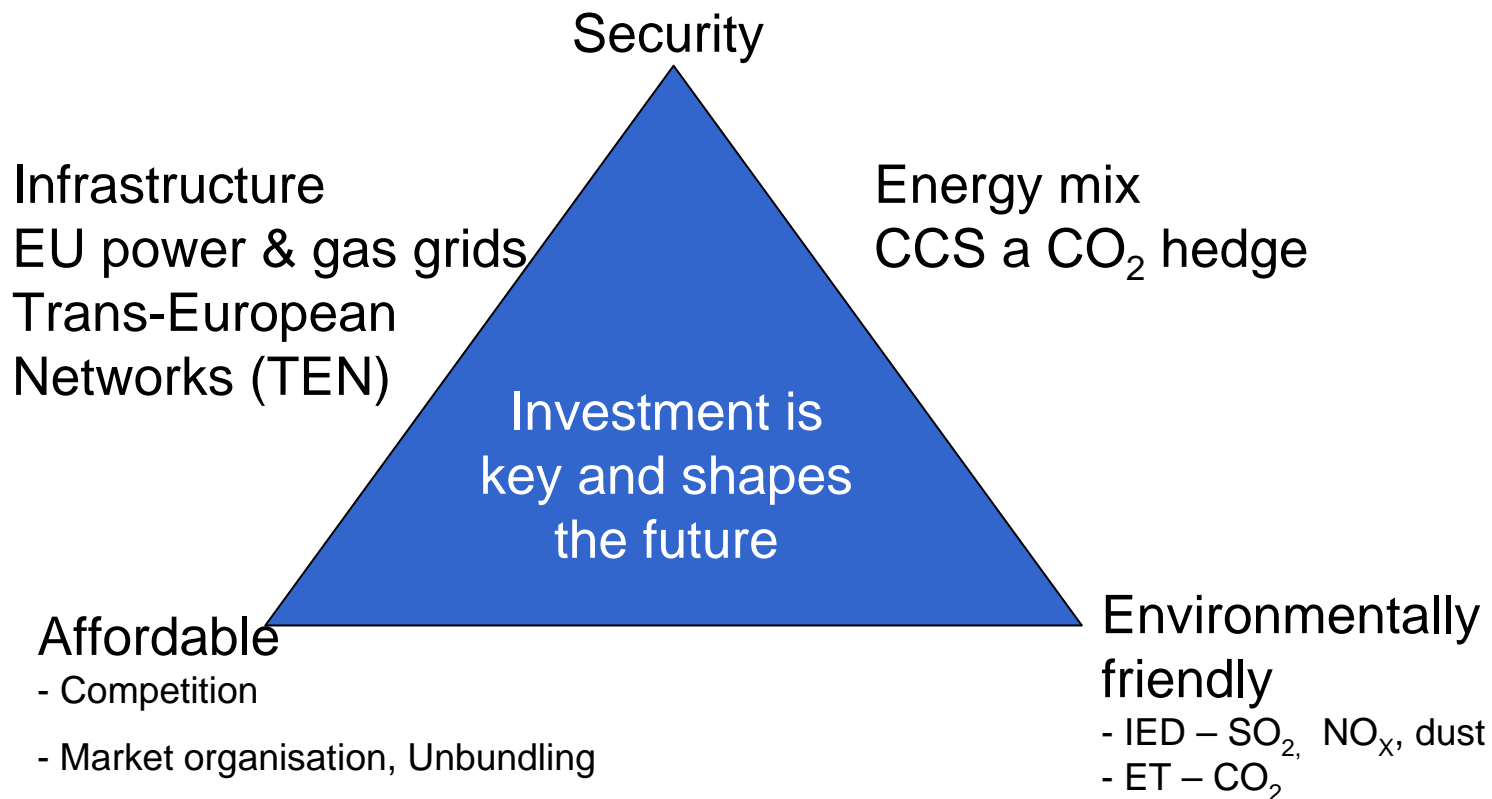


Source: www.wikipedia.org

- Unbundling
 - Power generation
 - Transmission
 - Distribution
- Cross border competition
- Increasing integration

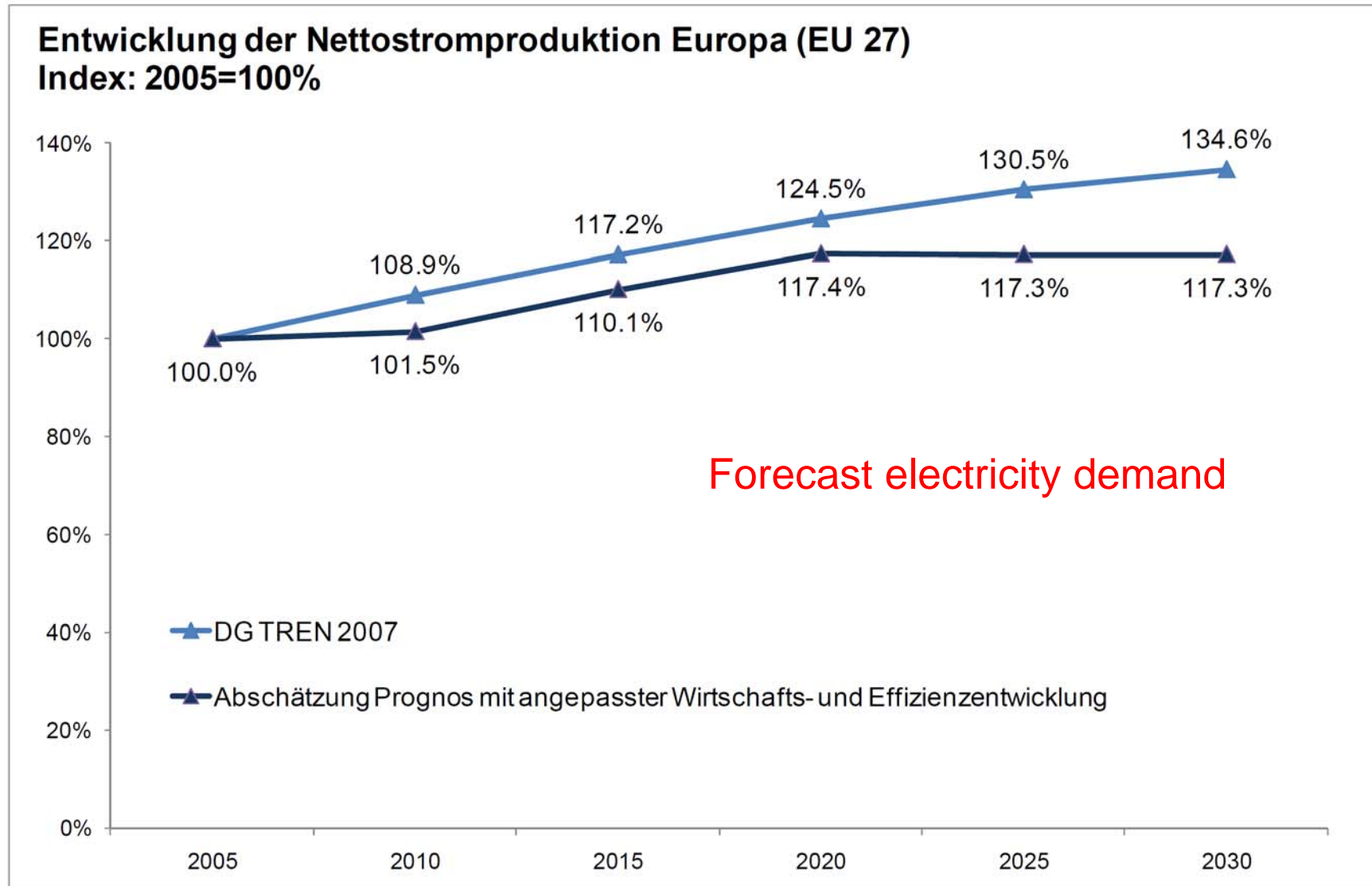
A European power market is under development – but still a lot of questions.

Energy policy objectives in the power sector



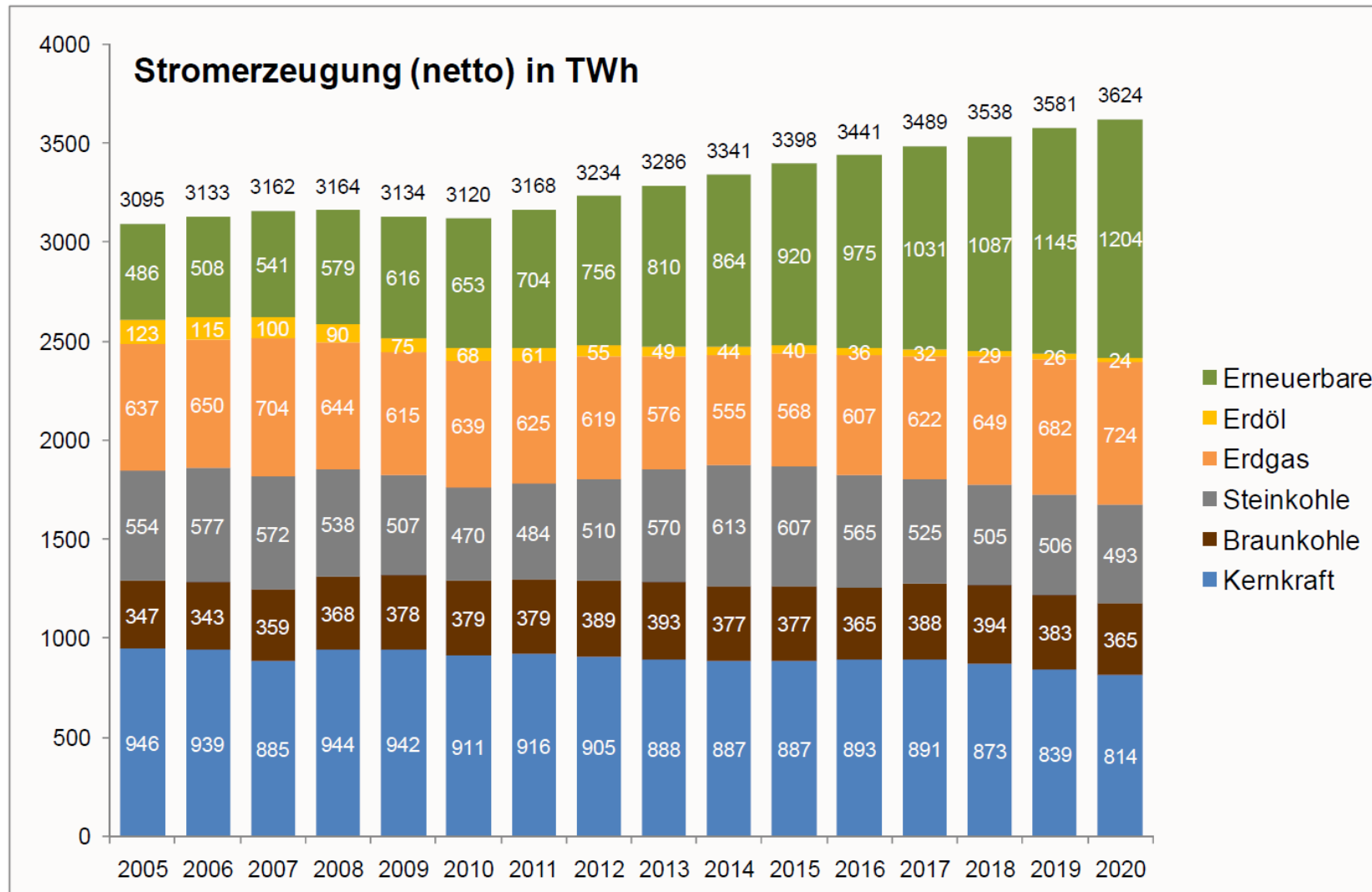
Who is responsible for „security“ in the power sector?

Abbildung 3-1: Entwicklung der Stromerzeugung in der EU-27



Source: Prognos/GWS 2009 – Impact of tightened climate protection objectives on the economic structure and on growth and employment in Germany and in the EU

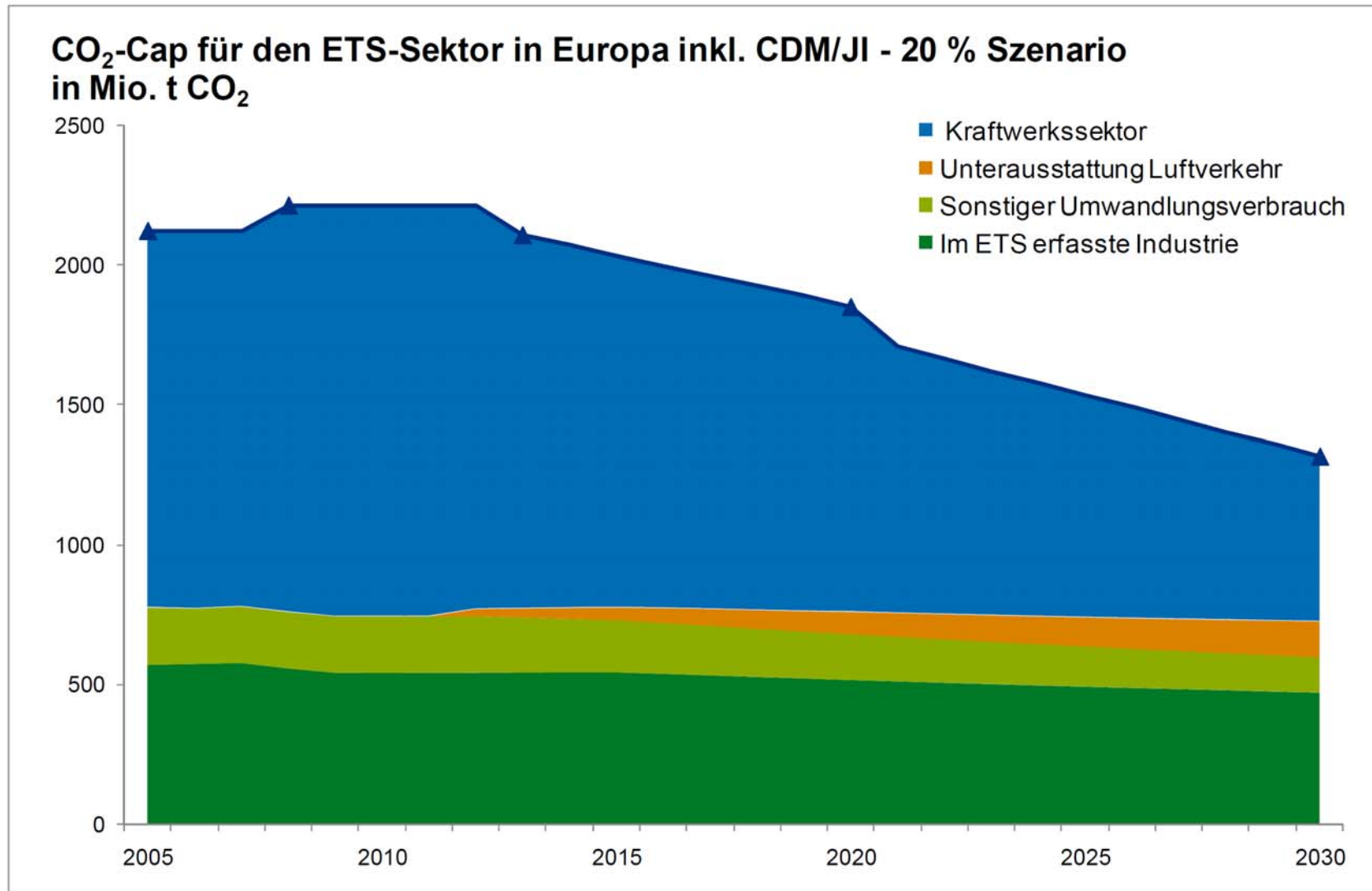
Abbildung 4-1: Stromerzeugung nach Energieträgern in der EU-27 im Referenzszenario



Prognos 2009

Forecast electricity supply

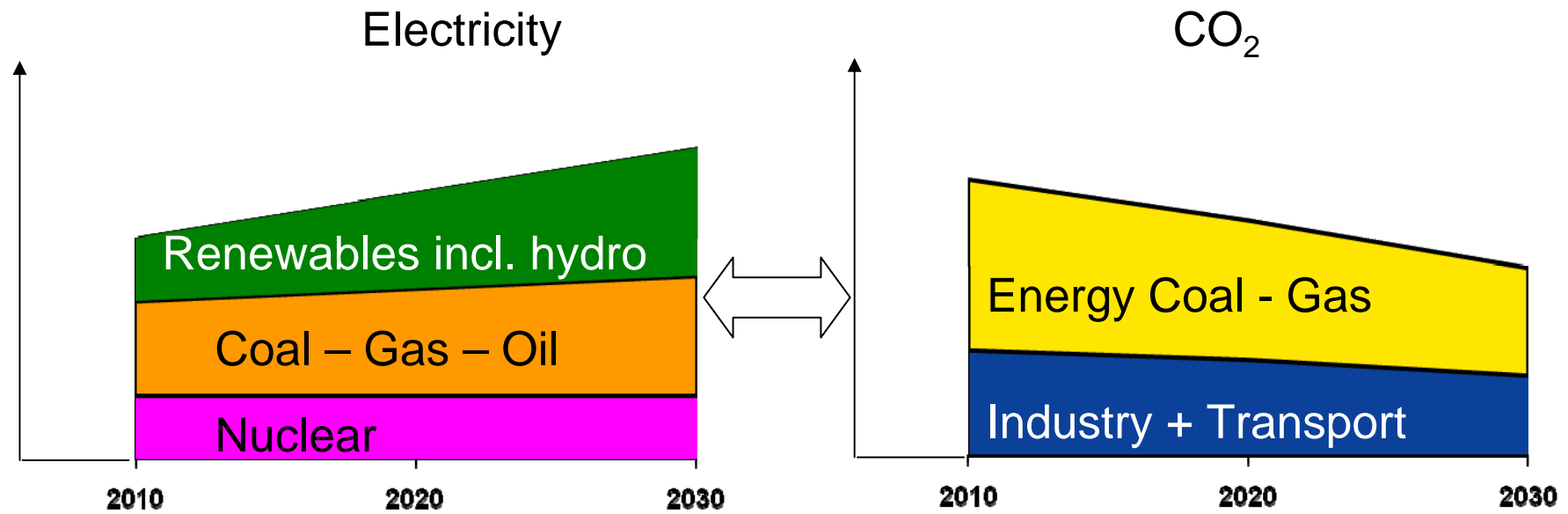
Abbildung 3-6: CO₂-Cap für den ETS-Sektor inkl. CDM/JI im 20 %-Szenario, in Mio. t CO₂



European CO₂-Cap

Prognos 2009

Electricity demand and share of CO₂-free power generation, CO₂ cap and specific CO₂ emissions in power generation determines the coal-gas mix



Electricity demand and share of CO₂-free power generation, CO₂ cap and specific CO₂ emissions in power generation establish coal-gas mix

Example:

Question:

Electricity_{coal} Electricity_{gas} (TWh)

Known:

Specific CO₂ emissions: Gas_{CO₂} = 0,53 kg CO₂/KWh, Coal_{CO₂} = 1,00 kg CO₂/KWh
(estimate 2010)

Electricity_{fossil}: Estimate 1 500 TWh, CO₂ – without industry/transport 1 250 Mt
(estimate 2010)

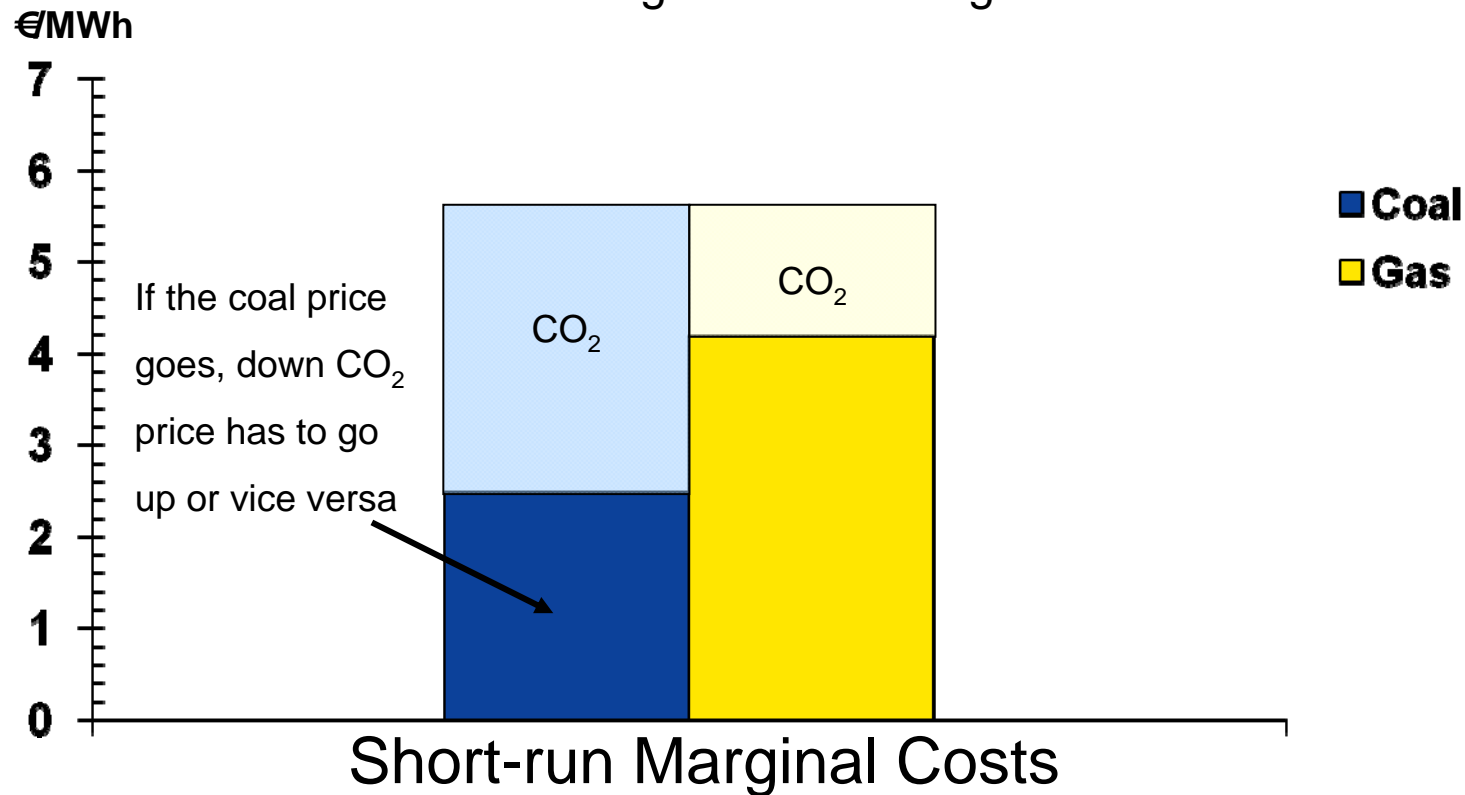
Two equations:

$$\text{I: Electricity}_{\text{fossil}} = \text{Electricity}_{\text{coal}} + \text{Electricity}_{\text{gas}}$$

$$\text{II: CO}_2\text{Electricity} = \text{Electricity}_{\text{coal}} \times \text{Coal}_{\text{CO}_2} + \text{Electricity}_{\text{gas}} \times \text{Gas}_{\text{CO}_2}$$

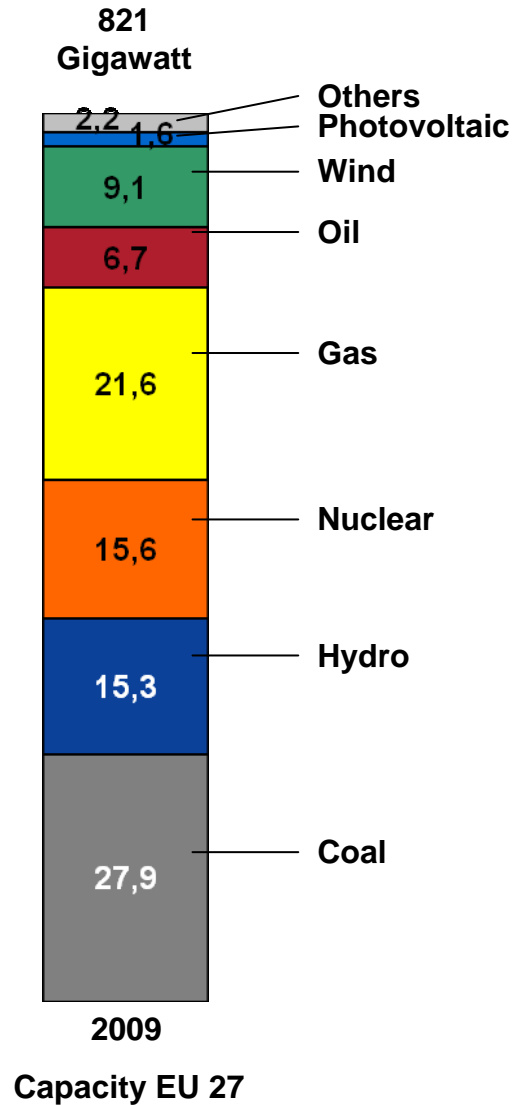
Short-term marginal costs influence prices for CO₂

Required costs for CO₂ in order to compensate cost advantage of coal over gas



A CO₂ reduction can be achieved in the short to medium term only by replacing coal with gas. The gas/coal price ratio determines the price of allowance certificates.

EU 27 power plant capacity and balance 2000 - 2009

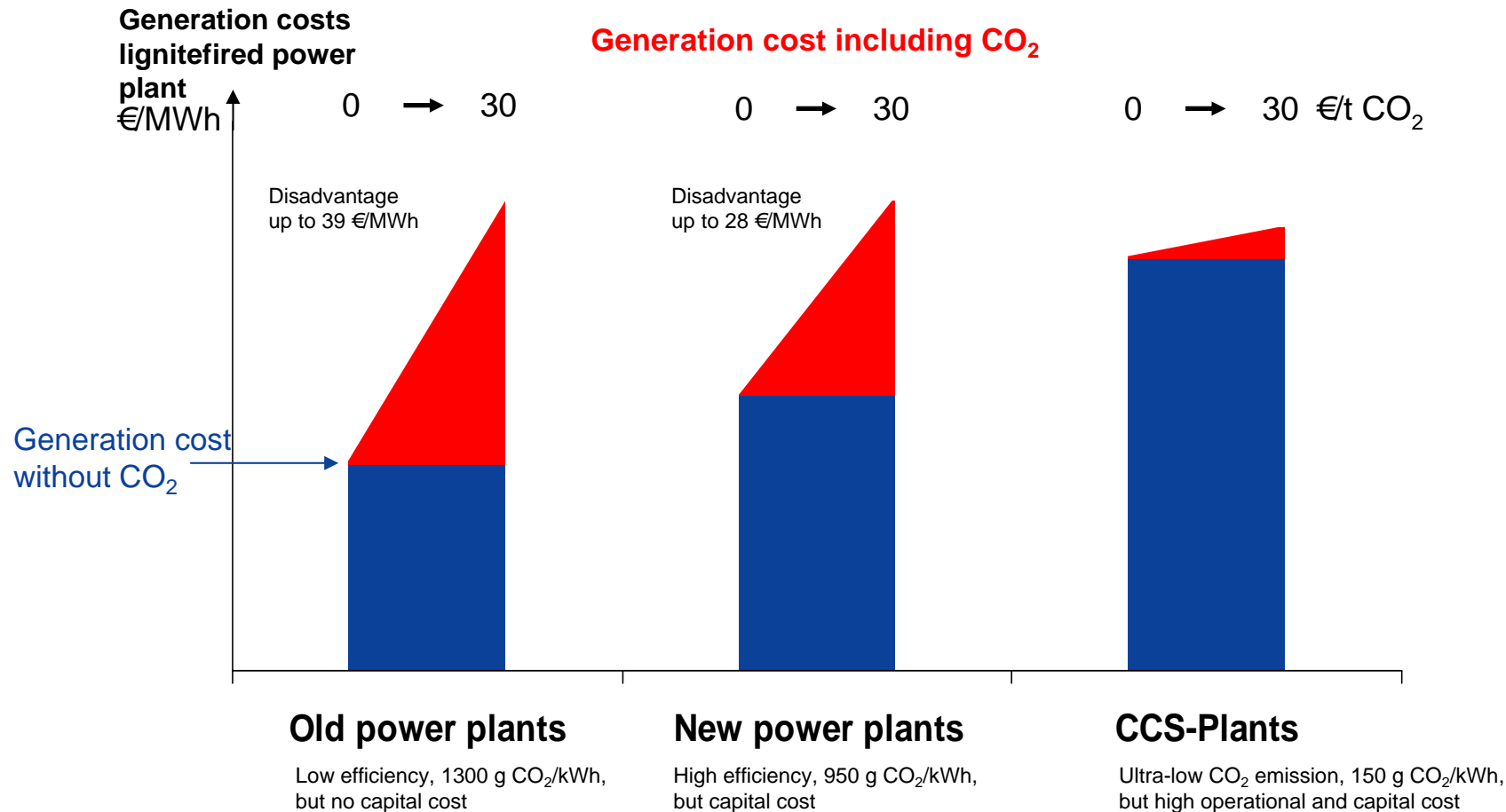


	Balance from 2000 to 2009	Changes in 2009 (MW)
Gas	81067	6226
Wind	65102	10048
Hydro	3122	226
Others	4177	1096
Photovoltaic	13027	4200
Nuclear	-7204	-954
Coal	-12010	-794 *
Oil	-12920	101

* In 2406 MW – Out 3200 MW

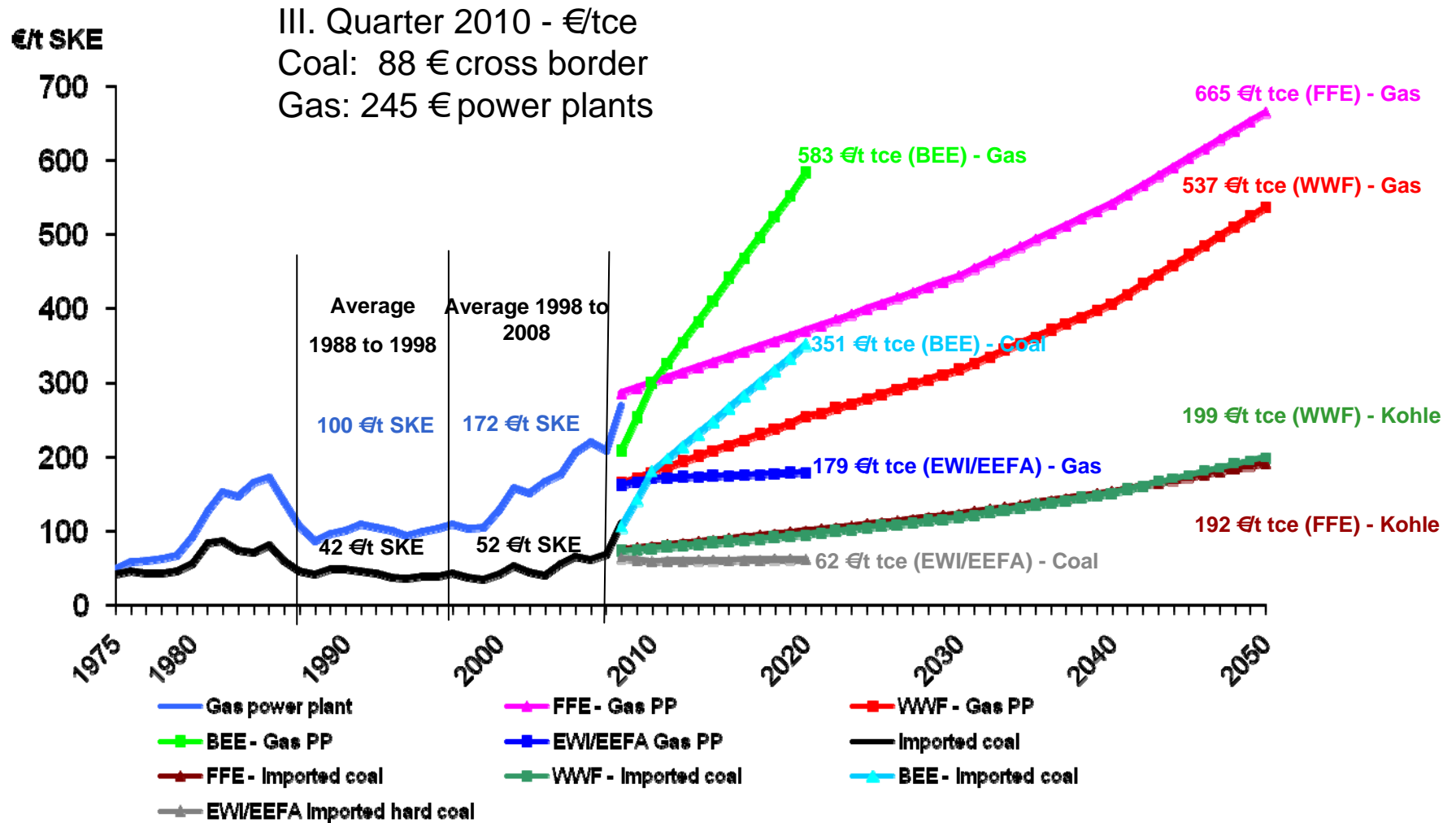
Impact of auctioning on generation cost

Case study: 100 % auctioning, CO₂-prices 0 – 30 €/t.



Medium-term: Strong negative impact on generation cost and power prices, auctioning works like a CO₂ tax. No incentive to build BAT plants. Long-term: Phase-in of CCS is high risk because only driven by high and uncertain power prices.

Assumptions for energy prices - Germany



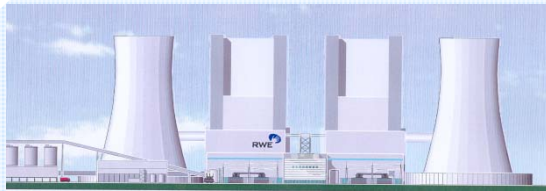
Sources: Statistik der Kohlenwirtschaft, EW/EEFA, BEE, FFE 2009, WWF 2009 / Prognos

Energy flow is cash flow

€7.0 billion turnover for a 1,000 MW power plant over 20 years operating 7,000 hours/year at a base-load-price of €50 /MWh



Coal power plant



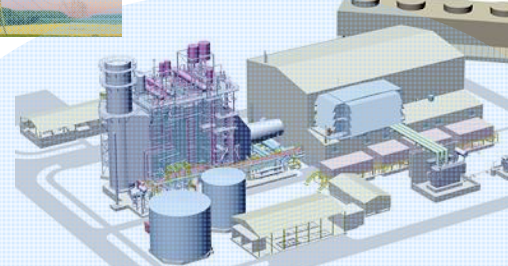
plant costs: 2/3 share of turnover

fuel costs: 1/3 share of turnover



70 up to 100 % domestic added value

Gas power plant



plant costs: 25 % share of turnover

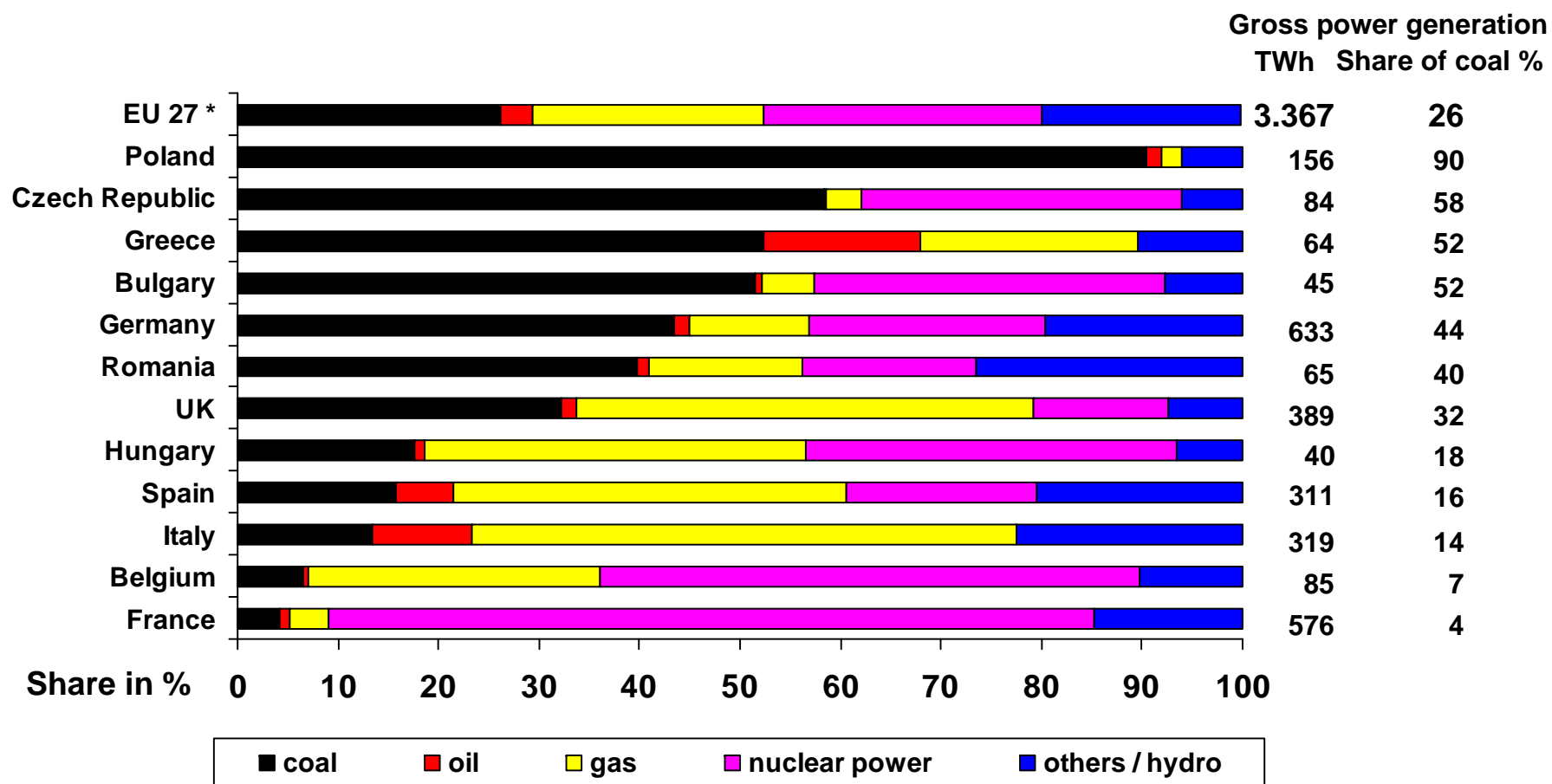
fuel costs: 75 % share of turnover



up to 100 % imported

Power generated from coal promotes growth in the EU

Structure of power generation in selected EU countries 2008



* Peat and oilshale included in Other/Hydro
 Data as per: 06/2010
 Source: EUROSTAT – Energy / Yearly statistics 2008

European – national competencies for energy and CO₂ policies

	Fields of action	Fields of actions
	energy *	CO ₂ and NO _x , SO ₂ , dust
EU	<ul style="list-style-type: none"> ■ Functioning of energy markets ■ European network infrastructure power, gas – CO₂?! ■ Energy solidarity, crisis management 	<p>EU ETS – Industry – Power generation CAP describes reduction targets finally, no national guidelines for ET installations Industrial Emissions Directive (IED)</p>
Member States	<ul style="list-style-type: none"> ■ Choice of energy sources <ul style="list-style-type: none"> - Renewables, nuclear! - Coal and lignite? ■ Utilisation of indigenous energy resources <ul style="list-style-type: none"> - Coal and lignite? ■ General structure of energy supply 	<p>Non ET sector</p>



* § 194 – Treaty of Lisbon

EURACOAL's interest: modernisation

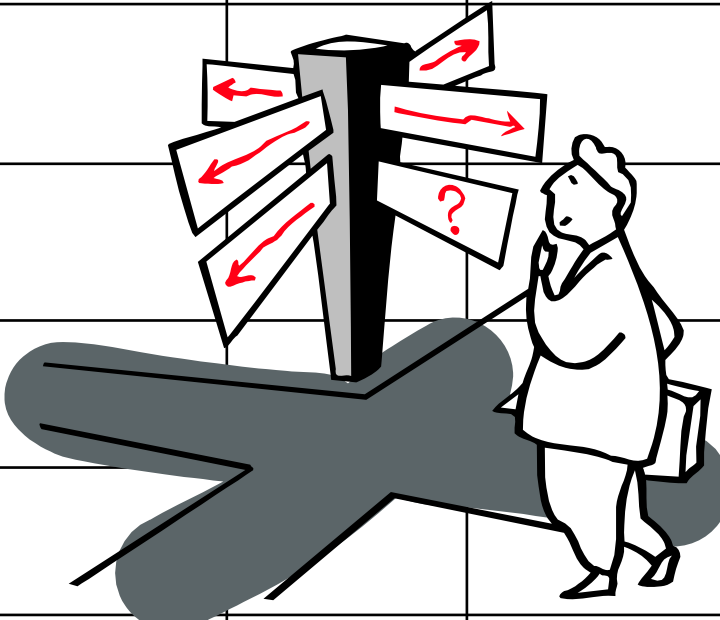
- Use of indigenous resources like coal to improve security of supply and to maintain important industry clusters
 - Coal and gas have to deliver the backup of renewables
 - Europe can achieve its CO₂ targets by following a path of modernization
- Discussion of the investment framework under ET scheme

EURACOAL's interest: CCS

- CCS is like a safety valve for the CO₂ market
 - CCS gives relief if the prices for CO₂ are so high that they destroy industry and harm consumer interests
 - CCS enables the EU to maintain an energy mix in the long term which is essential for security of supply
- Concerted effort on CCS demonstration and preparation for the development of a CCS transport and storage infrastructure are crucial

Different Fuels for Power Generation - different questions, answers and views

	Coal	Oil	Gas	Nuclear	Renewables
Security of supply	+++				
Price risk / competitiveness	+++				
Transport / waste risk	+++				
CO ₂ emissions	+				
Consumer acceptance	++				
Importance for the power sector	+++				



The illustration shows a person standing at a signpost with multiple arrows pointing in different directions, one arrow has a question mark. This symbolizes the complexity and uncertainty in choosing a power generation fuel source.