

German Energiewende

A steep fall: from champion to “fossil of the day”

Swedish Gas Market Council

Gothenburg, 7 March 2017

Dr. Wolfgang Peters, MBA

Fmr. Chairman of the Board, CEO, RWE Supply & Trading CZ, a.s.

Managing Director, The Gas Value Chain Company GmbH

The Gas Value Chain Company GmbH



Agenda

- ▶ **Two amazingly divergent views**
- ▶ **Achievement & failure: RES instead of CO₂ reduction**
- ▶ **The “cost of an ice cone” ...fallacy of the EEG**
- ▶ **A life times’ savings wasted: citizens footing the bill**
- ▶ **The fallen angles: collateral damage**
- ▶ **Further collateral damage**
- ▶ **Removing the myth: two white knight interventions**
- ▶ **Hope for German sensibility point forward?**
- ▶ **Sector convergence and “all-out” electrification**
- ▶ **The “low-hanging fruit”: can natural gas save the day?**
- ▶ **Outlook**

Two amazingly divergent views

- ▶ **Fatih Birol, Berlin Nov. 2016:**
“Germany ... a source of inspiration”



Two amazingly divergent views

**COP22 Marrakesh November 2016:
Germany declared “Fossil of the Day”**



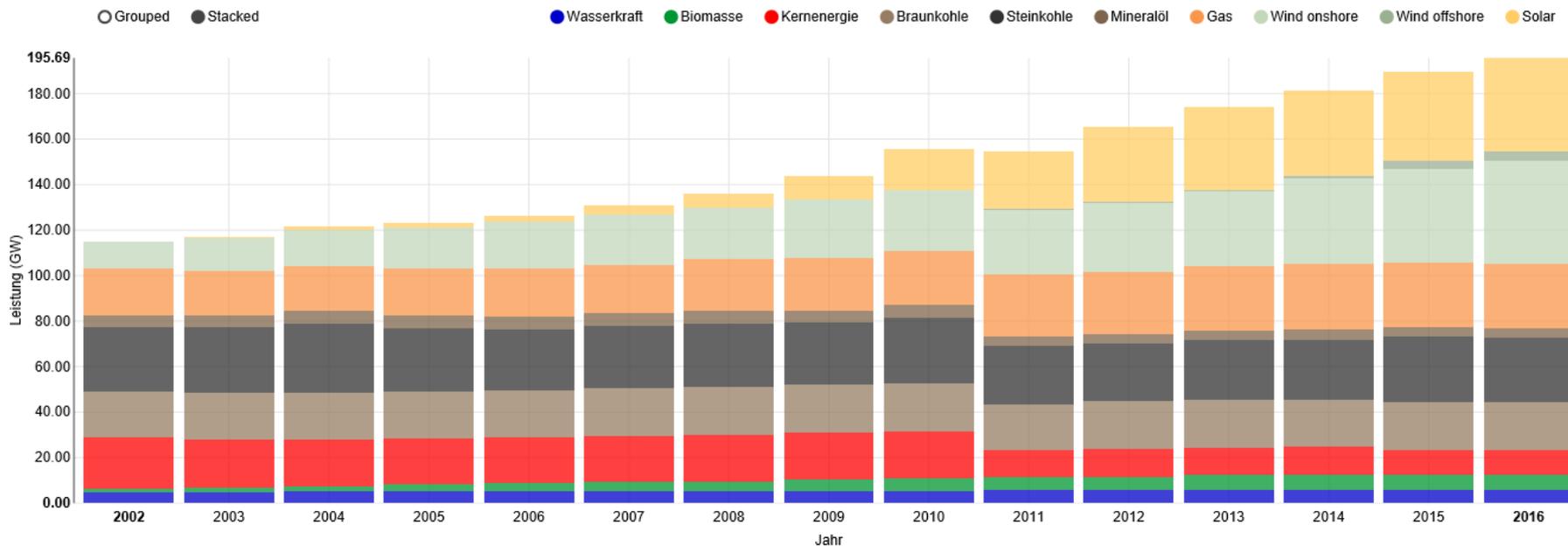
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Achievement & failure: RES instead of CO2 reduction

Development German generation capacity

Since inception “EEG”*) 2000: continuous rise of RES



Datenquelle: AGEE, BMWi, Bundesnetzagentur
Update: 02 Feb 2017 23:13

Source: BNetzA

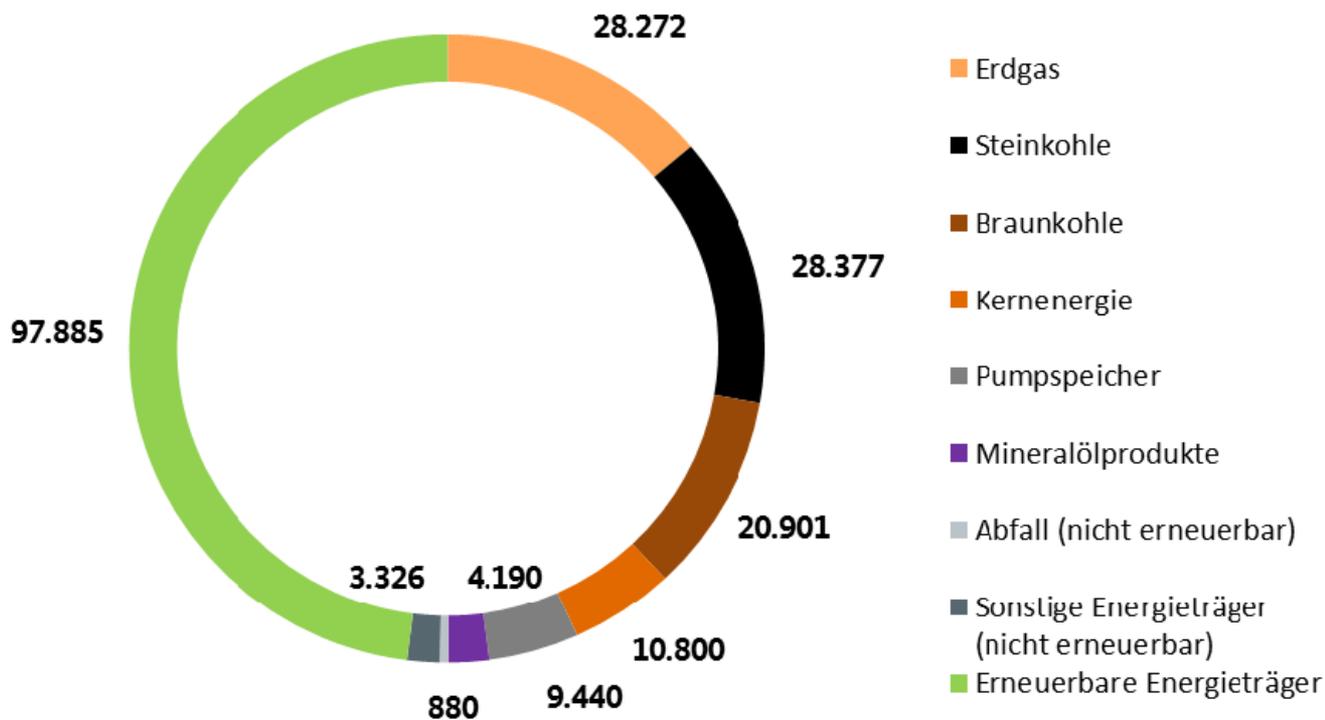
*) EEG = “Erneuerbare Einspeisegesetz” = RES Feed-in Law”

Achievement & failure: RES instead of CO2 reduction

German generation capacity 2016

Conventional: ~106 GW; RES ~98 GW (~200%)

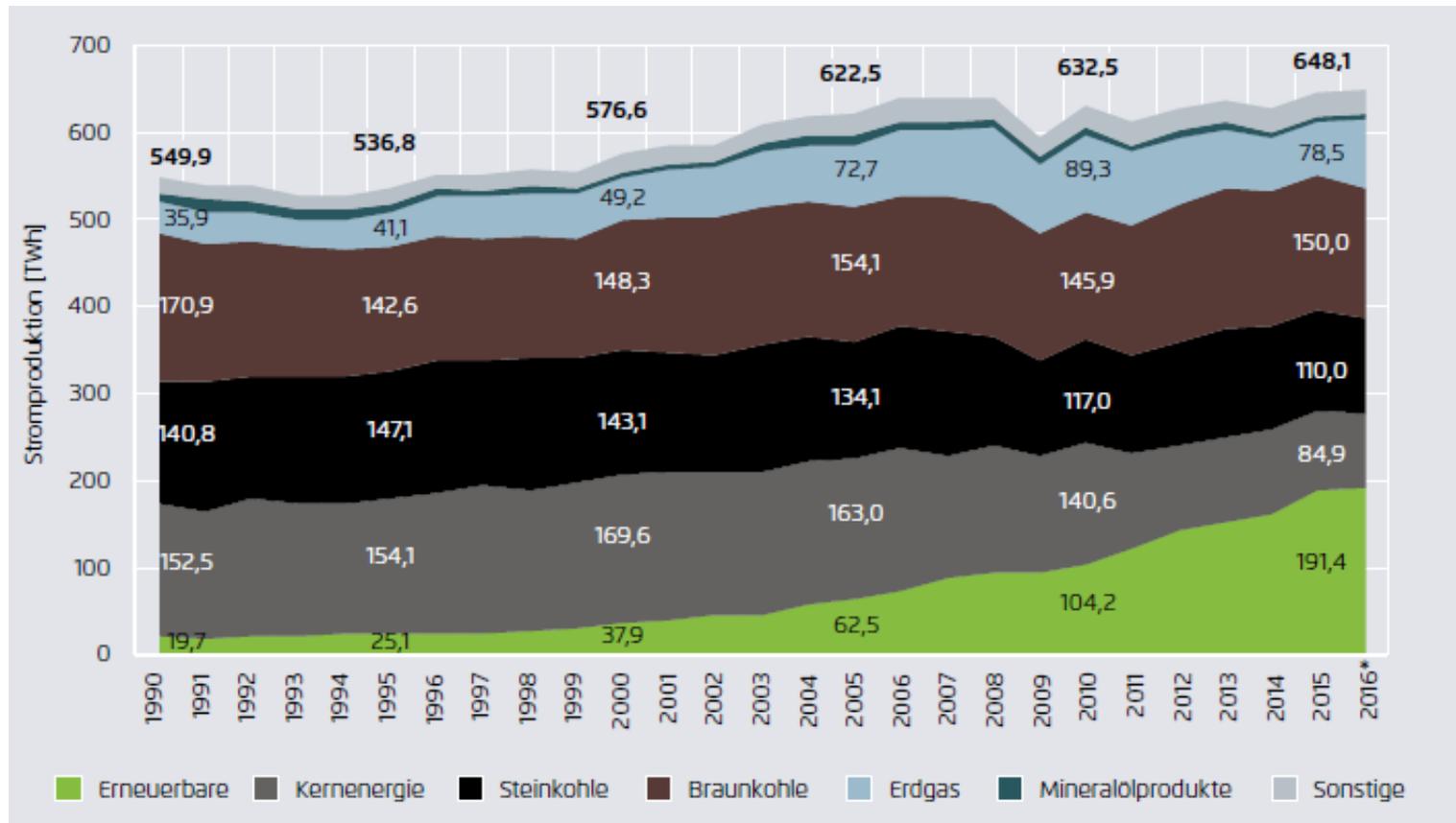
Aktuell installierte elektrische Erzeugungsleistung
in MW



Source: BNetzA

Achievement & failure: RES instead of CO2 reduction

Development German power generation 1990 – 2016 Steep increase RES, albeit growth slowing

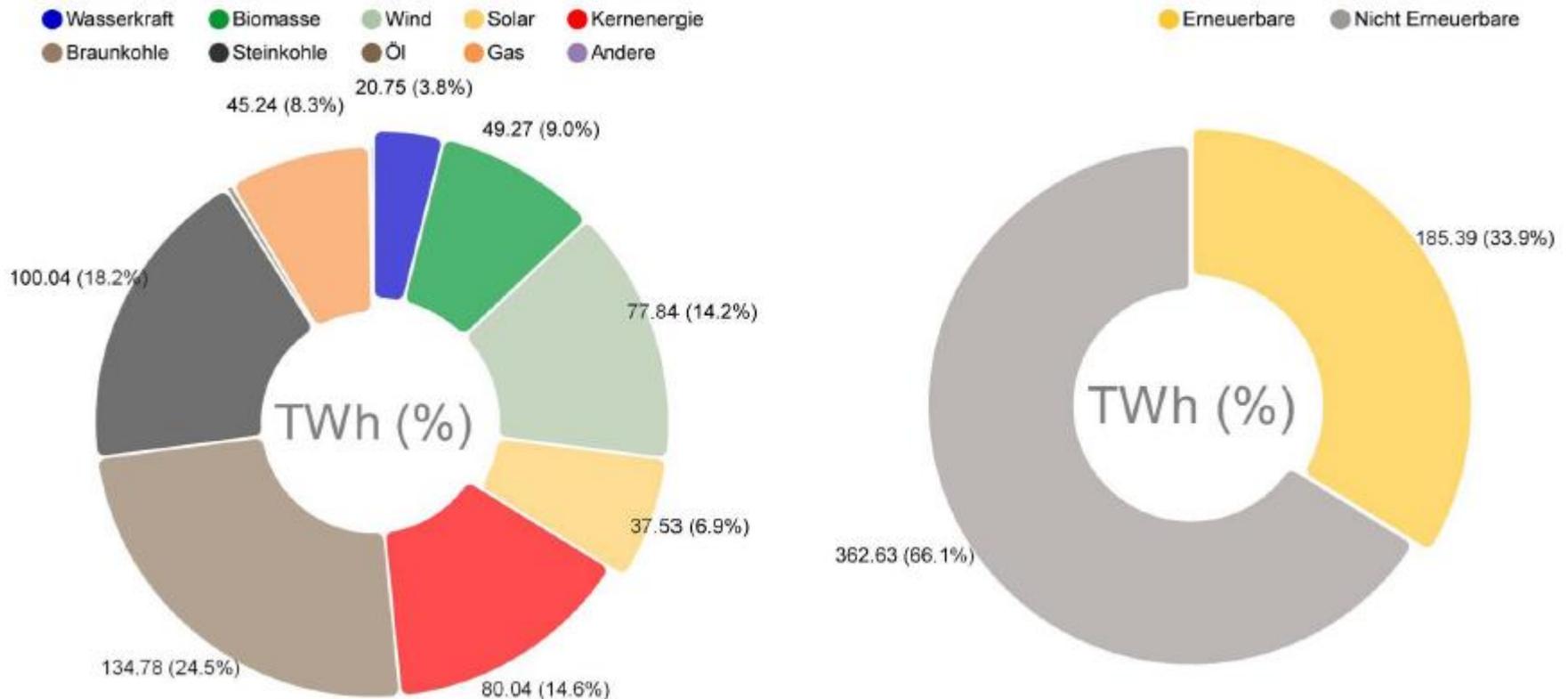


Source: AG Energiebilanzen

Achievement & failure: RES instead of CO2 reduction

Net German power generation 2016

Total: 648.1 TWh; RES: 185.39 TWh (33.9%)



Source: Fraunhofer

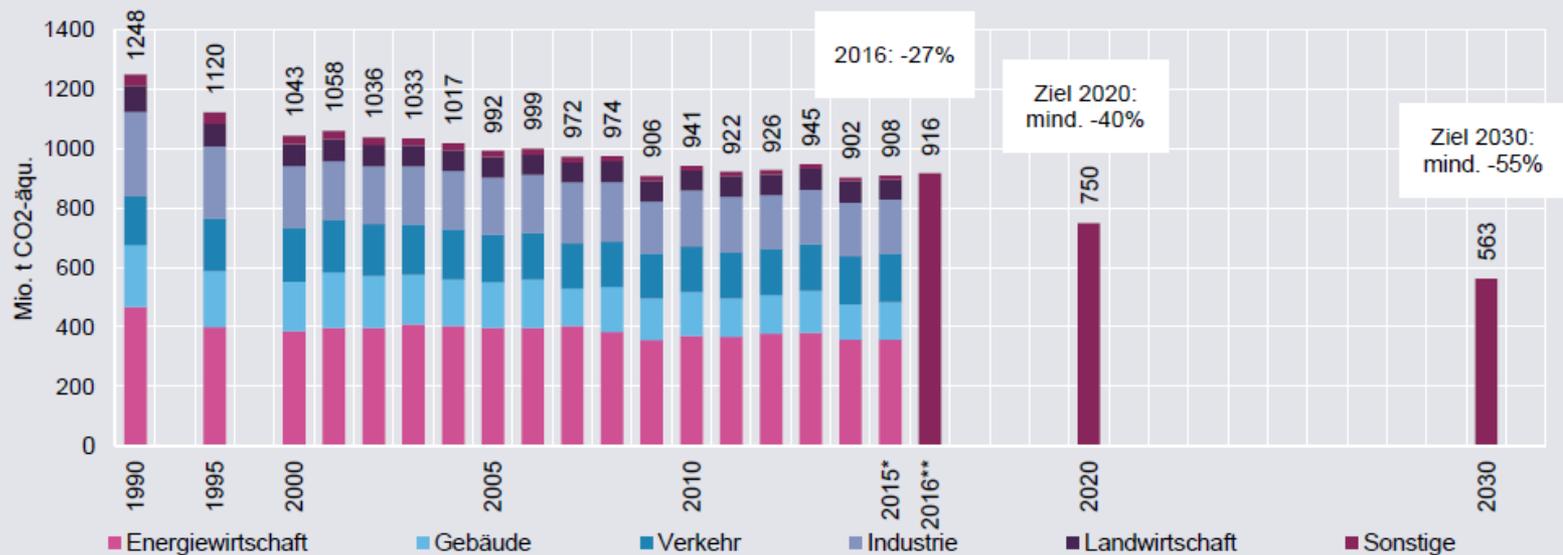
Achievement & failure: RES instead of CO2 reduction

Marrakesh 2016: „Fossil of the day“: NO climate contribution

2016: +8 Mio. t CO2-equ. increase

2020 target will be missed: 41 mio. t CO2-equ./year impossible

Treibhausgasemissionen nach Sektor 1990-2016 sowie Reduktionsziele für 2020 und 2030



UBA 2016, eigene Schätzungen

Source: Agora Energiewende 2017

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The “cost of an ice cone”... fallacy of the EEG

EEG 2000: Push RES by “must-run” priority & 20 year guaranteed (above market) feed-in tariffs

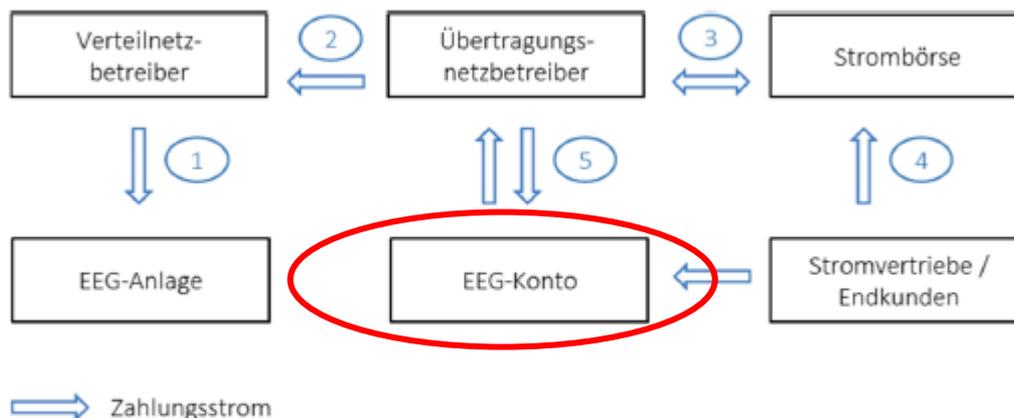
Cash flow: DSO/TSO pay above market feed-in tariff; sell at a loss at the exchange & charge losses to “EEG account”

=> allocated to end user electricity bills

€ 1.00



ABBILDUNG 5: FÖRDERMECHANISMUS BEI DER EINSPEISERVERGÜTUNG



Quelle: Graeber, 2014, 21.

Source: DICE, INSM

The “cost of an ice cone”... fallacy of the EEG

Centrally planned economy style approach; no incentive for efficiency/innovation

P&L state: balance zero

P&L citizen: € 1.00 ?

ABBILDUNG 4: EEG-KONTO – KOSTEN UND ERLÖSE

EEG-Konto	
Ausgaben	Einnahmen
<ul style="list-style-type: none">• Zahlung der EEG-Einspeisevergütung an EEG-Anlagenbetreiber• Zahlung der Markt- und Managementprämie an EEG-Anlagenbetreiber	<ul style="list-style-type: none">• Einnahmen aus der Vermarktung des Stroms aus EEG-Anlagen an der Strombörse durch die Übertragungsnetzbetreiber• <u>Differenz: EEG-Umlage</u>
	Saldo: 0

Quelle: IWR, 2015²⁰.

Source: DICE, INSM



€ 1.00 ?

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A life times' savings wasted: citizens footing the bill

By 2015: € 150 billion; by 2025: € 520 billion

„Ice cone“: € 25,000 per family

Average net wealth of 40% of families: € 25,000

So viel wird das neue Energiezeitalter kosten

■ 27,6 Mrd. €

Sonstiges

■ 12,2 Mrd. €

Forschungsausbau

■ 18,0 Mrd. €

KWK-Gesamtumlage

■ 23,0 Mrd. €

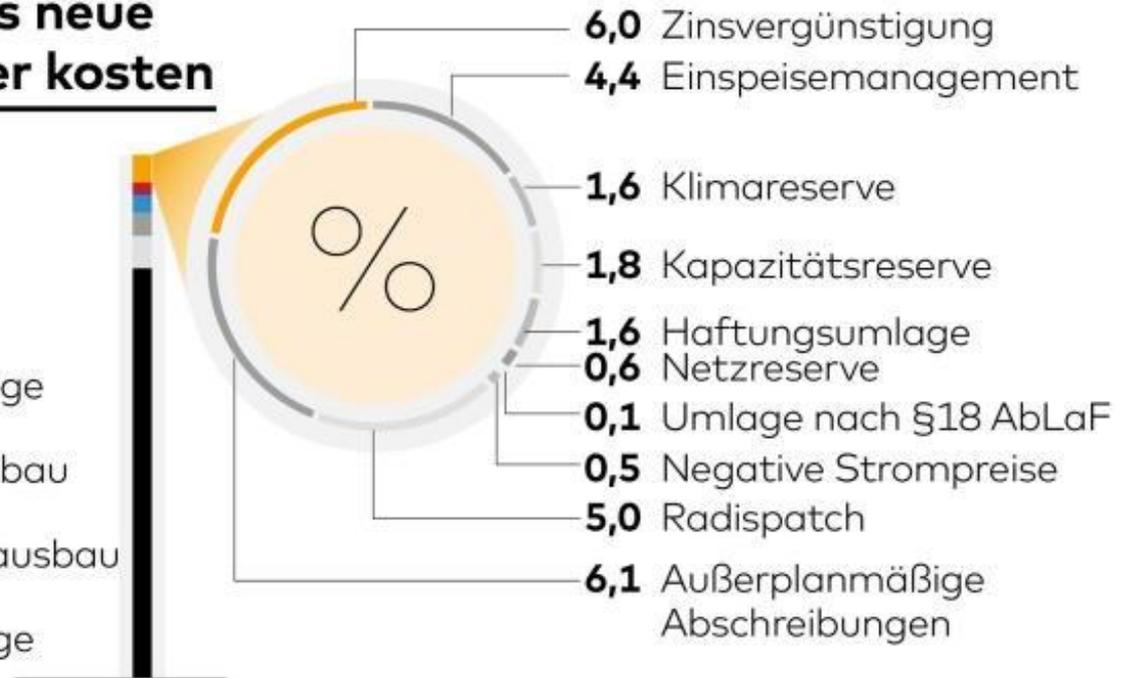
Verteilungsnetzausbau

■ 32,3 Mrd. €

Übertragungsnetzausbau

■ 407,5 Mrd. €

EEG-Gesamtumlage



WELT

Quelle: DICE Consult GmbH

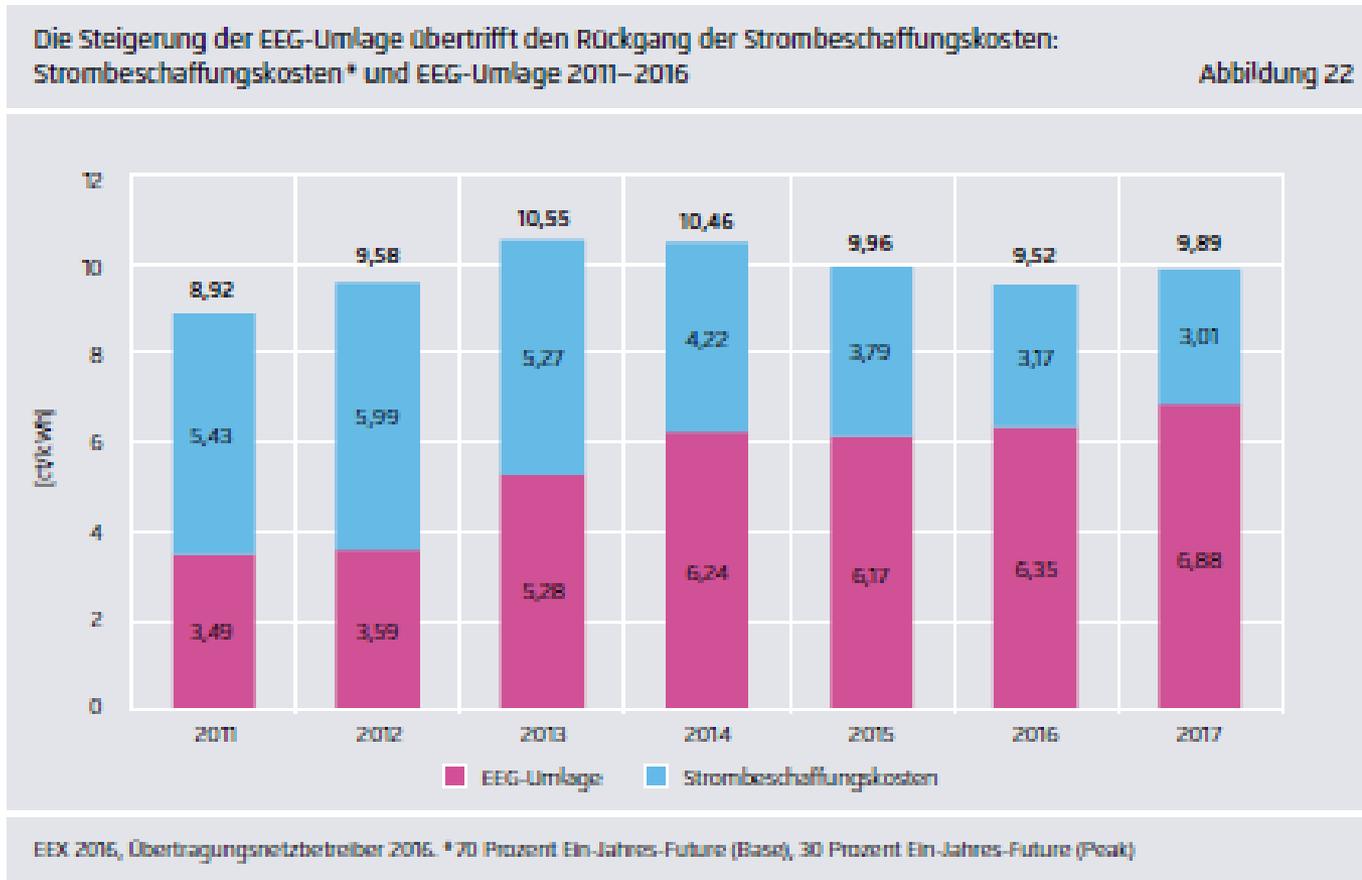
Von 2000 bis 2025 kostet die Energiewende rund 520 Milliarden Euro

Quelle: Infografik: Die Welt

Source: Die Welt/DICE

A life times' savings wasted: citizens footing the bill

Central economy beats market: Subsidies rise more (to 6.88 cts/kWh) than EEX commodity prices drop (to 3.01 cts/kWh)



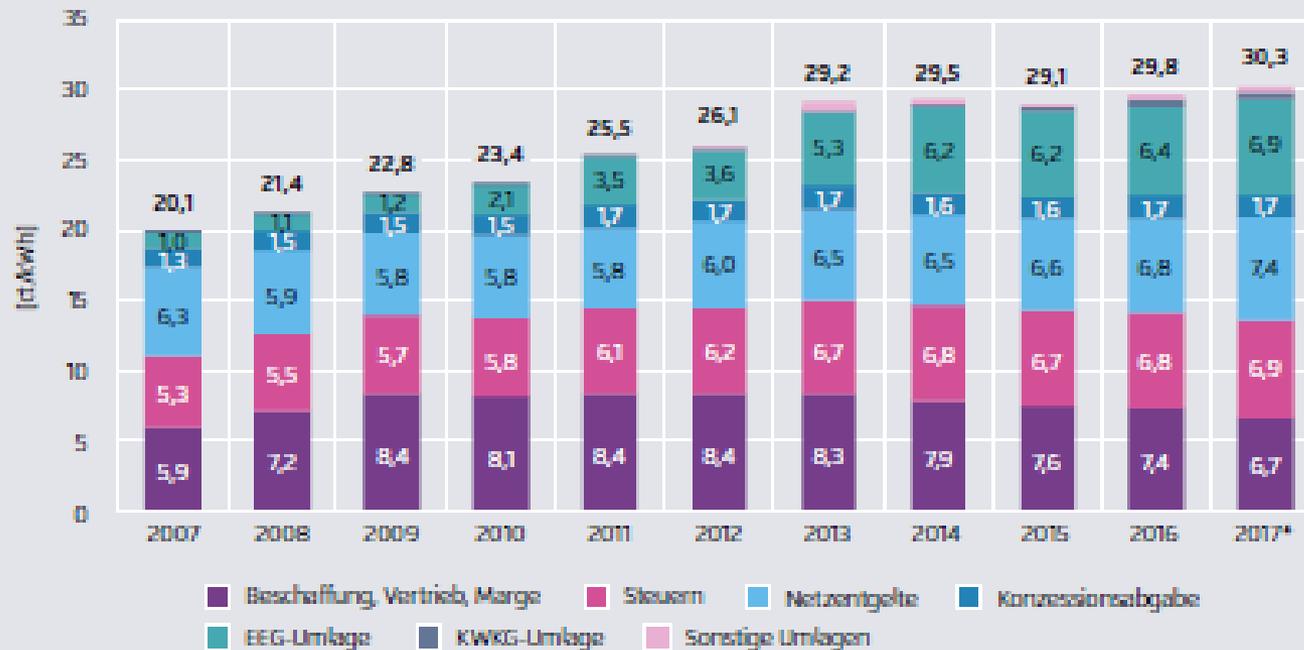
Source: Agora Energiewende

A life times' savings wasted: citizens footing the bill

German electricity prices rise once more in 2017: > 30 cts/kWh

Die mittleren Haushaltsstrompreise überschreiten 2017 die 30-Cent-Marke:
Haushaltsstrompreise 2007–2017

Abbildung 23



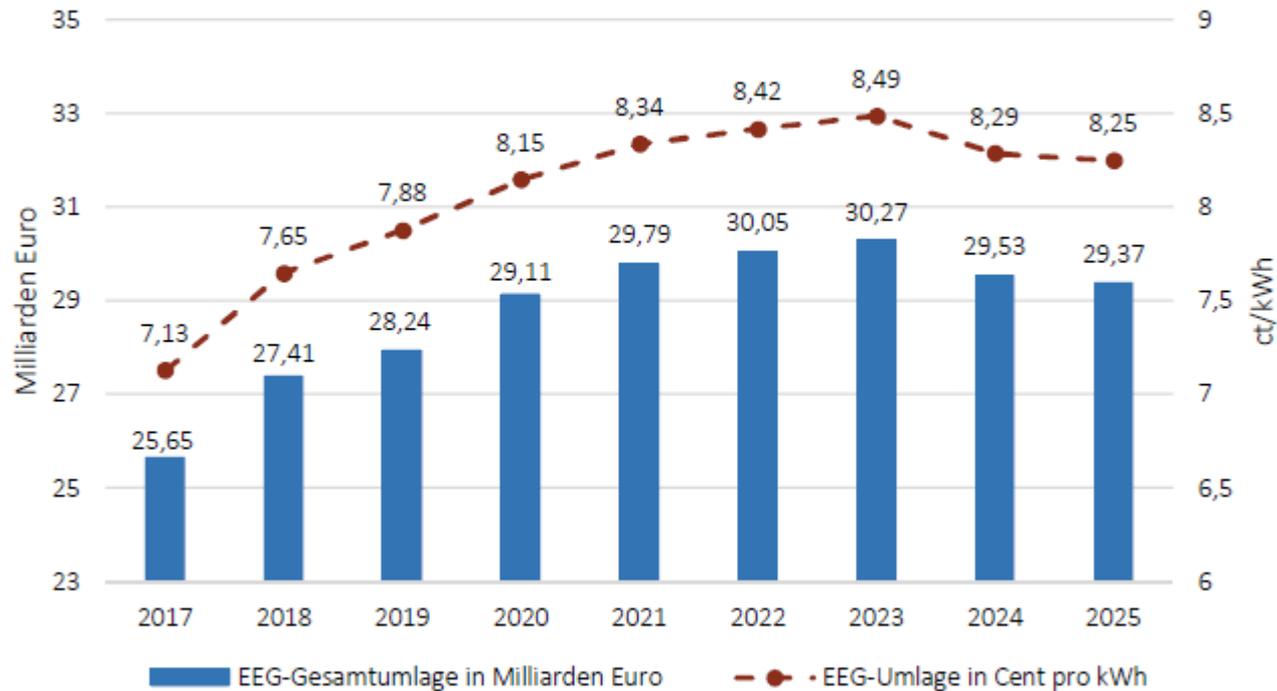
ENetza 2016. *eigene Schätzung

Source: Agora Energiewende

A life times' savings wasted: citizens footing the bill

Projected further development EEG-Umlage: 8.49 cts/kWh 2023

ABBILDUNG 8: PROGNOTIZIERTE ENTWICKLUNG DER EEG-UMLAGE (IN CT/KWH) UND DER EEG-GESAMTUMLAGE FÜR DEN ZEITRAUM 2017-2025



Quelle: Öko-Institut, EEG-Rechner, Version v3.2.06 vom 31. August 2016, Expertenmodus, Blatt „MOD-Berechnungen“, Zeile 354.

Source:DICE/INSM

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The fallen angels: collateral damage

E.ON, RWE & others: massive value destruction

Banana Republic: exit nuclears

Incumbent's arrogance: underestimated impact of RES

E.ON SE NAMENS-AKTIE O.N.

WKN: ENAG99 - ISIN: DE000ENAG999

Chart



RWE AG INHABER-STAMMAKTIE O.N.

WKN: 703712 - ISIN: DE0007037129

Chart

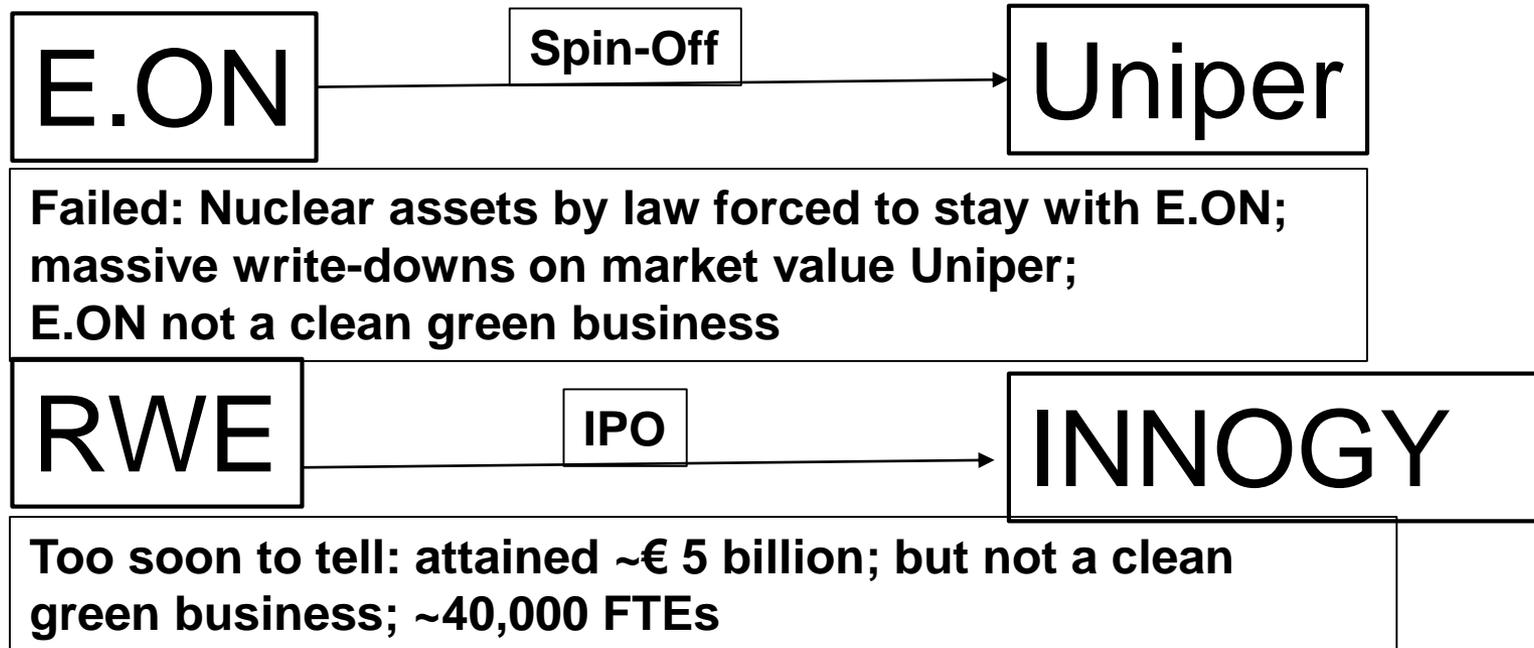


Source: Telebörse

The fallen angels: collateral damage

Desperately fighting for survival:

E.ON: spin-off “bad bank”; RWE: IPO the RES unit



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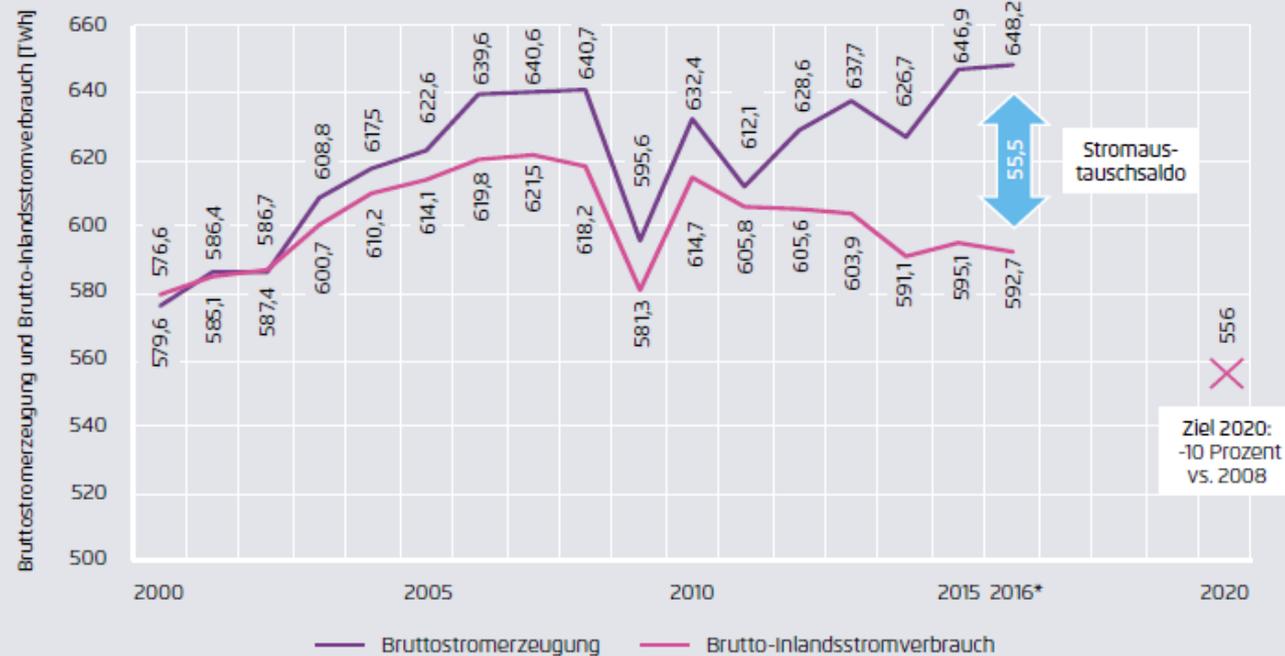
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Further collateral damage - examples

Excess RES production floods neighbours (55.6 TWh)
Single European electricity market negatively affected

Rekorde bei Stromerzeugung und Export, Rückgänge beim Stromverbrauch:
Stromverbrauch und -produktion 2000–2016 sowie Effizienzziel 2020

Abbildung 4

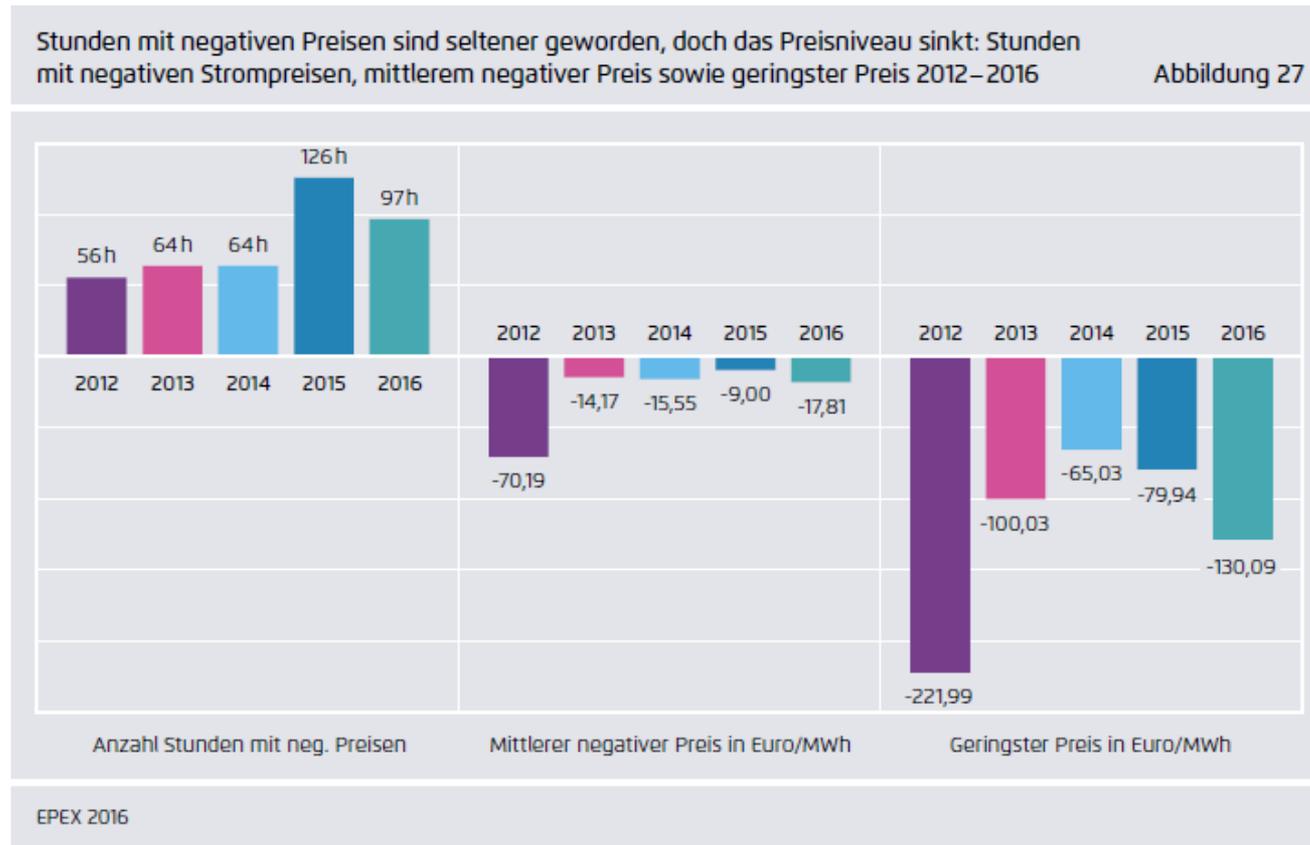


AG Energiebilanzen 2016a. * vorläufige Angaben

Source: Agora Energiewende

Further collateral damage - examples

Negative electricity prices: we pay our neighbours to have them take our green electricity



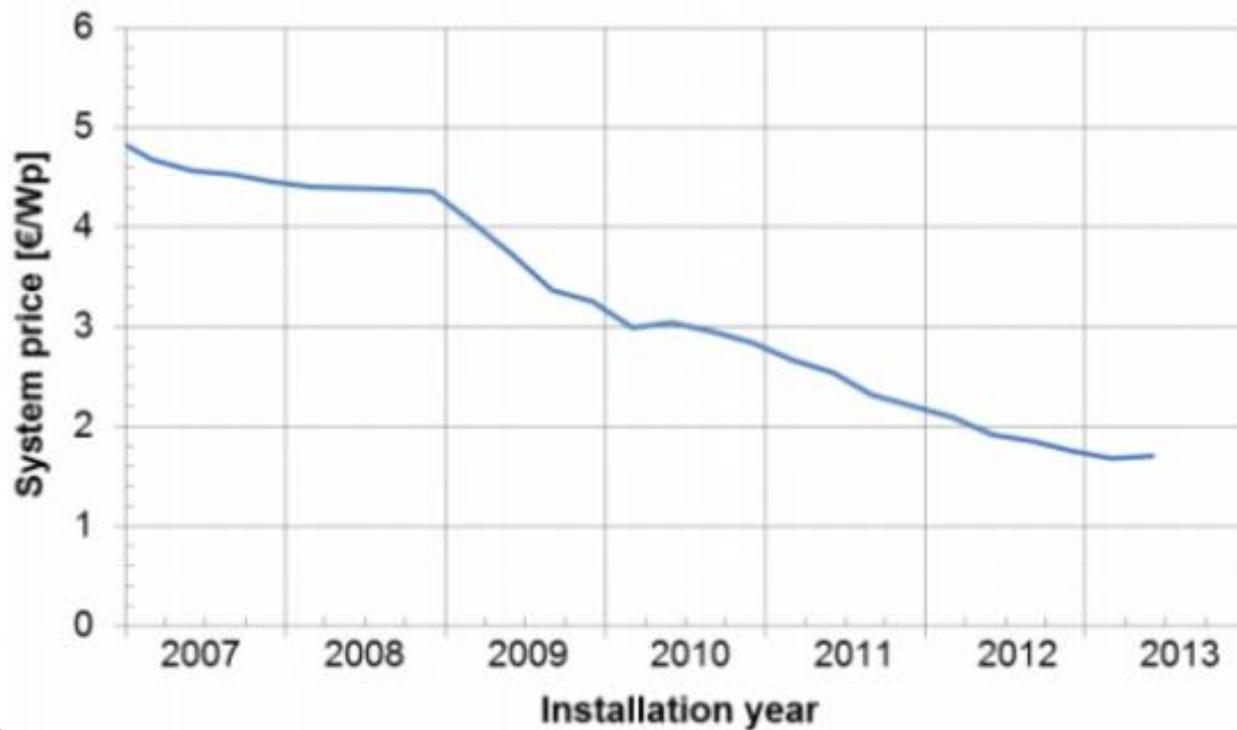
Source: Agora Energiewende

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Removing the myth: two “white knight” interventions

- ▶ **Widespread misperception: cost degression thanks to German EEG? No!**
- ▶ **2006: China exports cheaper & more efficient solar panels**
- ▶ **European lobby cries for continued dumping duties**



Source: Fraunhofer; Stanford

Removing the myth: two “white knight” interventions

- ▶ **Cost degression thanks to German EEG? No!**
- ▶ **DG Comp. regards subsidies as illegal state aid**
- ▶ **Introduction tenders renders more competitive prices**

Die Einführung von Wettbewerb durch Ausschreibungen zeigt Wirkung

Die durchschnittliche Förderhöhe für große Photovoltaikanlagen ist um 30 Prozent gesunken



Source: BMWi

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Hope for German sensibility point forward?

- ▶ **Germany is firmly stuck in central economy planning style approach: picking winners & dishing subsidies**
- ▶ **Introduction of serious price on carbon (European ETS all sectors) hampered by ever rising “EEG-Umlage”**
- ▶ **German climate protection plan pruned in the face of elections (e.g. continue coal till 2040)**
- ▶ **So-called “sector convergence” appears once more infested by RES ideology: “all-electric by RES”**

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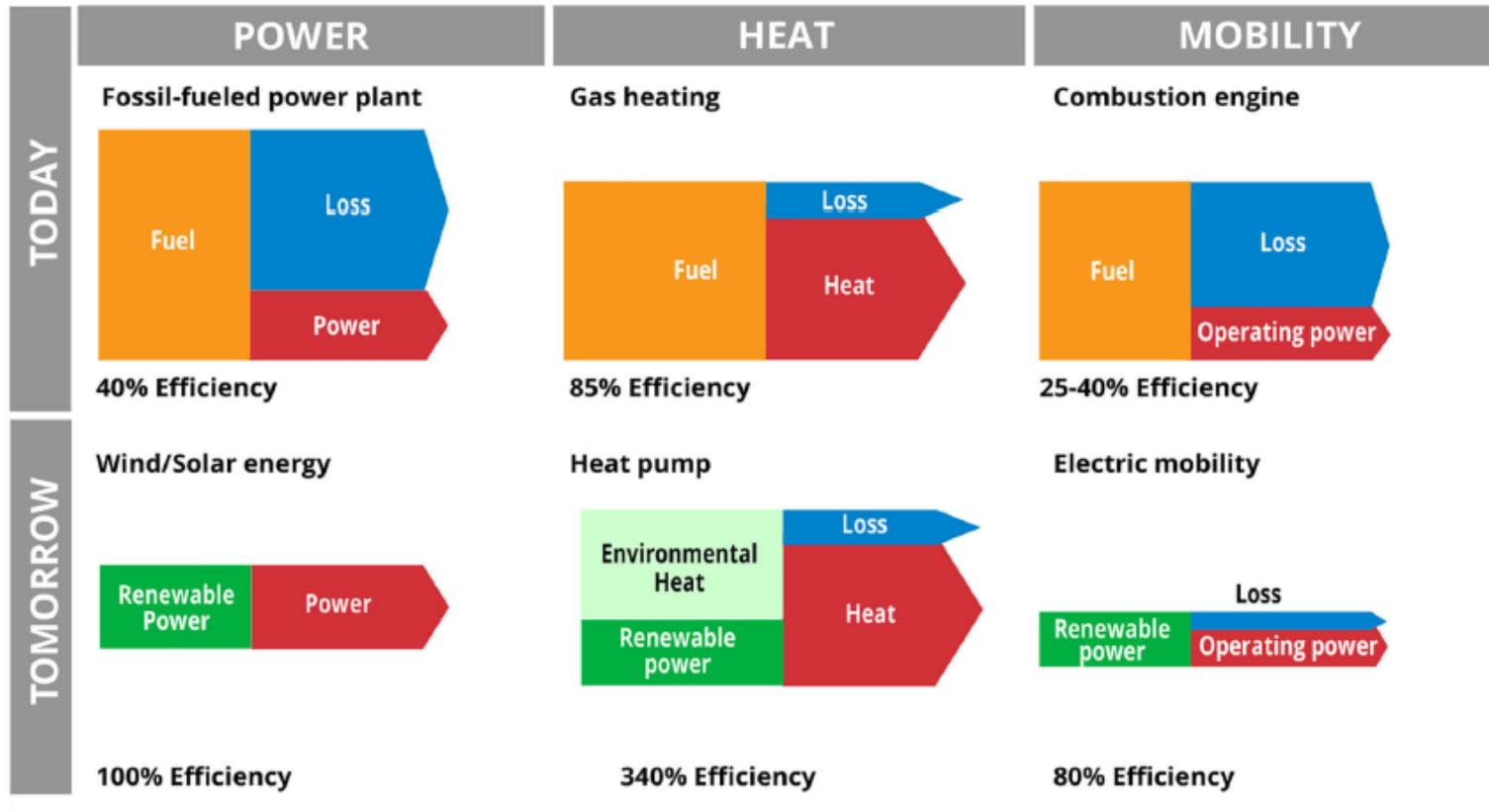
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Sector convergence and “all-out” electrification

Yet another fallacy: increase power demand whilst not at 100% RES?

Figure 2: The concept of sector coupling

Chart: Gas Strategies Source: German ministry of economics and energy: A power market of the Energiewende, July 2015



Source: Gas Strategies

Sector convergence and “all-out” electrification

For politicians, “vision suffices”

Electricity: much lower energy density

Costs peak generation & transport capacity barely calculable



	Britned (NL-UK) Power wire - cable	BBL (NL - UK) Gas pipeline
Length	235 km	260 km
Budget	600 M€	550 M€
Capacity (NL→UK)	1 GW	20 GW

Source: Enagas

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The “low-hanging fruit”: can natural gas save the day?

OIES Stern: “...not much traction with policy makers...”

THE CASE FOR GAS POST COP21

Natural gas is the „low hanging fruit“ for material and immediate reduction of greenhouse gases

by

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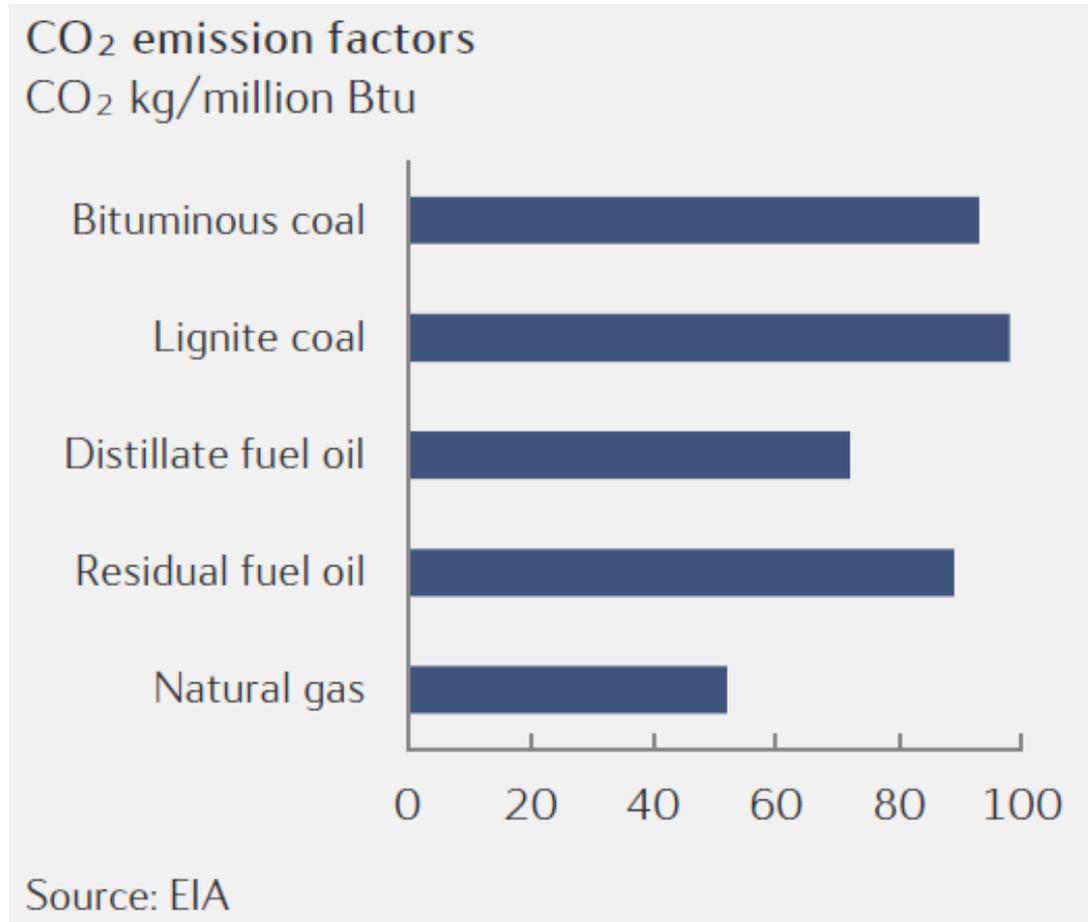
Fax: +49-208 8484031

Mail: wolfgang.peters@gasvaluechain.com

Web: www.gasvaluechain.com

The “low-hanging fruit”: can natural gas save the day?

Gas has superior qualities regarding climate protection and ... clean air



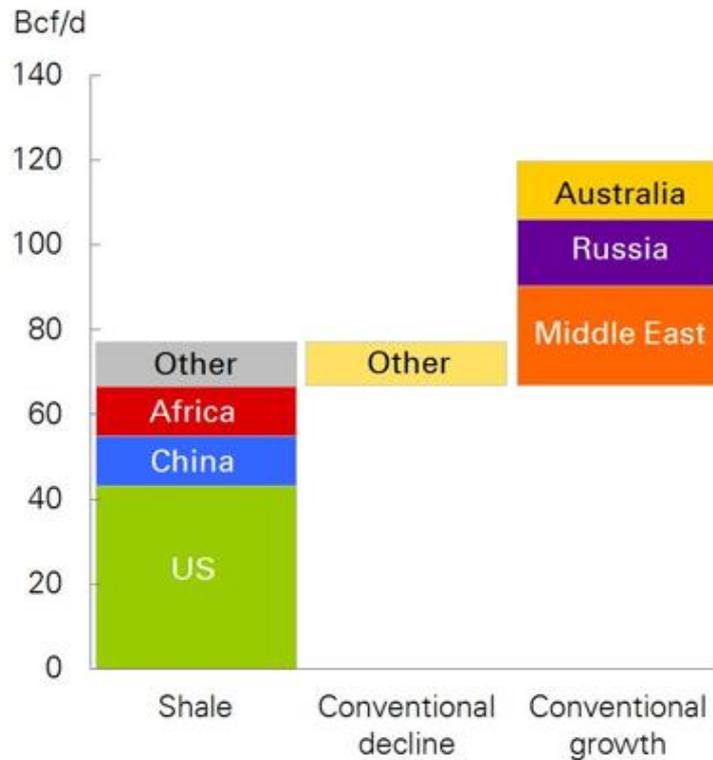
Source: EIA

The “low-hanging fruit”: can natural gas save the day?

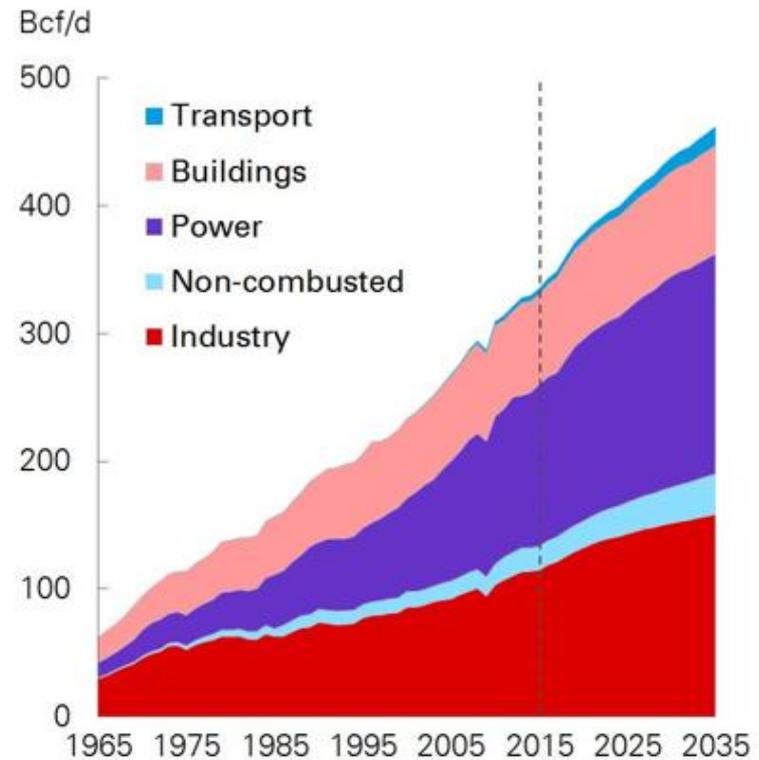
IEA & others bullish on gas growth:

Supply growth ~1,200 bcm/a; demand ~5,000 bcm/a

Gas supply growth 2015-2035



Gas consumption by sector

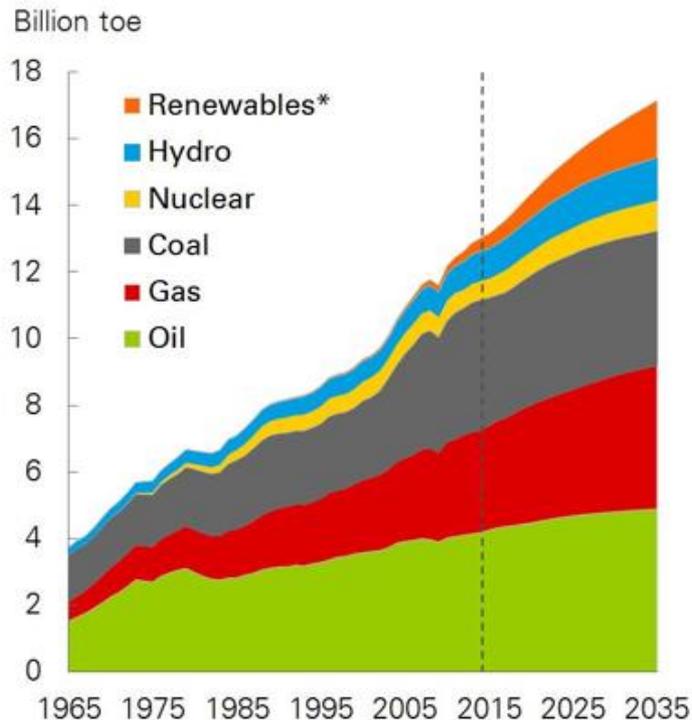


Source: BP Energy Outlook 2017

The “low-hanging fruit”: can natural gas save the day?

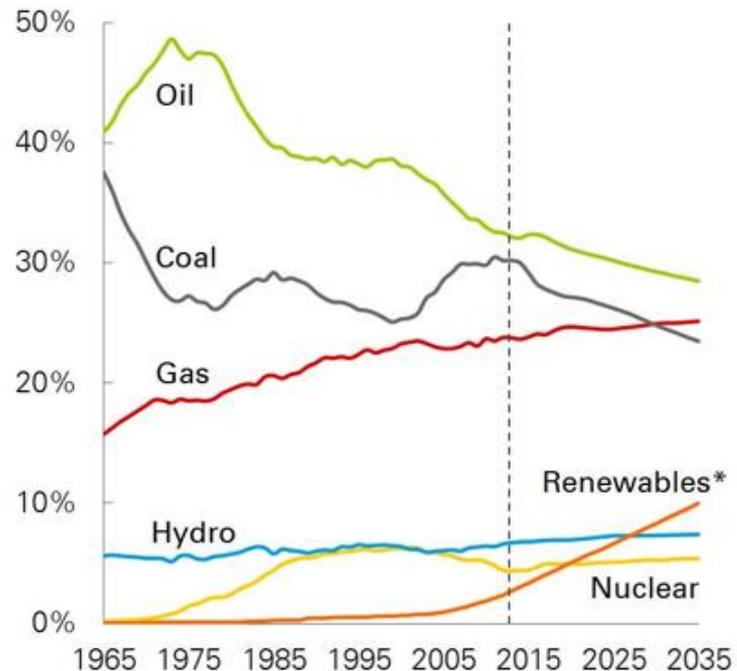
Gas expected to overtake coal primary energy share

Primary energy consumption by fuel



*Renewables includes wind, solar, geothermal, biomass, and biofuels

Shares of primary energy



Source: BP Energy Outlook 2017

The “low-hanging fruit”: can natural gas save the day?

IEA WEO 2016: The unfolding LNG “revolution”

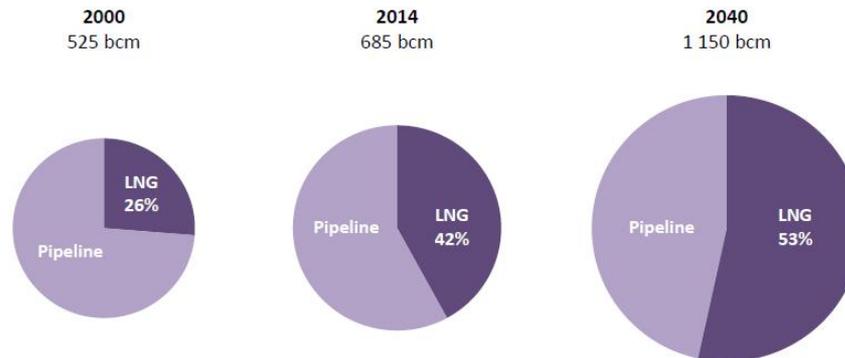
LNG about to overtake piped gas in global trade

New LNG has no destination restrictions

Gas on its way to become “just another” a globally traded commodity



Share of LNG in global long-distance gas trade



Contractual terms and pricing arrangements are all being tested as new LNG from Australia, the US & others collides into an already well-supplied market

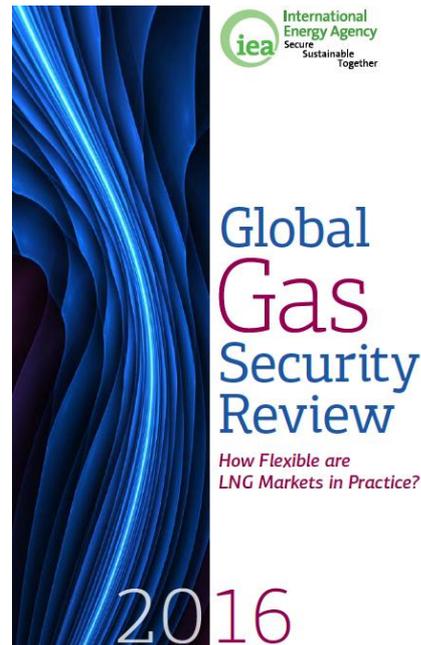
Source: IEA WEO 2016

The “low-hanging fruit”: can natural gas save the day?

Security of gas supply no longer a regional issue

Dependency concerns (e.g. heated debates Russia) less relevant

IEA: “As the role of gas ... evolves, a narrow approach to gas security focussing on gas as a stand-alone fuel in an individual region is no longer appropriate.”



Source: IEA Global Gas Security Review 2016

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Outlook

- ▶ **Perhaps most importantly: Beware of German Energiewende**
- ▶ **Since 2 degree target cannot be met, additional measures are to be expected**
- ▶ **Most likely: higher price on carbon, increasingly globally**
- ▶ **Clean air problems augment and accelerate the process**
- ▶ **Natural gas stands good chance to play significant role**
- ▶ **Natural gas only fossil fuel which “can green”**
- ▶ **Good chance to play continued role in holistic energy system (PtG hydrogen, synthetic gas, biogas)**
- ▶ **Ultimate challenge: grid parity of RES and competitive storage solutions for RES electricity**