

The Transformation of Germany's Energy System – Not a Sprint, but a Marathon!

30 May 2013



Global Challenges in Energy Policy



Figure 2.8 • World primary energy demand by region in the New Policies Scenario

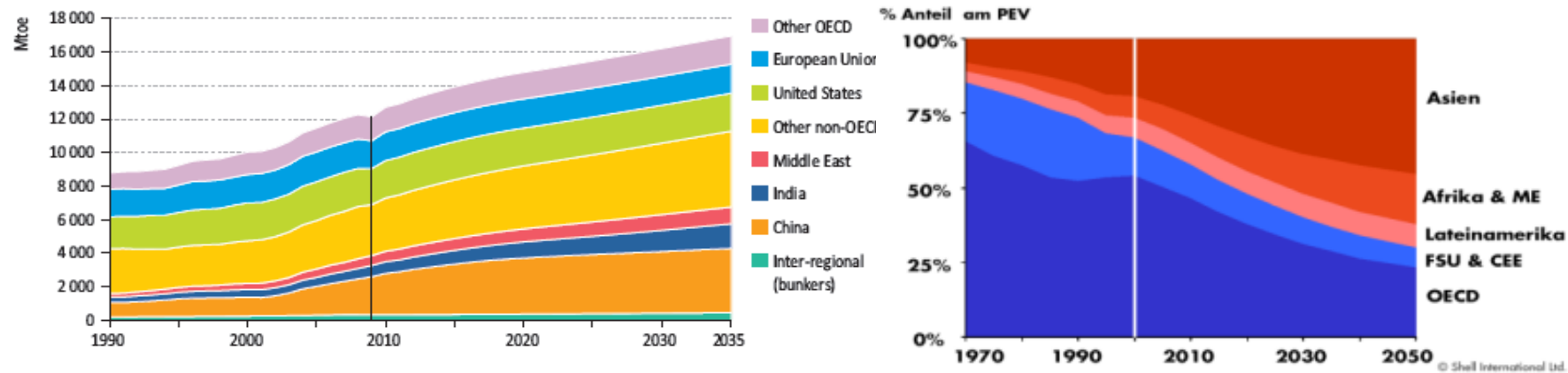
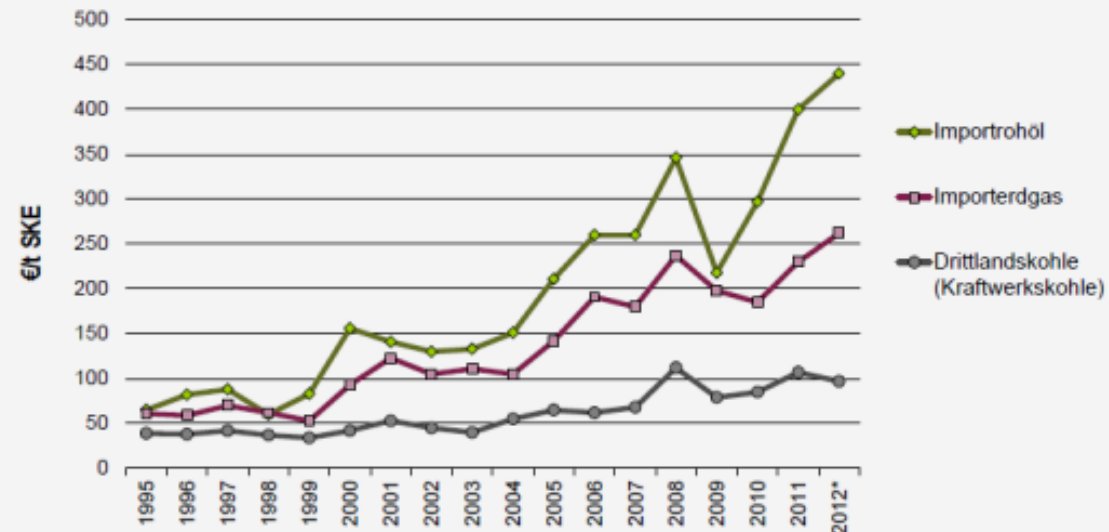
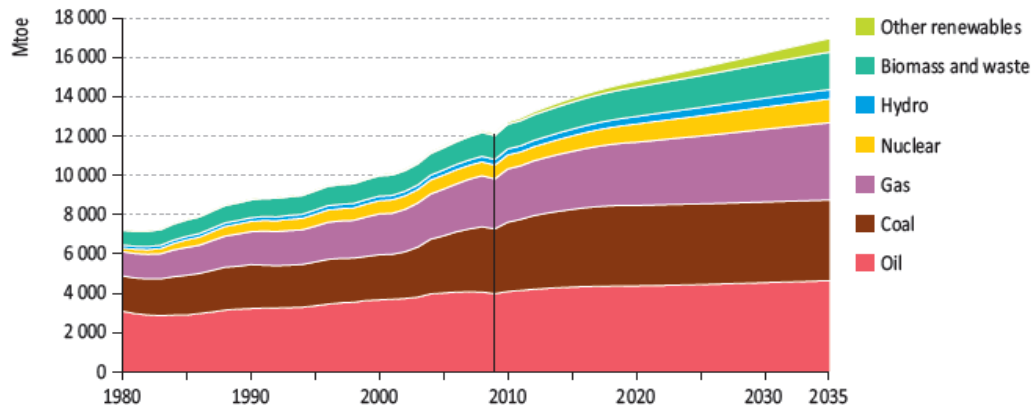
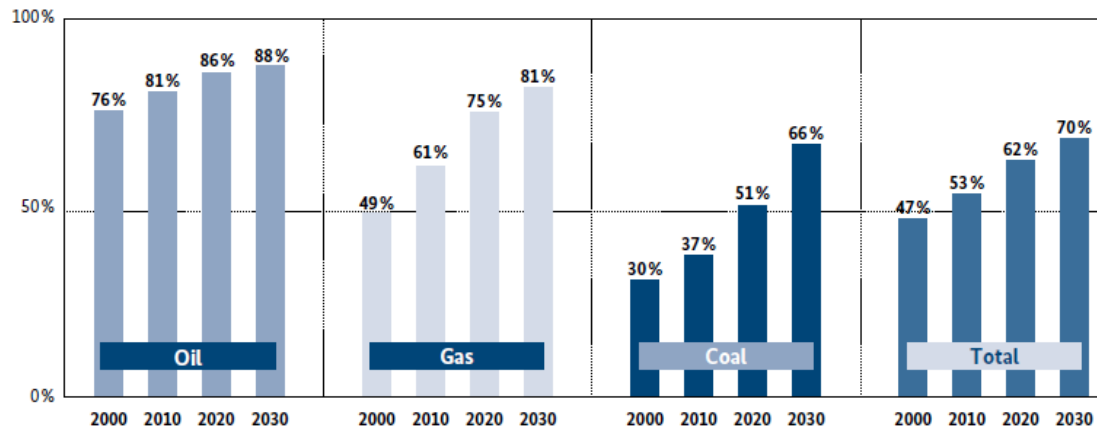


Figure 2.6 • World primary energy demand by fuel in the New Policies Scenario

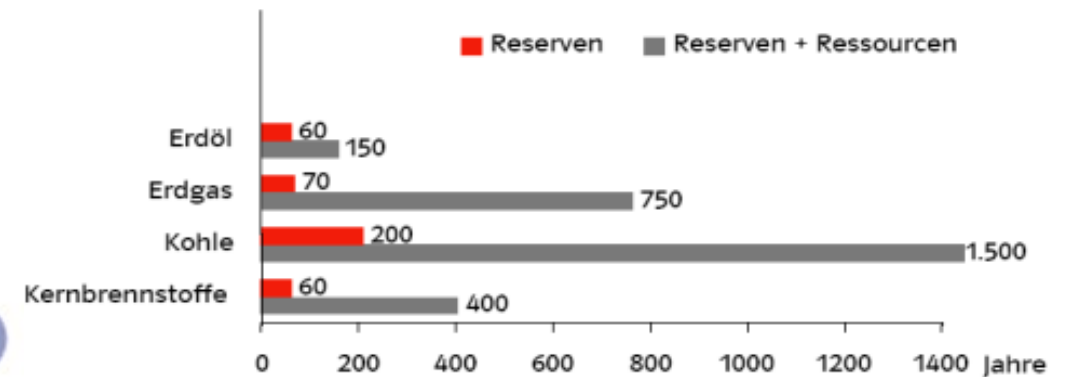
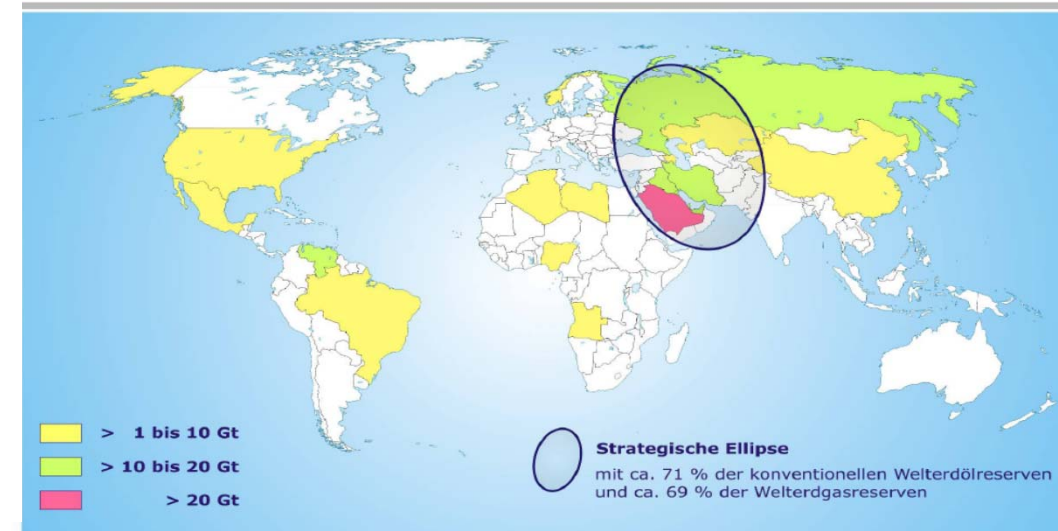


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Figure 1: EU dependence on imports will increase significantly for all the relevant energy sources
Share of imports in overall energy consumption

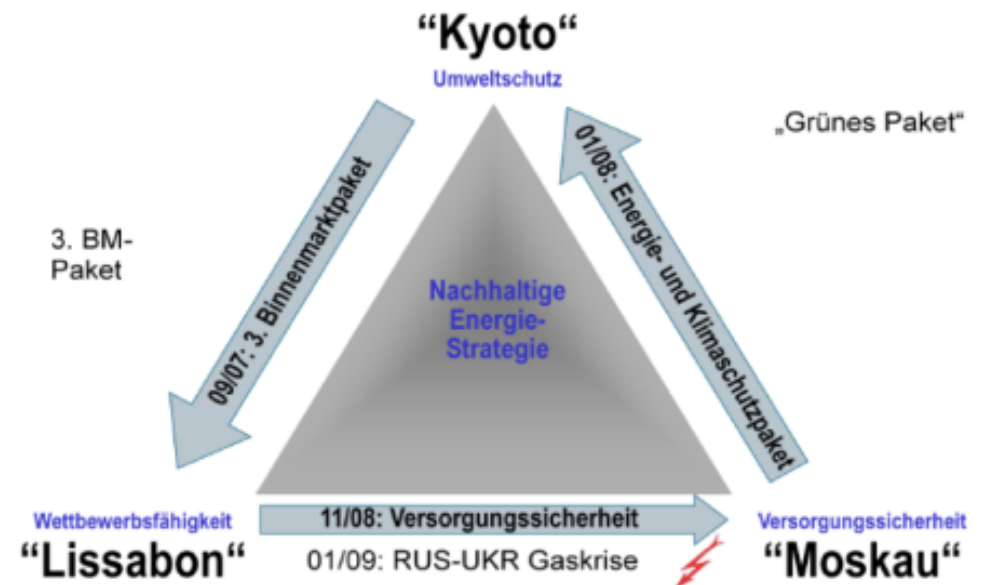
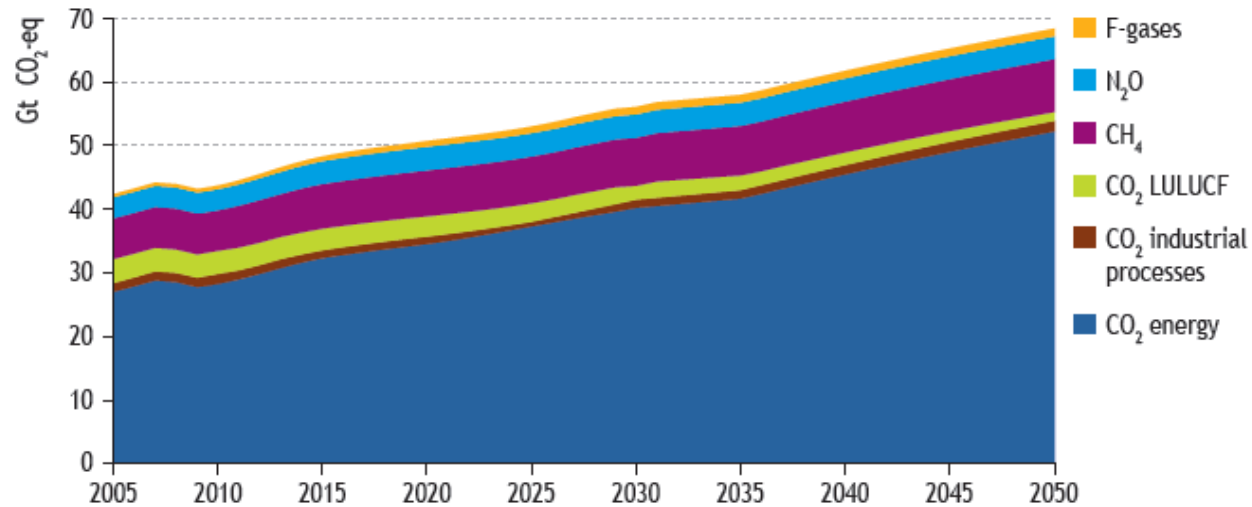


Source: European Commission



Global Challenges in Energy Policy

Worldwide Development of greenhouse gas emissions till 2050



The Energy Concept...

... meets the global challenges in energy policy.

...is the most ambitious strategy for the transformation and decarbonization of the energy system.



Targets of the Energy Concept

	2020	2030	2040	2050	Accchieved so far
Reduction of Primary Energy Consumption (compared to 2008)	- 20 %			- 50 %	- 3,3%
Reduction of final energy consumption in transport (compared to 1990)	- 10 %			- 40%	+ 7,5 %
Reduction of gross electricity consumption (compared to 2008)	- 10 %			- 25 %	- 0,7 %
CO2- Reduction (compared to 1990)	- 40 %	- 55 %	- 70 %	- 80 - 95 %	- 23 %
Share of Renewables in gross final energy consumption	18 %	30 %	45 %	60 %	12,2 %
Share of Renewables in gross electricity consumption	35 %	50 %	65 %	80 %	23,1 %

Further Objectives: Improvement of the energy productivity by 2,1% per annum (since 1990: +38 %; currently 0,9% p.a.) and the doubling of the rate of modernisation to 2% p.a.

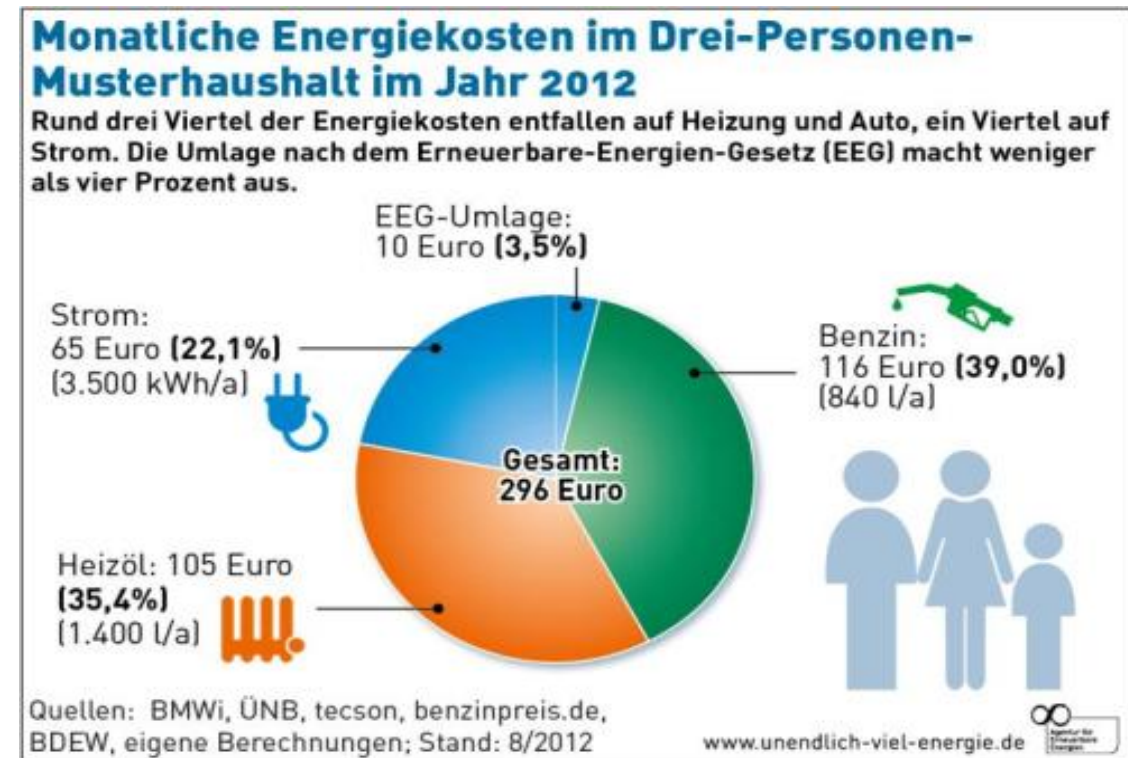
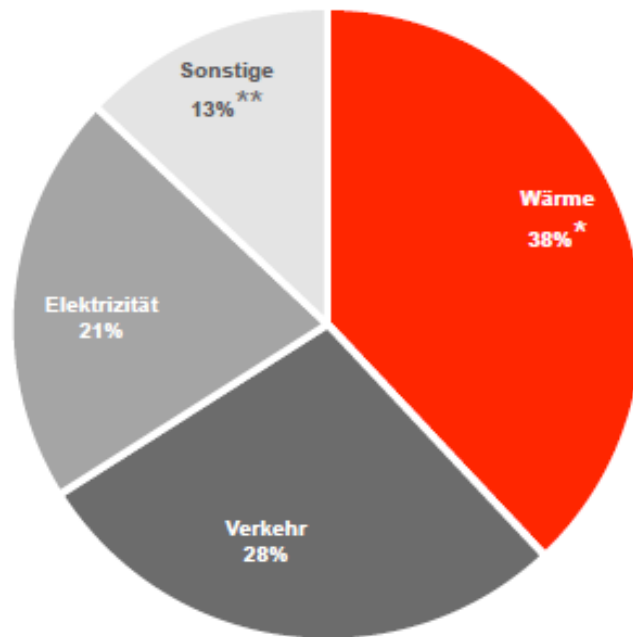


Dr. Joachim Pfeiffer
Mitglied des Deutschen Bundestages



The energy concept addresses all sectors: Electricity, buildings and transport

Energy consumption in the different sectors in per cent



* Gebäudebeheizung, Warmwasser (ohne Prozesswärme)
** insbes. industrielle Prozesse, mechanische Energie etc.

Quelle: Viessmann 2013.

Vital Challenges for a succesful transformation

- (1) Increase energy efficiency in all sectors
- (2) Developing energy infrastructure – Electricity transmission grid and storage facilities
- (3) Supply security and grid stability
- (4) Preservation of Germany's industrial competitiveness
- (5) Facilitate the market integration of renewable energy sources
- (6) Monitoring of trends in energy prices
- (7) Coordination between the federal government and the Laender
- (8) Further integration of the European Internal Energy Market



Vital Challenges for a succesful transformation

(1) Increase energy efficiency in all sectors

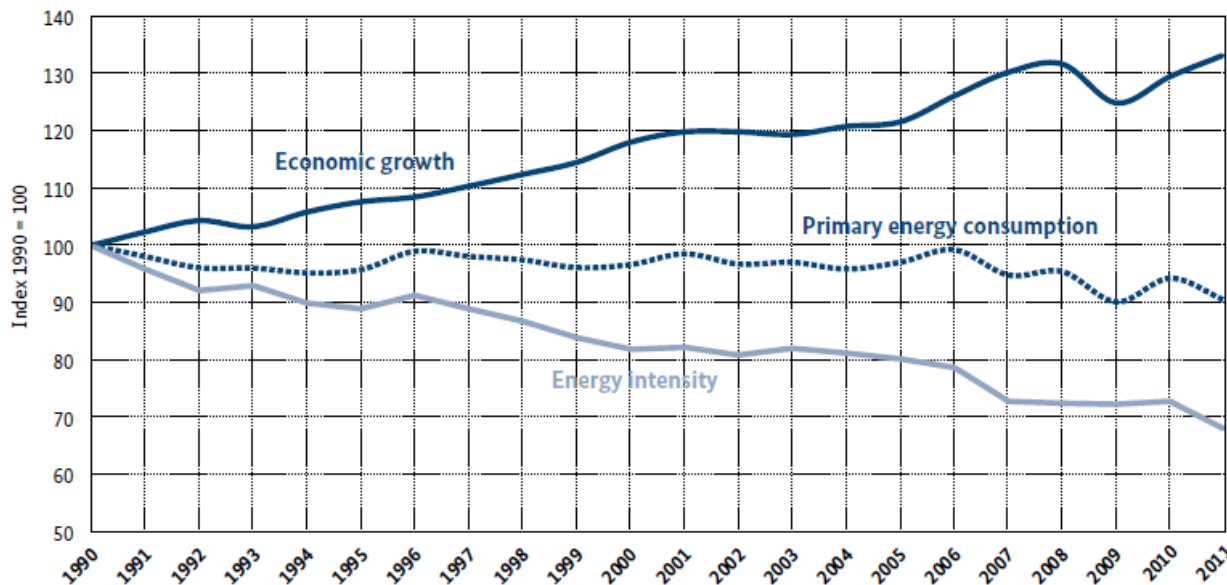


Energy efficiency in the german economy: So far, so good!

- While the GDP increased 30% (since 1990), the primary energy consumption decreased for 6,8% (Temperature-corrected 10%) and the final energy consumption reduced 5%.

Economic growth, but less energy consumption

Figure 2: Decoupling of economic growth and energy consumption



Source: Federal Ministry of Economics and Technology

Since 1990:

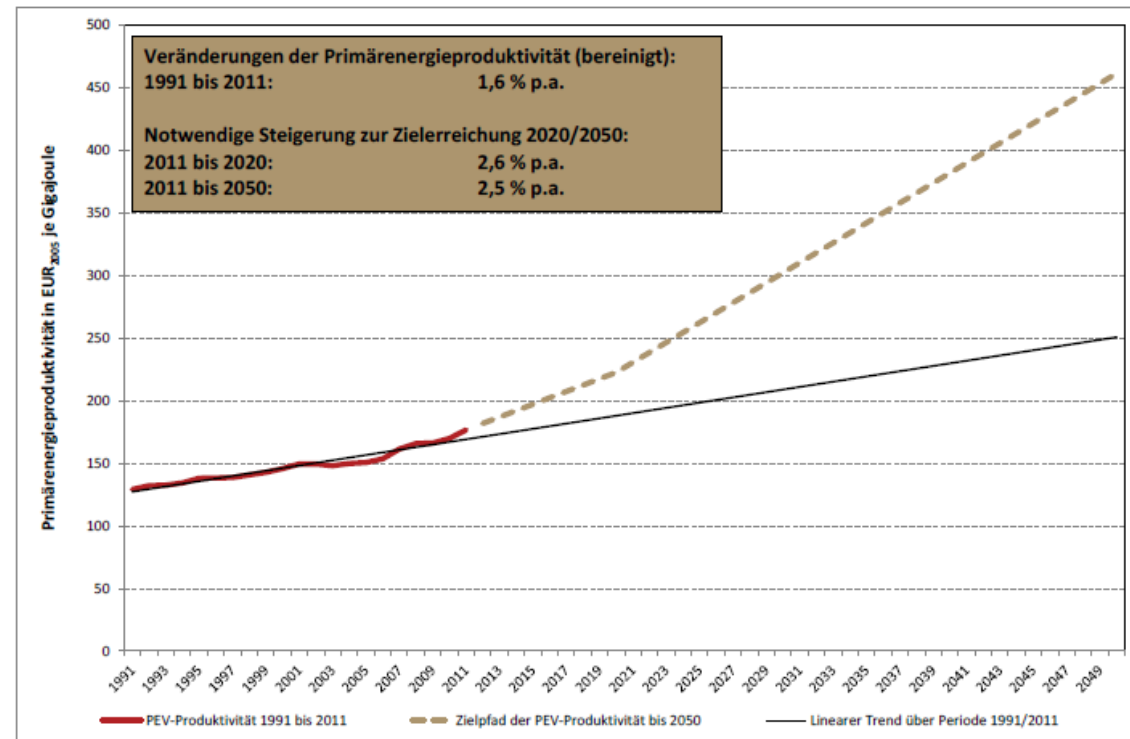
Energy intensity:
Improved 1,7% per annum

Development of final energy consumption:
total: - 5 %
Industry: - 15%
Commercial: - 22%
Private: + 9%

Increase energy efficiency in all sectors

Energy concept – Efficiency targets and Status Quo		
	2020	Status Quo
Reduction of primary energy consumption	-20,0%	-3,5%
Improvement of the Energy productivity (per annum)	2,1%	0,9%
Reduction of heat required	-20,0%	-1,0%
Doubling of the rate of modernisation	2,1%	0,9 - 1,3 %

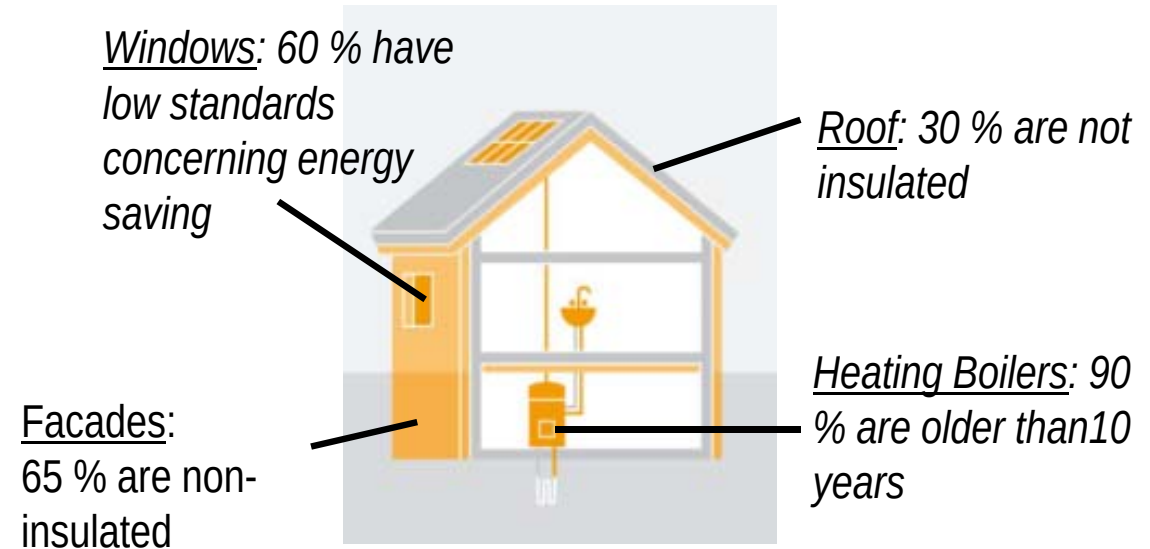
Development of primary energy consumption from 1990 till 2011 and targeted path till 2050



Energy efficiency in the building sector – high potentials

- Nearly 40 per cent of Germany's final energy consumption are consumed in the building sector
- With 19,6 Mio. housing units there is a huge potential for increasing energy efficiency

Non-insulated buildings waste energy



Quelle: Dena 2012

- The strategic approach must be a combination of support and regulation:
 - Regulatory law sets high standards in cases, where it is technological and economical feasible
 - Incentives for the energetic modernisation of buildings are set with support programmes

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Developing the electricity transmission grid

Existing fossil and nuclear power generation are mainly concentrated in the west and the south of Germany (near to the load centres).

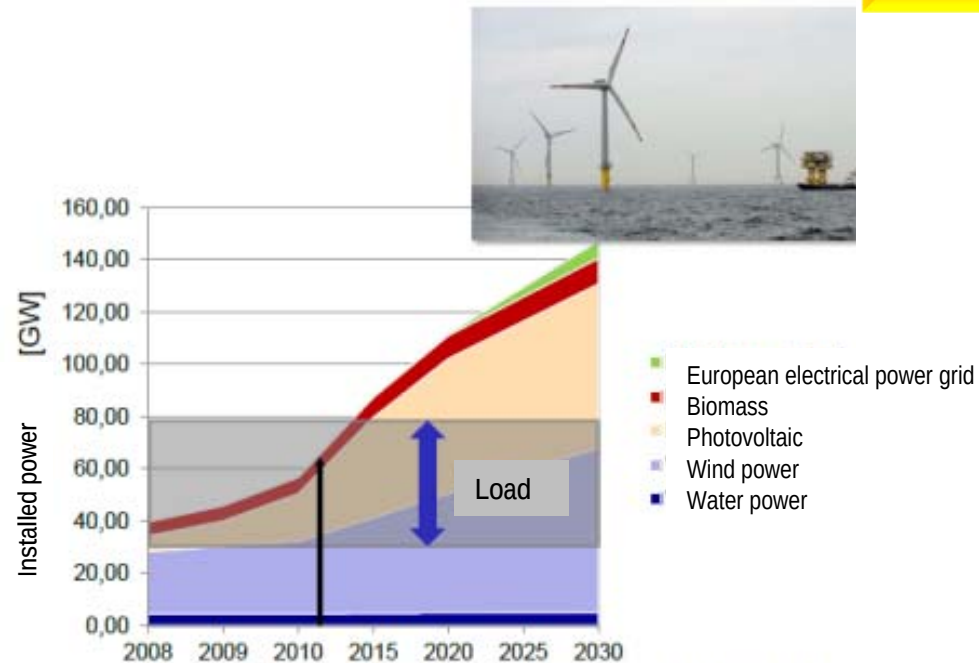
With the immense development of renewable energies in the north the center of power generation relocates in this region.

This trend will increase with the development of the offshore wind parks.

The transport capacity of the existing transmission grids is limited – especially from North to South and from East to West .

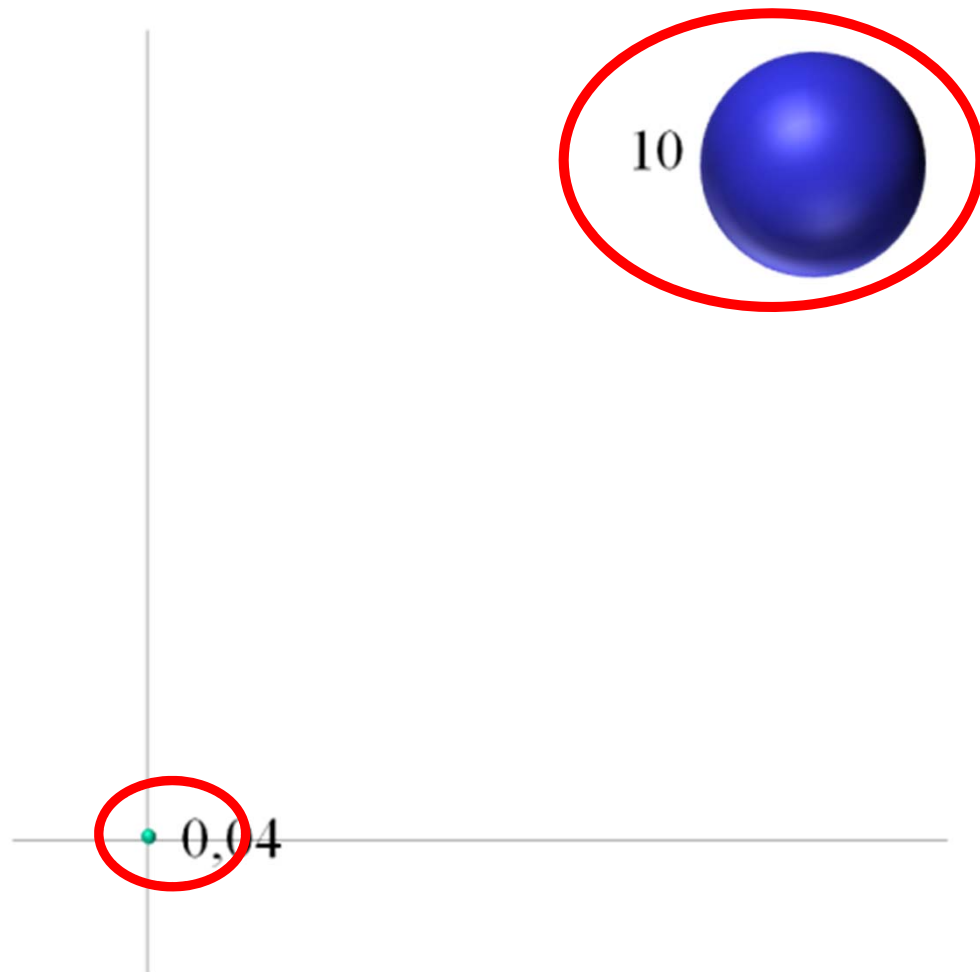


Quelle: Umweltbundesamt (UBA) 2012, Stand 31.12.2011



Quelle: IEH – Universität Stuttgart

Developing storage facilities



● Bestand ● Bedarf



- Status Quo:
- the current storage capacity in Germany ist circa 0,04 TWh
- existing storage facilities cover Germany's demand for electricity for about 30 minutes
- The necessary storage capacity is circa 10 TWh. This is 250 times of today's capacity.

Vital Challenges for a successful transformation

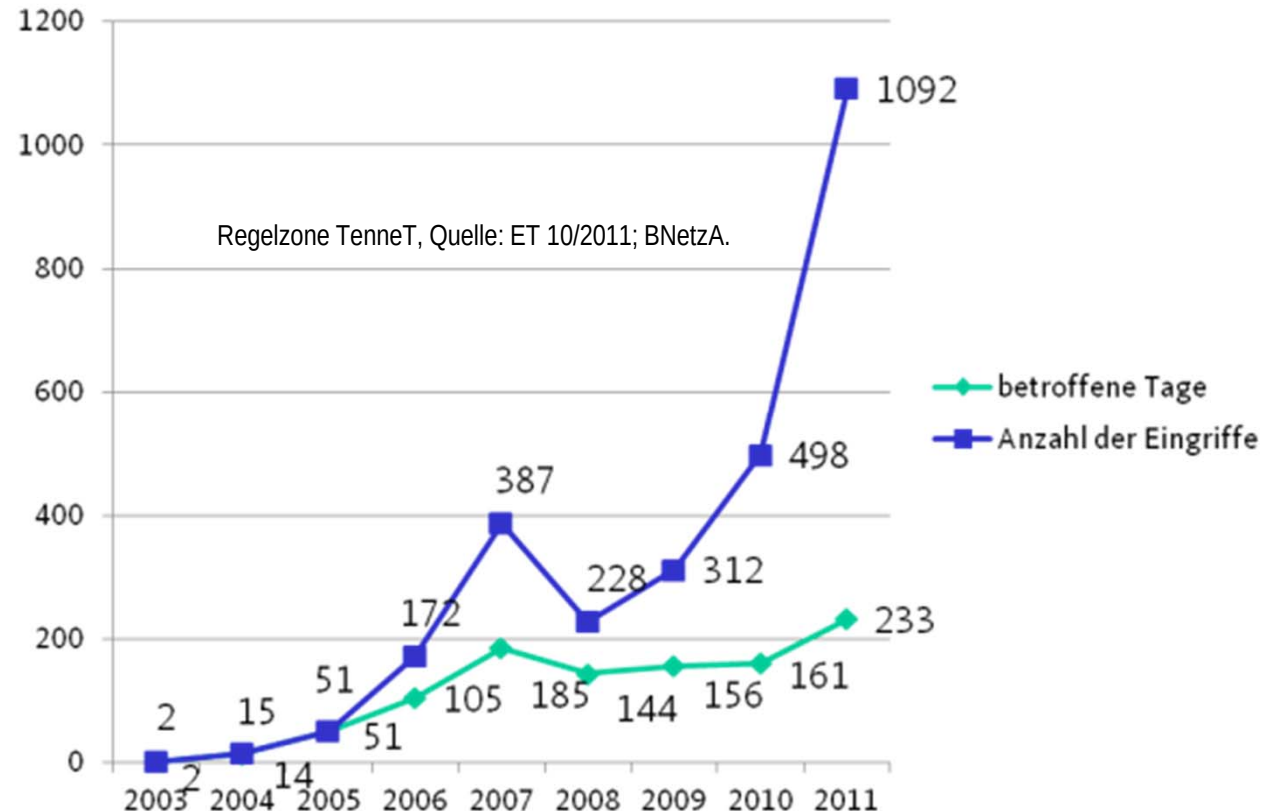
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- (3) Supply security and grid stability



Supply security and grid stability

With a changing pattern of power generation, interference in the grid ist becoming necessary

- Federal Network Agency (BNetzA) in August 2011:
1.009 MW reserve capacity in Germany and 1.075 MW in Austria
- in Dezember 2011 for the first time an austrian reserve power station had to intervene
- Demand Response Management („Verordnung Abschaltbare Lasten“)



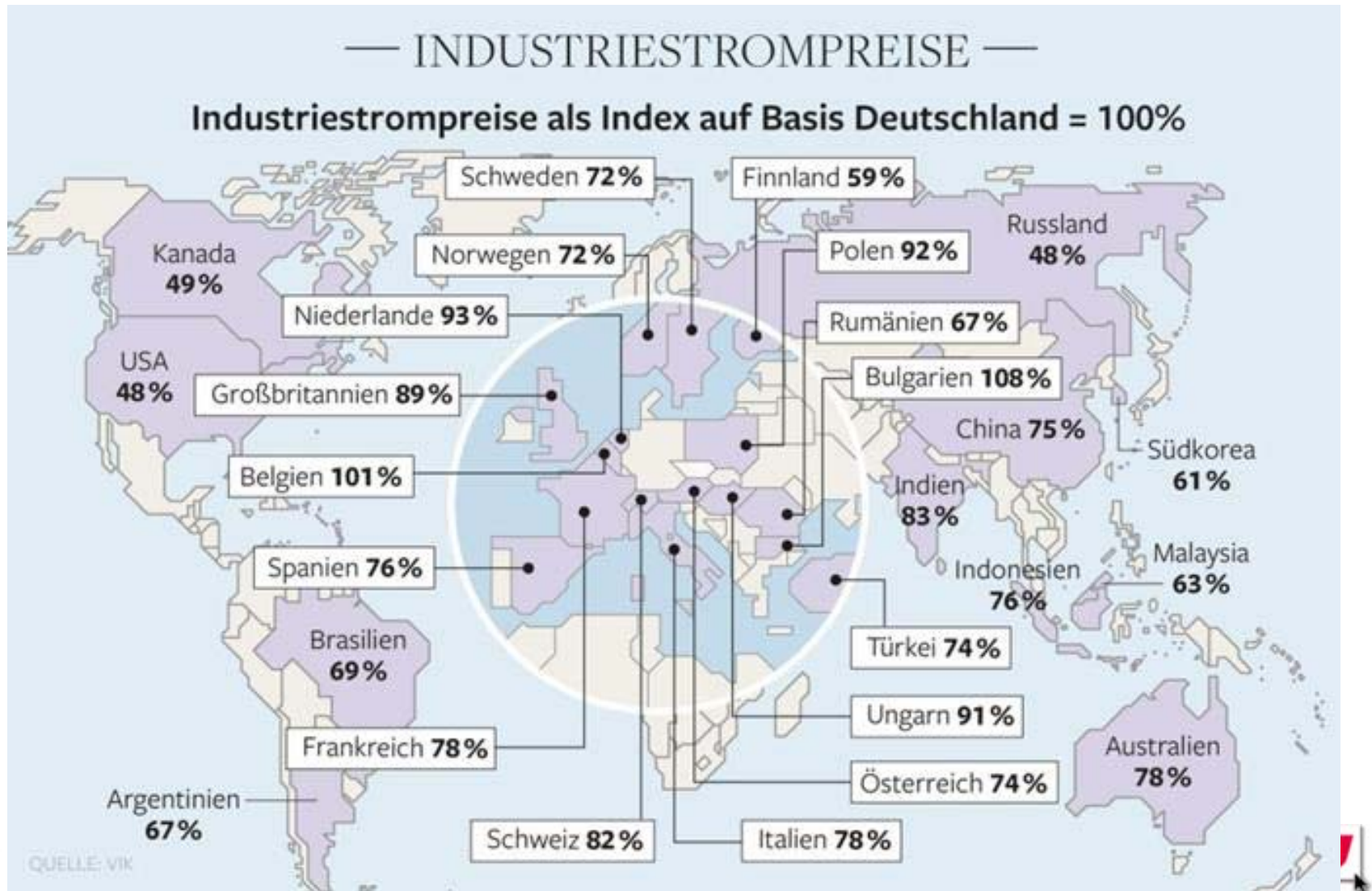
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- (2) Developing energy infrastructure – Electricity transmission grid and storage facilities
- (3) Supply security and grid stability
- (4) Preservation of Germany's industrial competitiveness

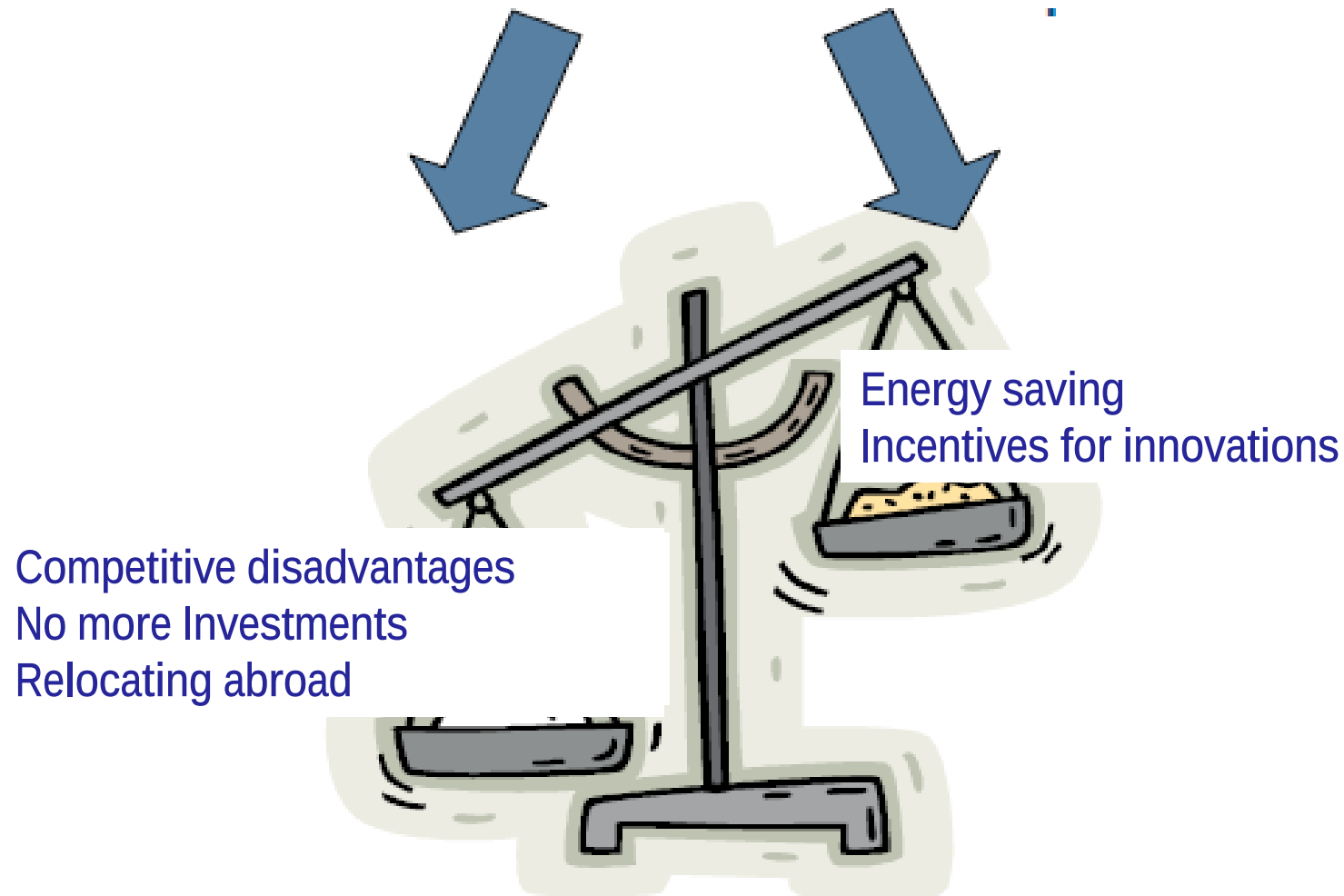


Preservation of Germany's industrial competitiveness

- Compared to the European and the global level, the industrial electricity price is very high in Germany



High energy costs – What are the possible consequences?

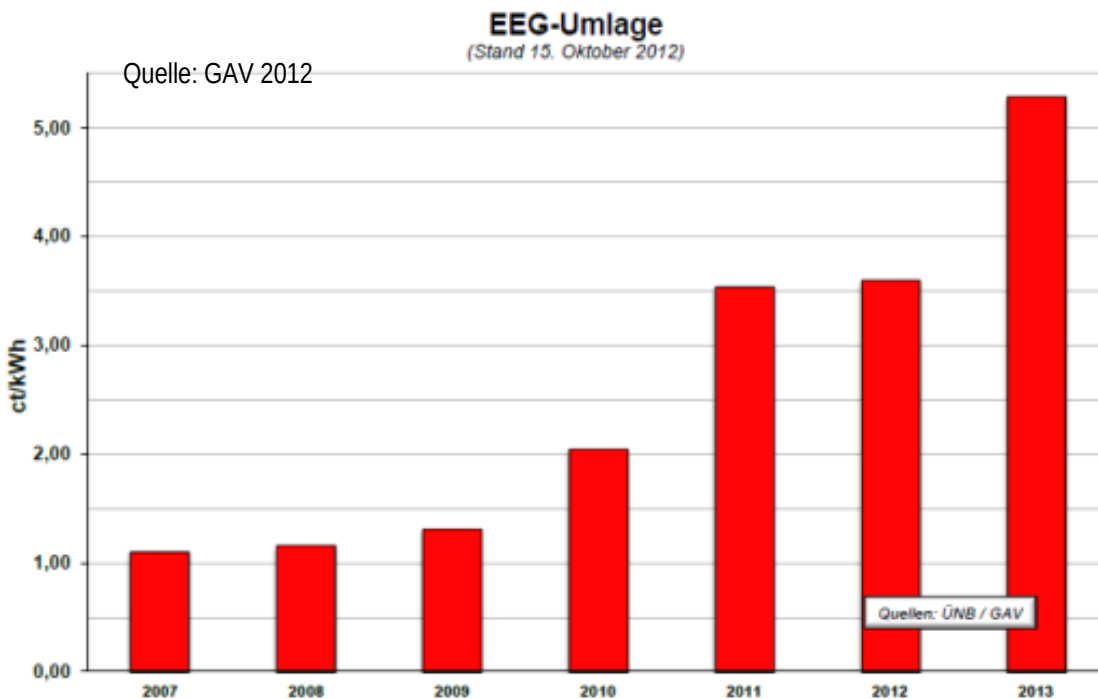


Vital Challenges for a successful transformation

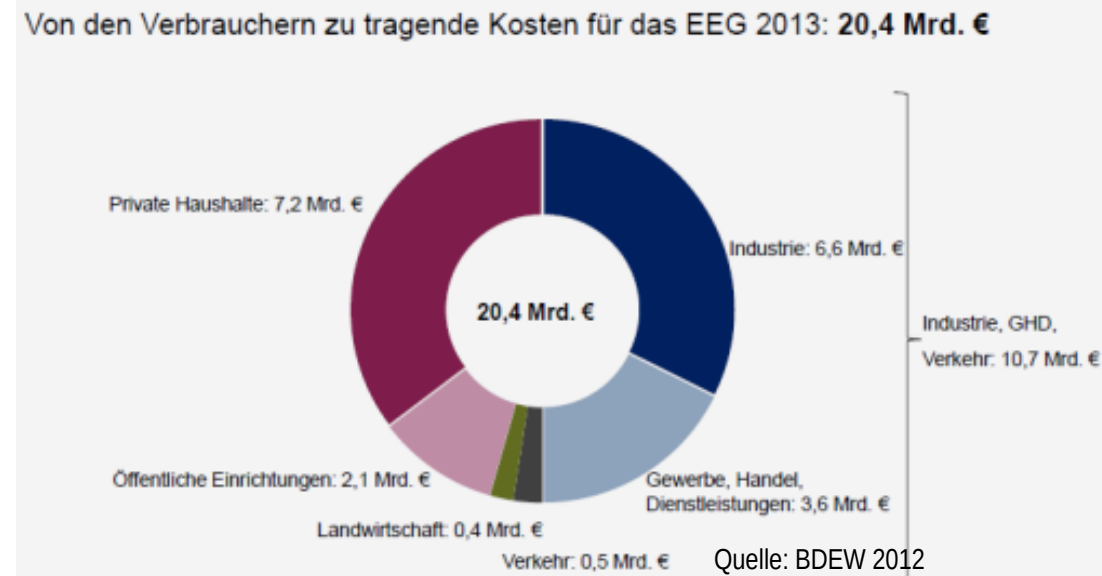
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Facilitate the market integration of renewable energy sources

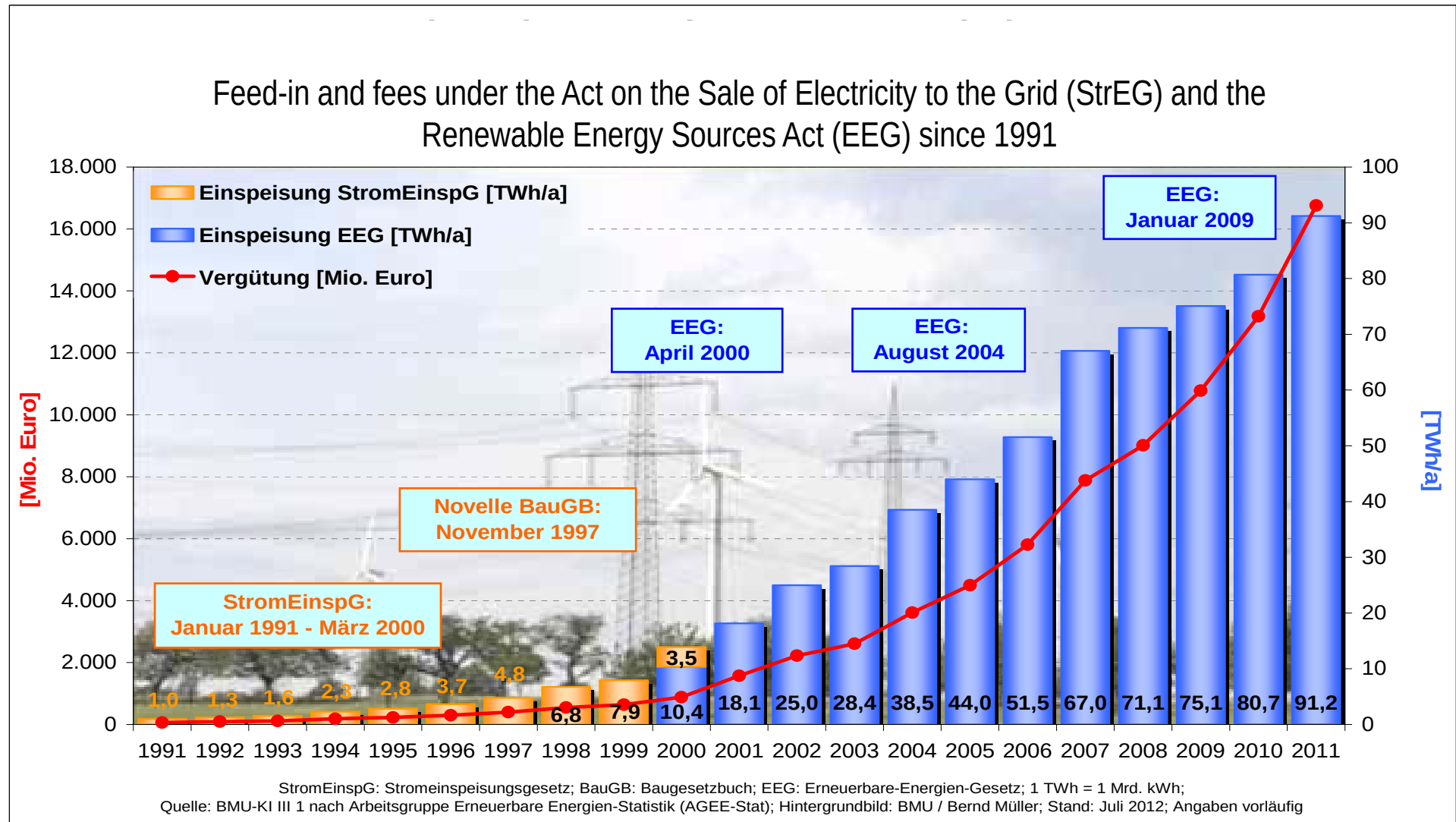


EEG – Distribution of costs in 2013



- 2013: forecasted feed-in-payment of 18,5 billion Euro stand vis-à-vis ca. 2,6 billion Euro revenues from sales.

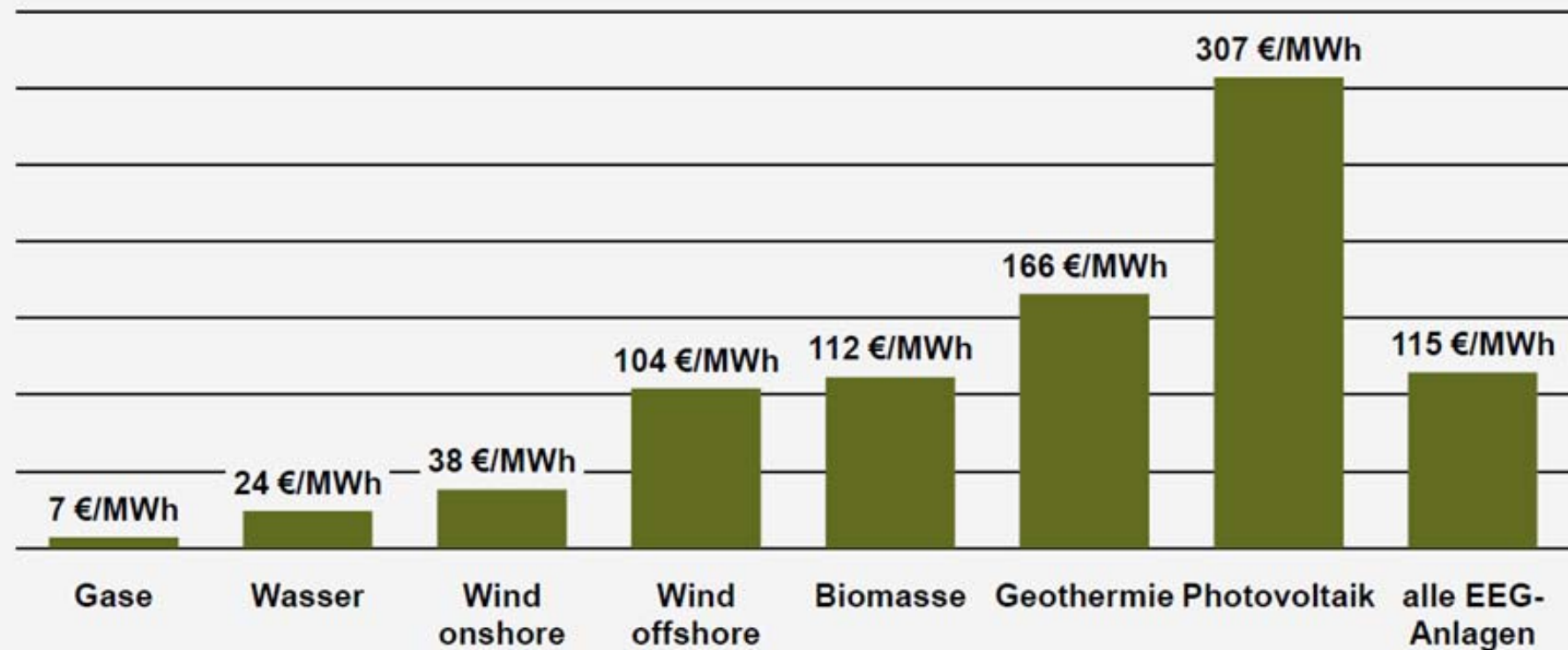
Development of renewable energy sources – Costs



Quelle: BMU Juli 2012.

Promotion of renewables according to energy sources

Costs per MWh for all consumer for the contribution to the Renewable Energy Law in 2012 – Distribution according to energy sources



* EEG-Auszahlungen abzgl. Vermarktungserlöse abzgl. vermiedene Netzentgelte

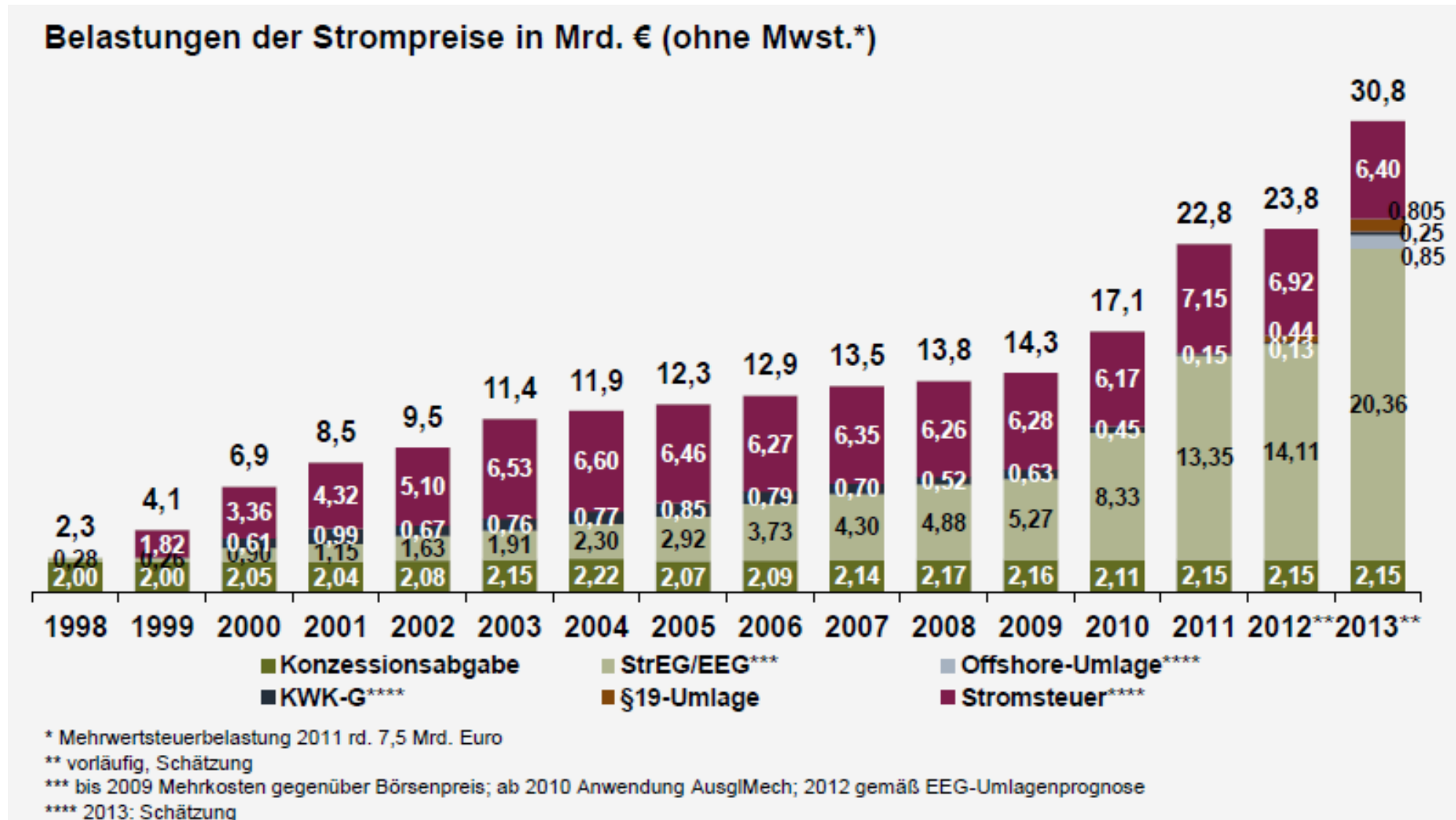
Quelle: BDEW (eigene Berechnungen auf Basis der Prognose zur Berechnung der EEG-Umlage 2012 der Übertragungsnetzbetreiber vom 14.10.2011)

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- (6) Monitoring of trends in energy prices



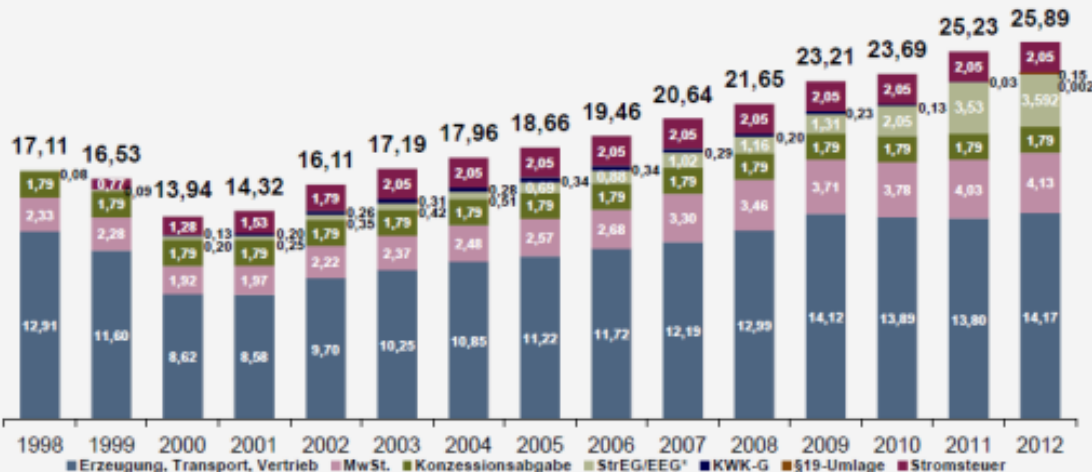
State-induced burdens as an increasing component of the electricity price



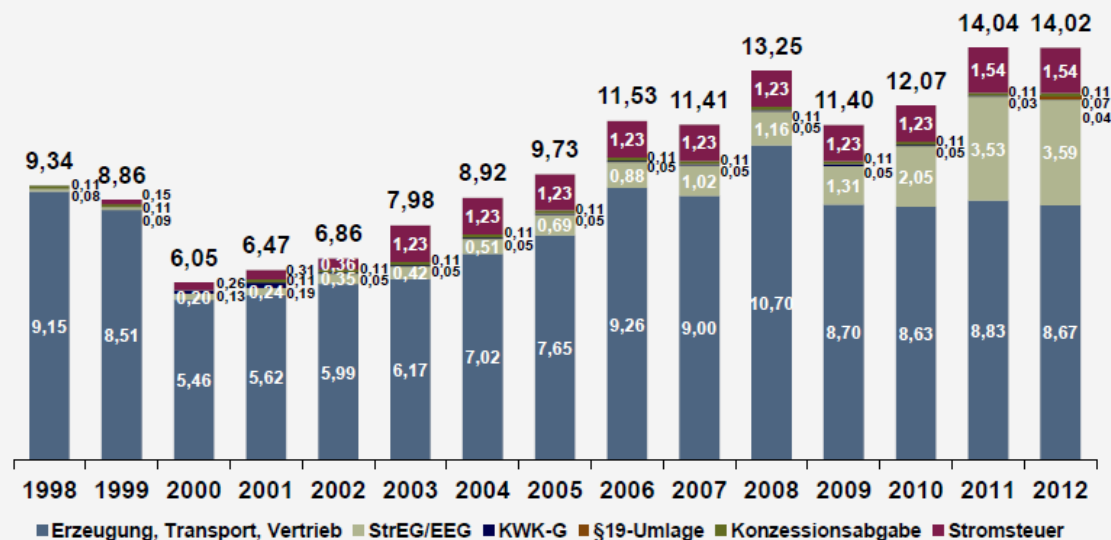
Quelle: BDEW 2012

The electricity price as an alarm signal

Average electricity price for a 3-person-household in ct/kWh
(3.500 kWh/year)

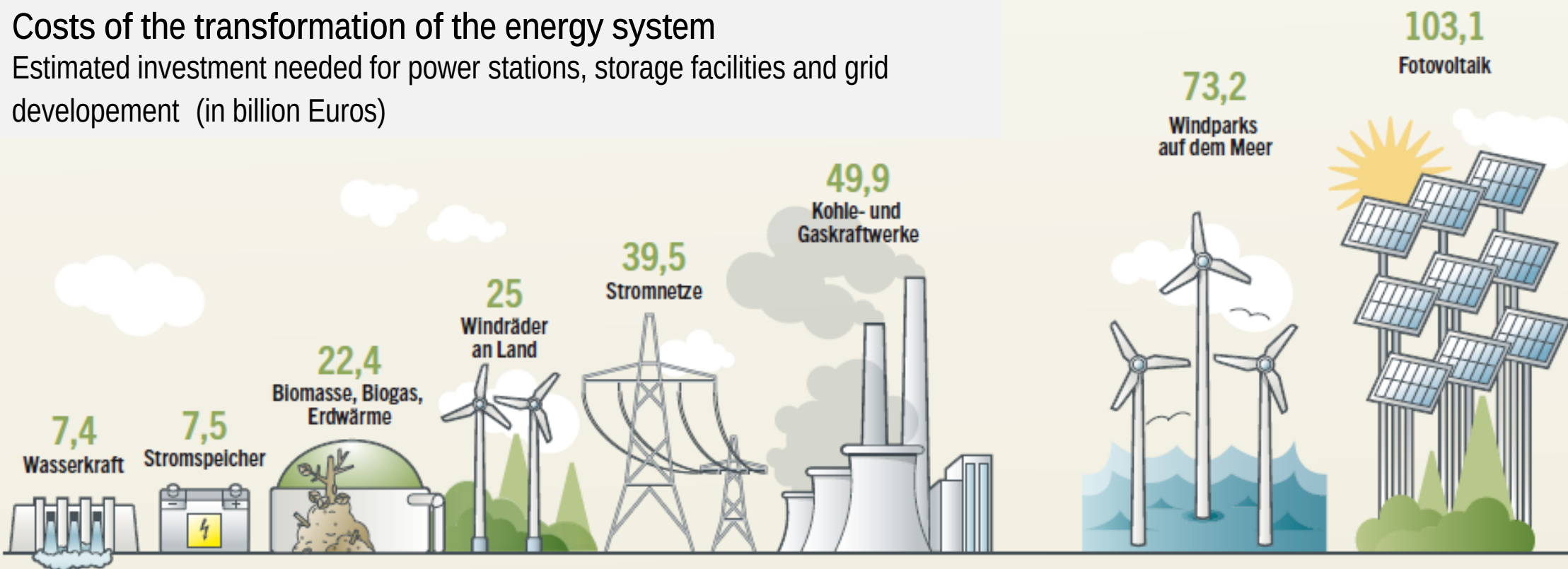


Average electricity price for the Industry in ct/kWh



Costs of the transformation of the energy system

Estimated investment needed for power stations, storage facilities and grid development (in billion Euros)



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Coordination between the federal government and the Laender

Renewable targets of the Laender

alle Angaben in GW	Photovoltaik	Wind onshore	Wind offshore	Sonstige EE	Summe EE
Baden-Württemberg	8,0	4	0	1,8	13,8
Bayern	14,0	4,3	0	4,6	22,9
Berlin	0,2	0,1	0	0,2	0,5
Brandenburg	3,3	7,5	0	0,4	11,2
Bremen	0,0	0,2	0	0,0	0,2
Hamburg	0,0	0,1	0	0,2	0,3
Hessen	3,8	3,3	0	0,3	7,4
Mecklenburg-Vorpommern	0,5	3,5	3,5	0,4	7,9
Niedersachsen	3,7	14,2	12	1,2	31,1
Nordrhein-Westfalen	5,5	10,3	0	0,9	16,7
Rheinland-Pfalz	2,7	4,5	0	0,3	7,5
Saarland	0,7	0,5	0	0,0	1,2
Sachsen	1,0	1,6	0	0,3	2,9
Sachsen-Anhalt	1,5	6,0	0	0,3	7,8
Schleswig-Holstein	2,0	13	3	0,4	18,4
Thüringen	1,7	5,4	0	0,4	7,5
Deutschland gesamt	48,6	78,5	18,5	11,7	157,3

Quelle: Dena 2012

➤ 16 „little energy“ concepts do not work out: This is inefficient and bears high costs

➤ The renewable energy targets of the Laender exceed the ambitious objectives of the federal government 60 per cent!

➤ Coordination is necessary: pull together!

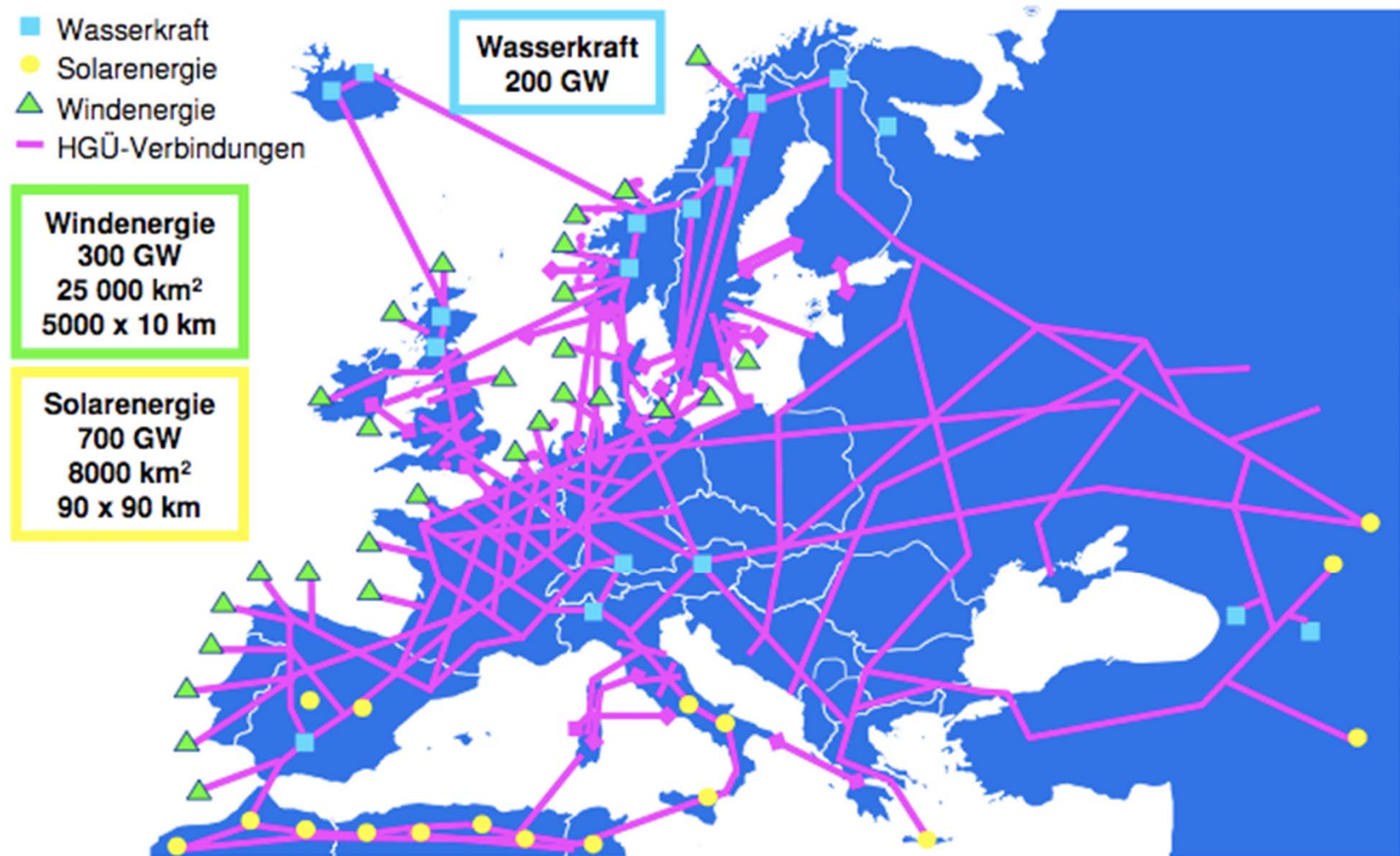


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European Perspective – Forecast für Europa 20xx



Résumé

- The transformation of the energy system has to be market-driven to become a successful project.
- A secure, clean and affordable energy supply is crucial for the future development and performance of Germany and the European Union.
- Energy policy must – at least – have an European focus.
- Therefore, it is mandatory...
 - ...to complete the integration of energy markets to an European Internal Energy Market
 - ...to develop a consistent external energy policy on EU-level
- Vital challenges and chances are:
 - the further improvement of energy efficiency,
 - the development of energy infrastructure and,
 - a coordinated and economic feasible development of renewable energy sources on the European level.
- The further integration of European energy policy is crucial for the future success of Europe.

Thank you for your attention!



30 May 2013