

GDF SUEZ



Electricity production in the Wadden Sea Region – fossil energy
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The GDF SUEZ Group

GDF SUEZ – one of the leading energy providers in the world

Europe's leading natural gas supplier

- Largest purchaser and supplier
- Largest transport and distribution network
- Second-largest European storage facility operator

A major electricity provider

- No. 1 in the Benelux countries
- Second-largest producer in France
- Fifth-largest producer and supplier in Europe

World's leading liquid natural gas operator

- Largest importer and purchaser in Europe
- Second-largest operator of LNG Terminals in Europe
- Market leader in the Atlantic Basin

Leading European energy service provider



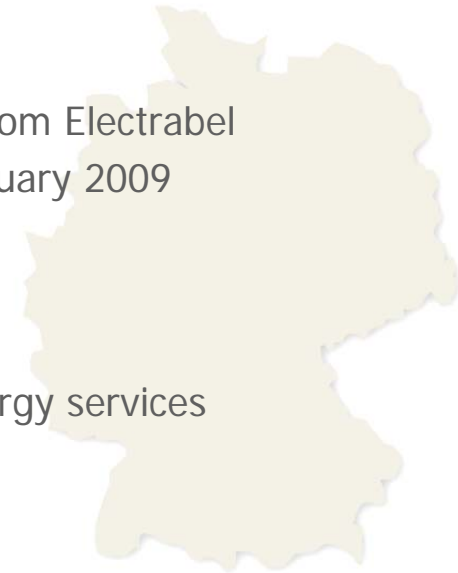
Key figures 2008

- ~ 200,000 employees
- Turnover of EUR 83.1 billion
- Investments of EUR 11.8 billion
- Production capacity of 68,000 MW
- 1,300 scientists in ten research and development centres
- 15 LNG tankers
- 16 natural gas storage sites in Europe, total capacity 10.7 bn m³



Key figures 2008 - Germany

- Entered the German market in 1998; changed its name from Electrabel Deutschland to GDF SUEZ Energie Deutschland on 1 February 2009
- Main areas of activity:
 - Generation of power and district heating
 - Distribution of power and gas and the provision of energy services
 - Trading
- Roughly 700 staff
- Sales €1.04 billion
- Output 8.9 TWh of power, 2.1 TWh of gas
- Supply of approx. 100 major industrial customers and distributors
- Residential and small industrial customers are supplied by our regional partners (350,000 energy customers, 858,000 gas customers)
- 1.288 MW installed capacity, plus a further 800 MW currently under construction



Why fossil power plant operators are going to the Wadden Sea Region?

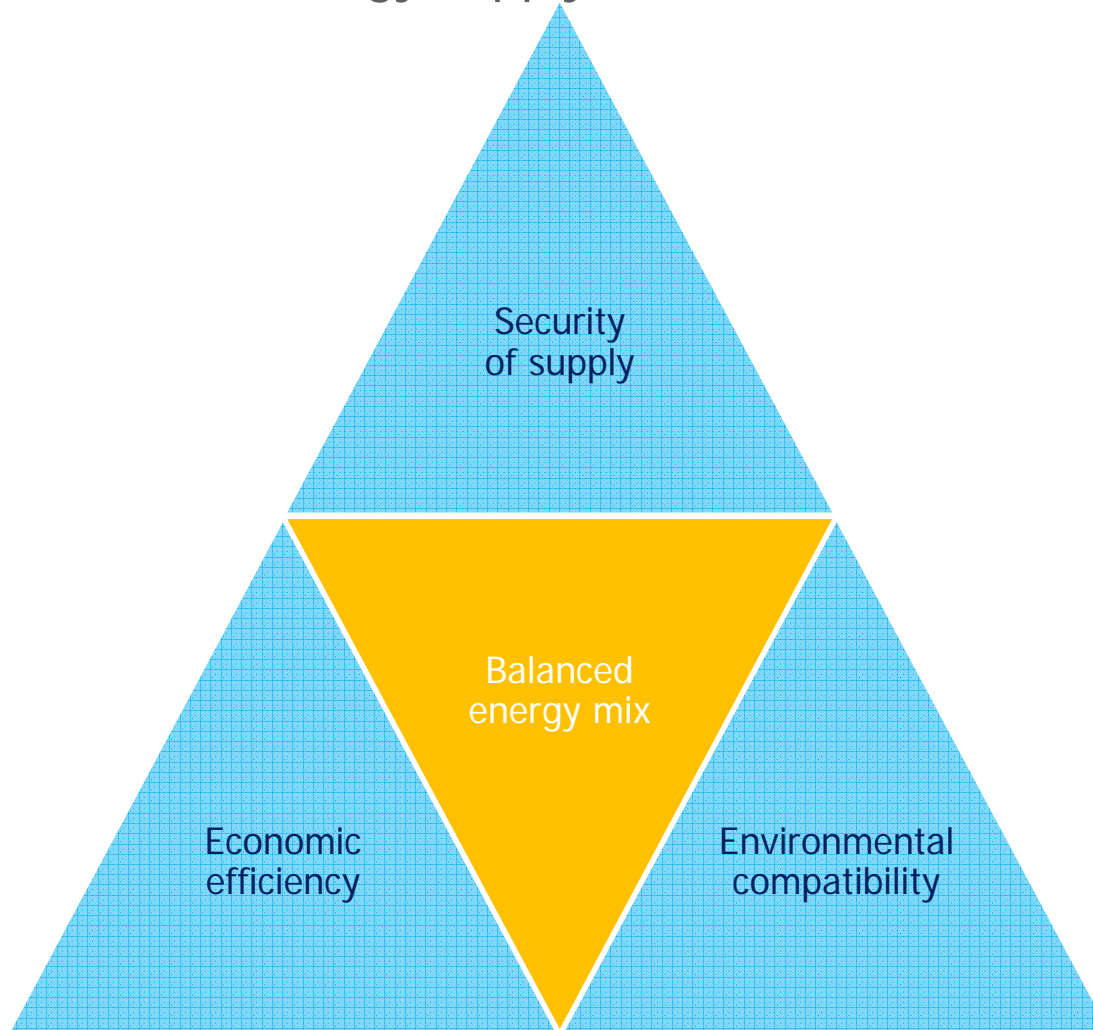
- Not the wadden sea itself is interesting ...
... but the coast
- Studies say that energy production will be twice as high (or more) than consumption in the area
- Is this realistic?
"projects are projects ..."

Tabelle 11: Im Bau und in Planung befindliche Kraftwerke in Norddeutschland

KW-Name / Standort	Betreiber / Unternehmen	Bundesland	Leistung netto (MW)	vorausst. Inbetriebn.	Brennstoff
Stavenhagen	Nehlsen Entsorgung GmbH	MV	46	2007	Biomasse
Lubmin I	Concord Power	MV	125	2007	Erdgas
Hamburg-Tiefstack neu	Vattenfall Europe Generation	HH	30	2007	Erdgas
Bremen Hafen	swb Erzeugung	NI	20	2008	Erdgas
Rostock	Vattenfall Europe Generation	SH	400	2008	Müll
Braunschweig	Braunsch. Versorgungs AG	NI	875	2008	Müll
Lingen	RWE Power	NI	940	2009	Erdgas
Niederaussem	RWE Rheinbraun AG	NI	580	2009	Erdgas
Emsland-Lingen 1 neu	RWE Power AG	SH	580	2009	Braunkohle
Hamburg Hafen	Vattenfall Europe Generation	HH	750	2009	Erdgas
Brunsbüttel	Electrabel	NI	800	2010	Erdgas
Stade	Electrabel	NI	800	2010/11	Steinkohle
Wilhelmshaven	Electrabel	SH	800	2011	Steinkohle
Bremen Mittelbüren	Electrabel	SH	800	2011	Steinkohle
Hamburg Moorburg neu	swb Erzeugung	SH	800	2011	Steinkohle
Lubmin	Vattenfall Europe Generation	NI	1.640	2012	Steinkohle
Lubmin II	Dong Energy, DK	HH	1.600	2012	Steinkohle
(Standort noch offen)	Concord Power	MV	1.200	2012	Steinkohle
	EON Energie/Stw. Hannover	MV	1.100	2015	Erdgas
	?		1.200	2015	Steinkohle
	Gesamt:		14.286		

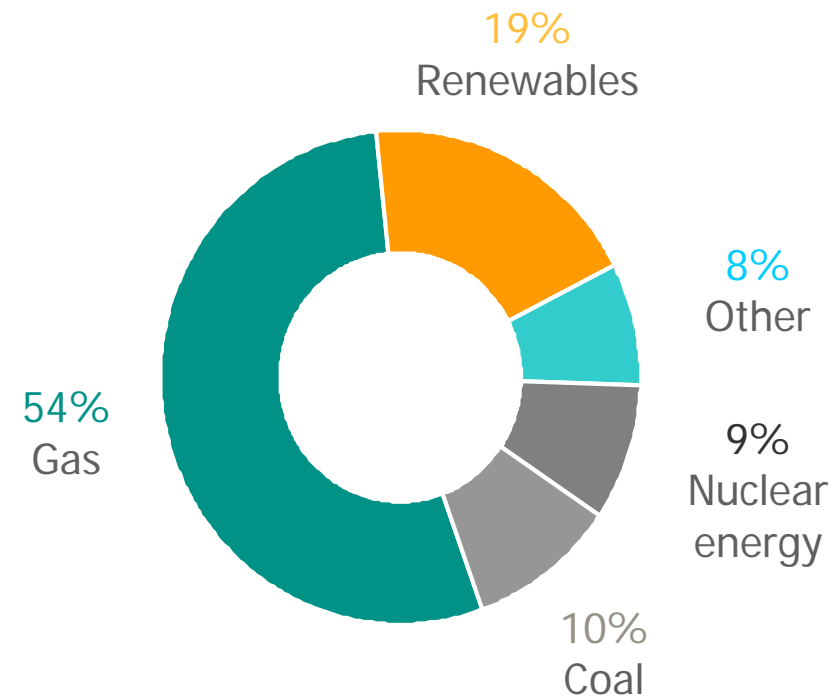
Example from:
Bremer energie institute
& Arrhenius Institut für Energie- und Klimapolitik,
2007

Objectives for energy supply



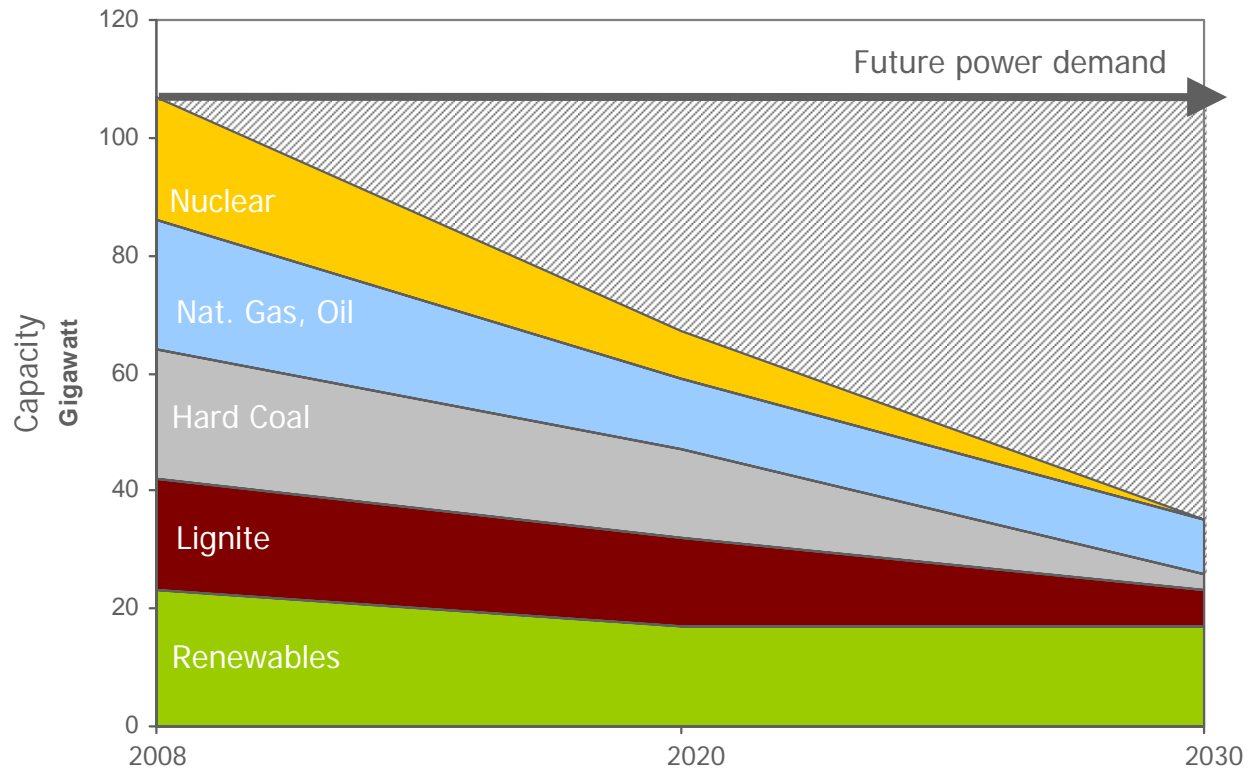
Electricity generation mix of GDF SUEZ today

- 68,000 MW installed capacity
- A competitive electricity generation portfolio
- Flexible, low-carbon and highly-efficient electricity generation capacities
- Further development of the electricity generation capacities, especially in the field of renewable energies and gas power plants



Installed capacity by energy source, 2008

Demand for new power plants in Germany!

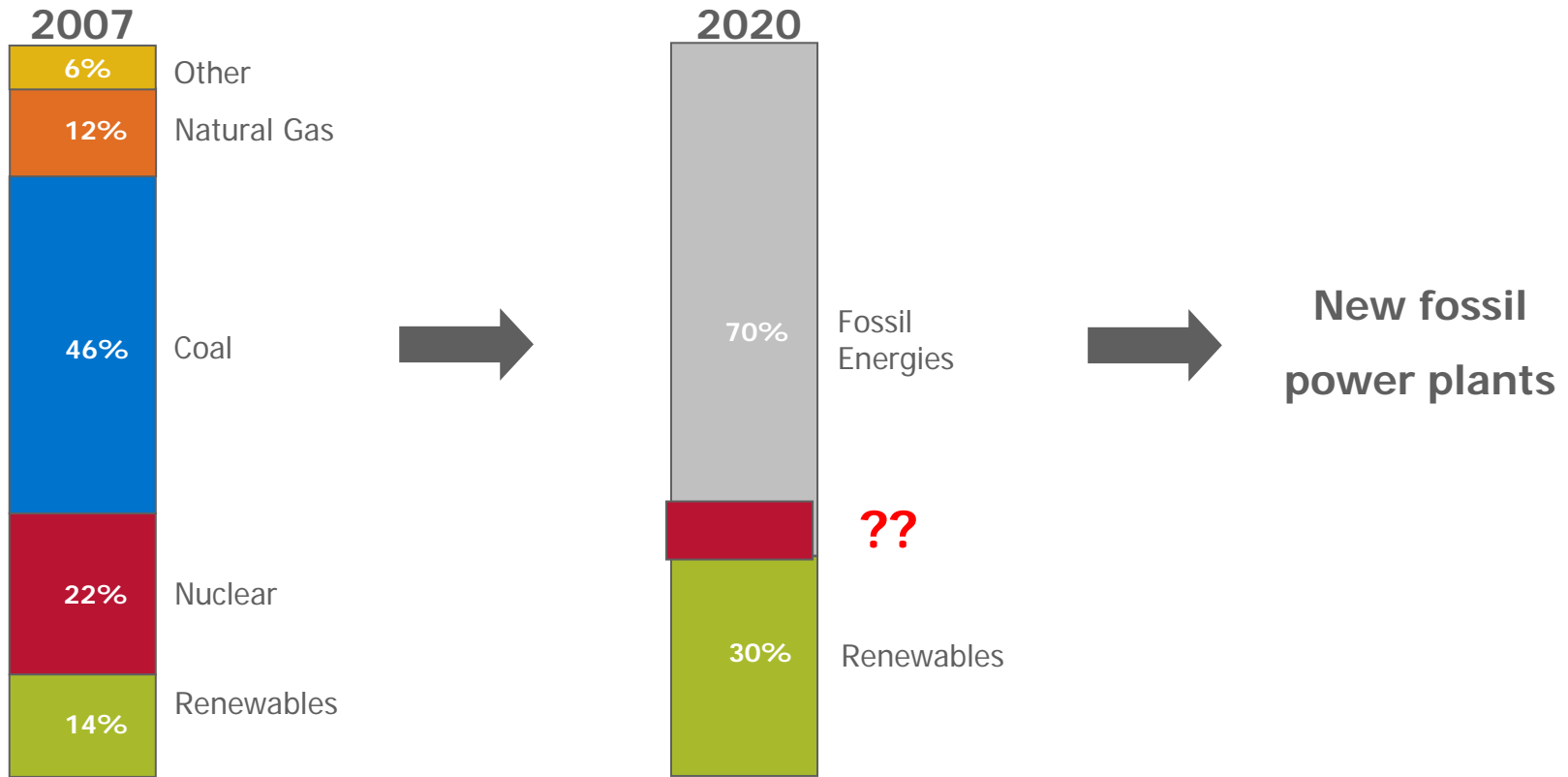


?

Only the power generation facilities as of today

Source: VBG Power Tech

Electricity production in Germany



Utilisation of fossil energies for electricity generation

Gas?



foto1a © Vitaliy Pakhryushchy

- Efficiency 57 %
- High prices
- Reserves 40 to 60 years
- Dependency from little number of supplying countries

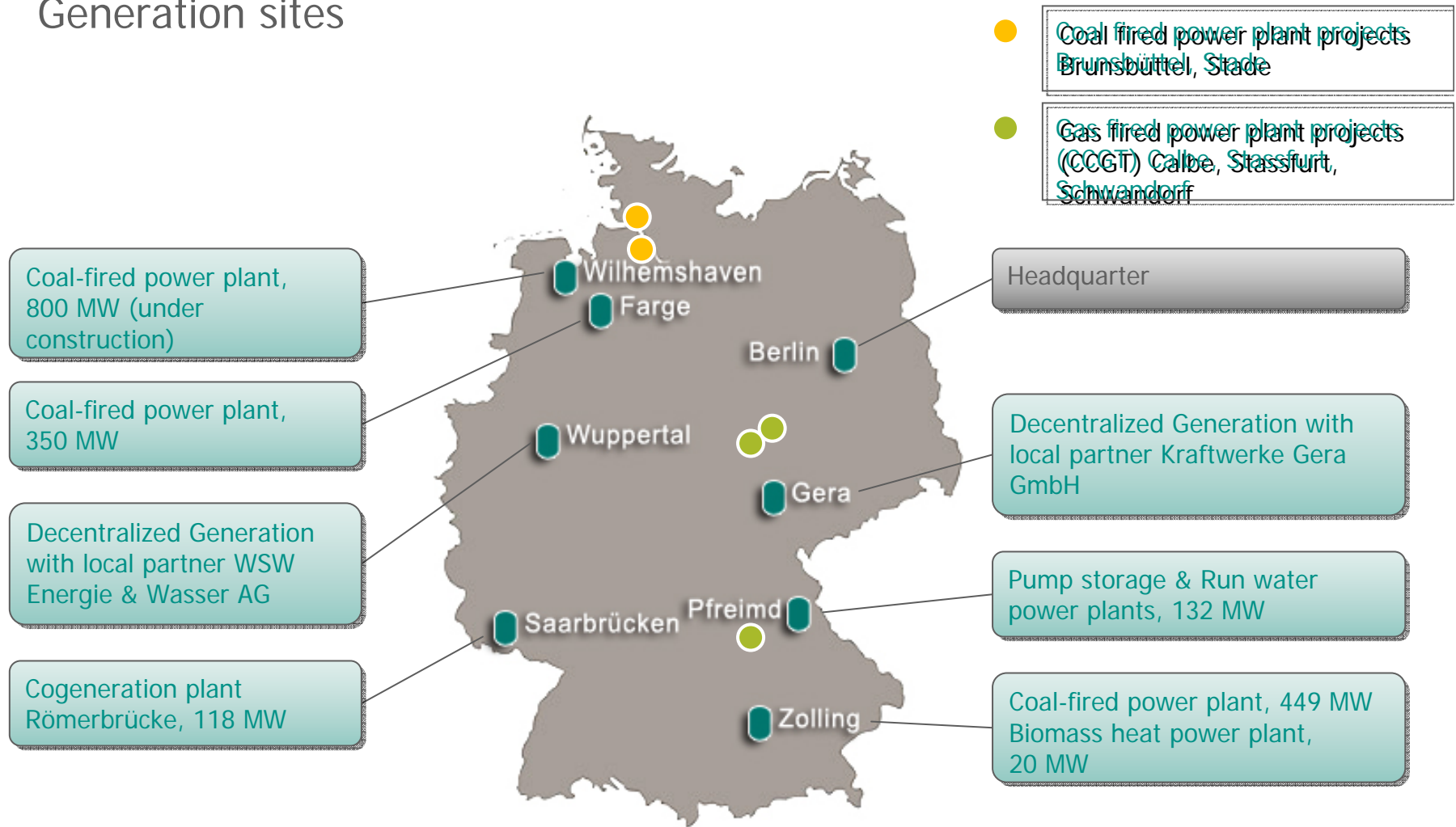
Coal?



- Efficiency 46 %
- Favourable prices
- Reserves for more than 200 years
- Worldwide availability

**Beside of
renewable energies
we still need both
of the fossil energies!**

Generation sites





Coal fired power plant Wilhelmshaven

Wilhelmshaven's Rüstersieler Groden: ideal site for coal-fired power plant

- Efficient coal logistics via „Niedersachsenbrücke“
- Efficient continuous-flow cooling (no cooling tower)
- High-voltage grid connection
- Site prepared for later CO₂-separation (CCS)



Wilhelmshaven coal-fired power plant

Gross output	800 MW
Net efficiency	> 46%
Cooling	Continuous-flow cooling (no cooling tower)
Investment	> €1 billion
Commissioning	2012
Cooperation partner	BKW FMB Energie AG (33%) WSW (15%)

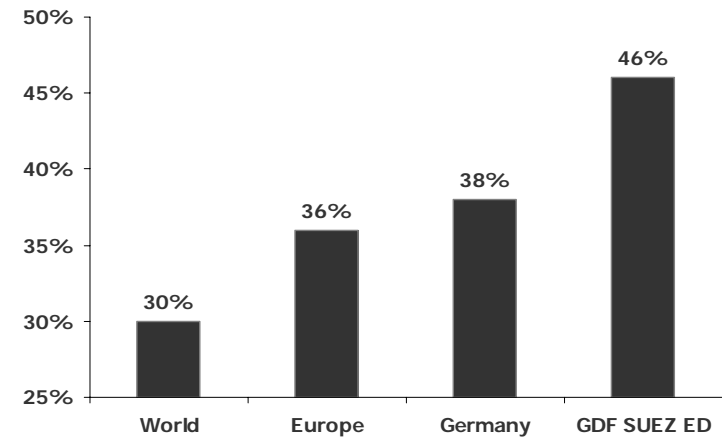


Optimal efficiency through state-of-the-art technology

- Efficiency of our new coal-fired power plants > **46%**
(for comparison: German average **38%**)
- Efficiency corresponds to the best currently available technology
- Leads to reduction in coal usage and CO₂ emissions

* Sources: VDEW, VGB Tech

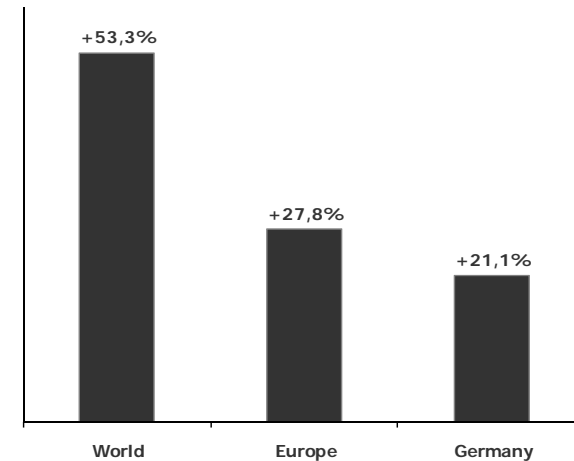
Average net efficiency of coal-fired power plants compared with the new GDF SUEZ Energie Deutschland power plants



A significant contribution to environmental protection

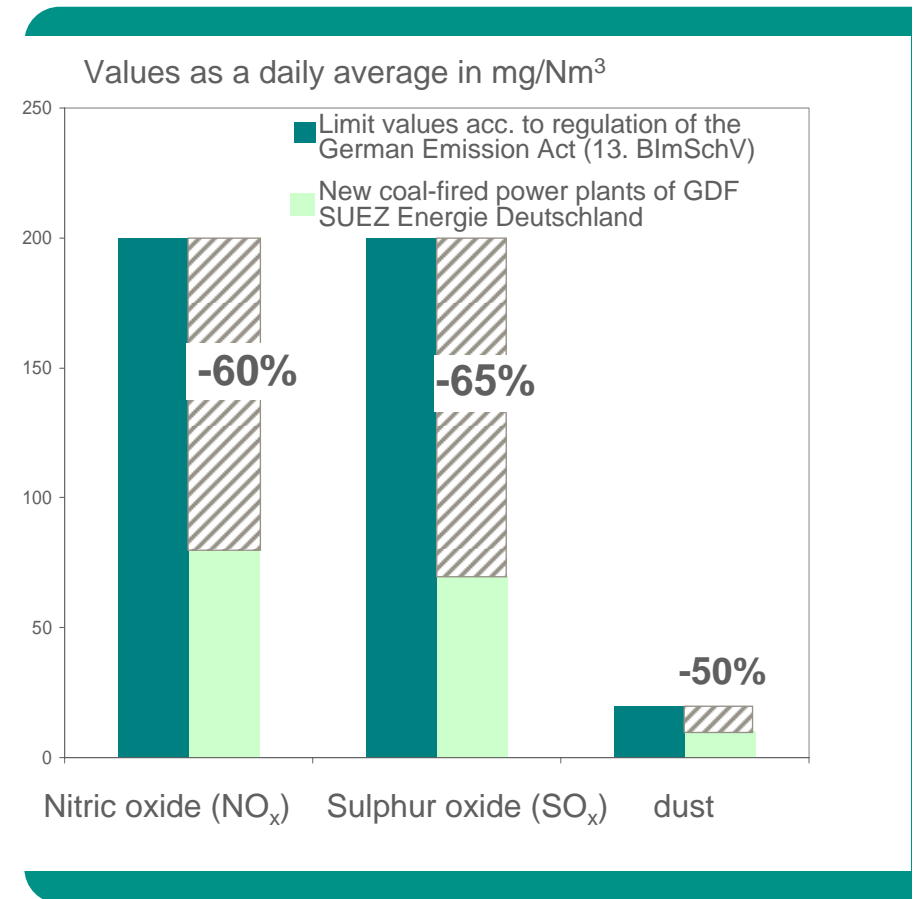
- Average German coal-fired power plants emit 20 percent more carbon dioxide than our new plants
- Contribution to climate protection (replacement of inefficient old plants)
- Participation in European research projects on further improvement of efficiency and development of CCS technology

The CO₂ emissions of existing coal-fired power plants compared with new power plants of GDF SUEZ Energie Deutschland



Emissions well below legal limits

- Responsibility for the region and the environment: **commitment** to low threshold values
- The **dust, NO_x and SO_x** emissions of our new power stations are 50 percent or more below the already stringent legal provisions



Summary

- Today, coal fired power plants move to sites where they could find their coal
→ to the coast!
- There's still a need for new fossil power plants, both gas and coal
- Modern power plants are better than old ones, both for CO₂ and other emissions
- There might be not a perfect balance between production and consumption for all regions → but: is this really necessary?
- The CO₂ trading mechanism will be the limiting factor for the number of fossil power plants





Thank you!