The practical aspects of renewable energy industry

Oldenburg, April 11, 2015

Uwe Nestle

EnKliP
Energy and Climate Policy | Consulting

What is EnKliP?

EnKliP stands for Energy and Climate Policy I Consulting

EnKliP is Uwe Nestle as a freelancer

Uwe Nestle is

- **Engineer for Technical Environmental Protection**
- **Expert for Energy Policy**
- **Gained experience in the Federal Ministry for the Environment for about 12 years**
- **Member of the bord of Green Budget Germany**

EnKliP is ready to

- **Produce studies and analyses**
- **Give talks**
- **Work national and international**

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General Aspects of the German Energiewende

Economic and Social Effects of the RES-E Policy

RES-E Costs

Instruments to Finance RES-E

The Politcal Discussion of the Energiewende

Conclusions

Challenges

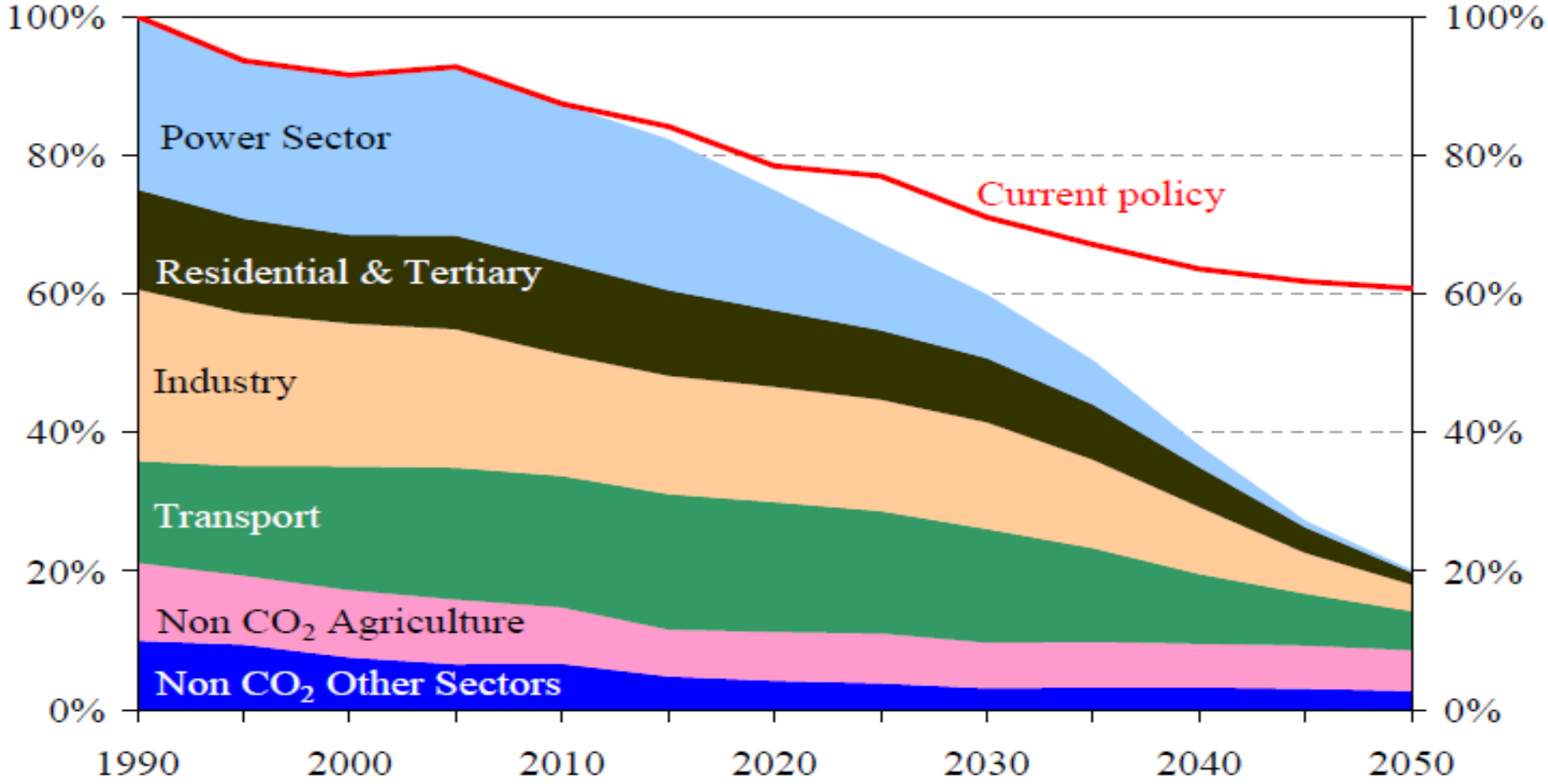
Kofi Annan 2014

Former Secretary General of the United Nations

"The Climate Crisis threatens the well-being of hundreds of million people. It undermines the human right to food, water, health and security.

This is not only a worrying future scenario but is already happening today."

Challenges



Reductions in EU GHG emissions in order to achieve a domestic reduction of 80% by 2050 (100% = 1990)

(EC 2011, Roadmap for moving to a competitive low carbon economy in 2050)

Challenges

In the power sector, affordable and almost zero-emissions technologies exist

Renewables:	Wind power
	Solar power
	Hydro power
	Geothermal power
	Biomass
Carbon Capture, Transport and Storage (CCTS):	Still relevant GHG-emissions Not available before 2020
Nuclear:	No sustainable option

Challenges

German energy infrastructure needs modernisation

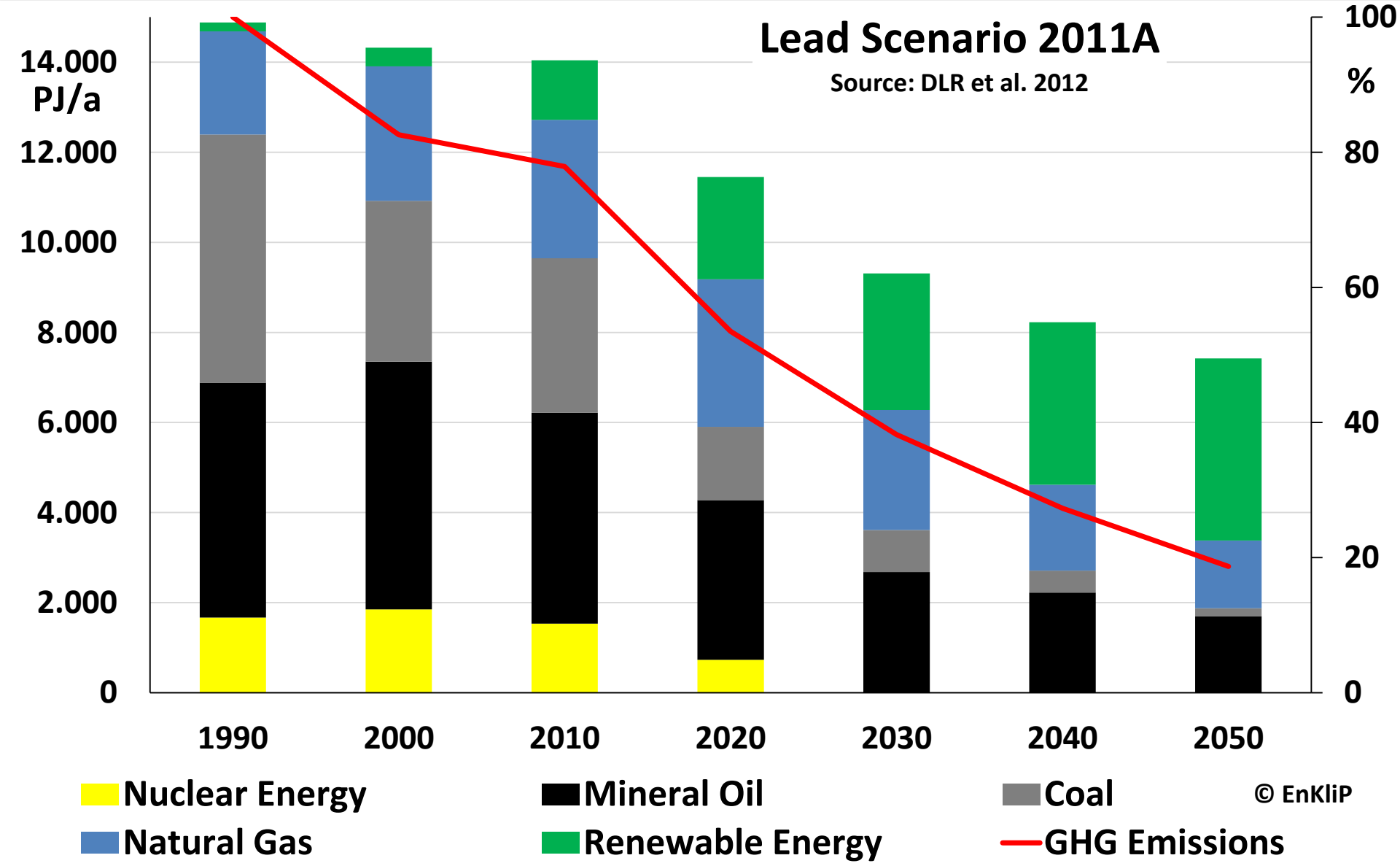
A) For climate protection reasons

B) Many power plants are old

- 50% of installed coal capacity is older than 30 years
- 25% of installed coal capacity is older than 40 years
- 40% of installed natural gas capacity is older than 30 years
  (source: BNetzA)

C) Phase out of nuclear power until 2022

Possible energy future of Germany (Governmernt Study)



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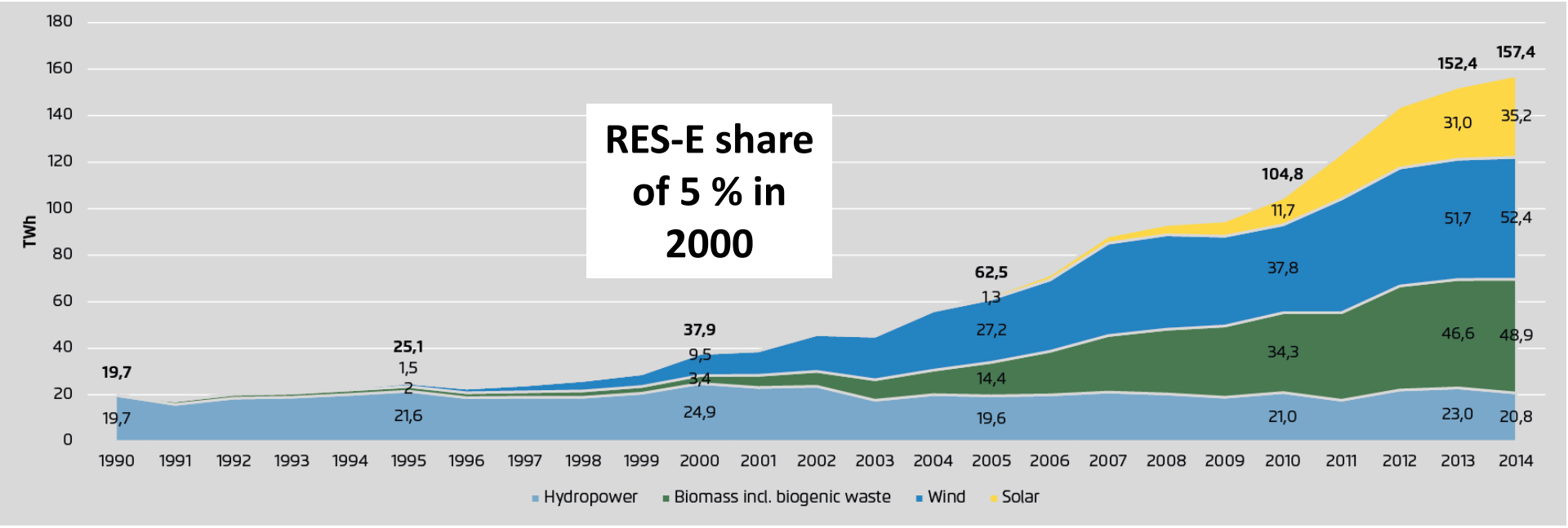
RES-E development 1990 to 2014

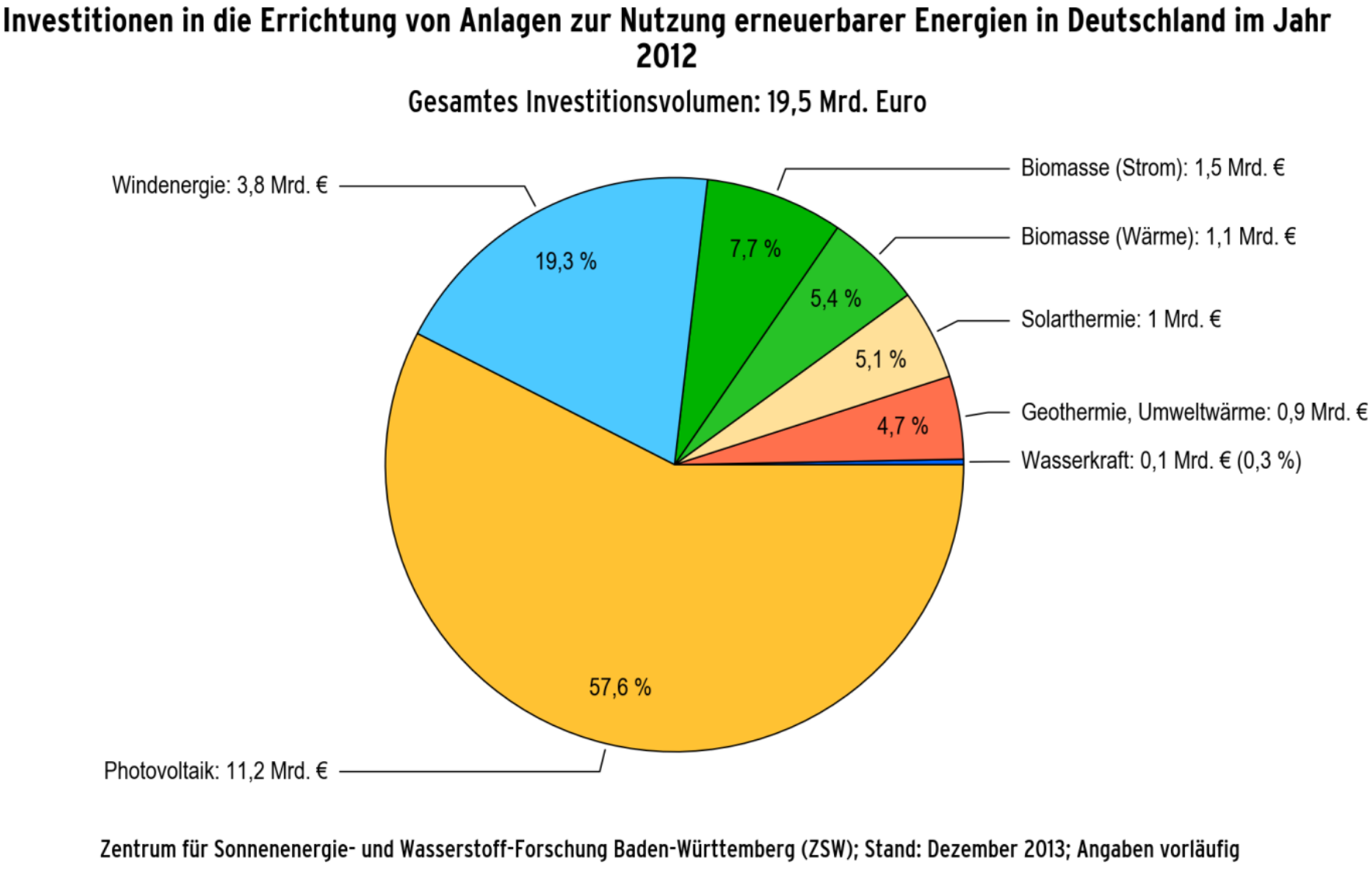
Gross power RES-E production

RES-E share of 27,2% in 2014

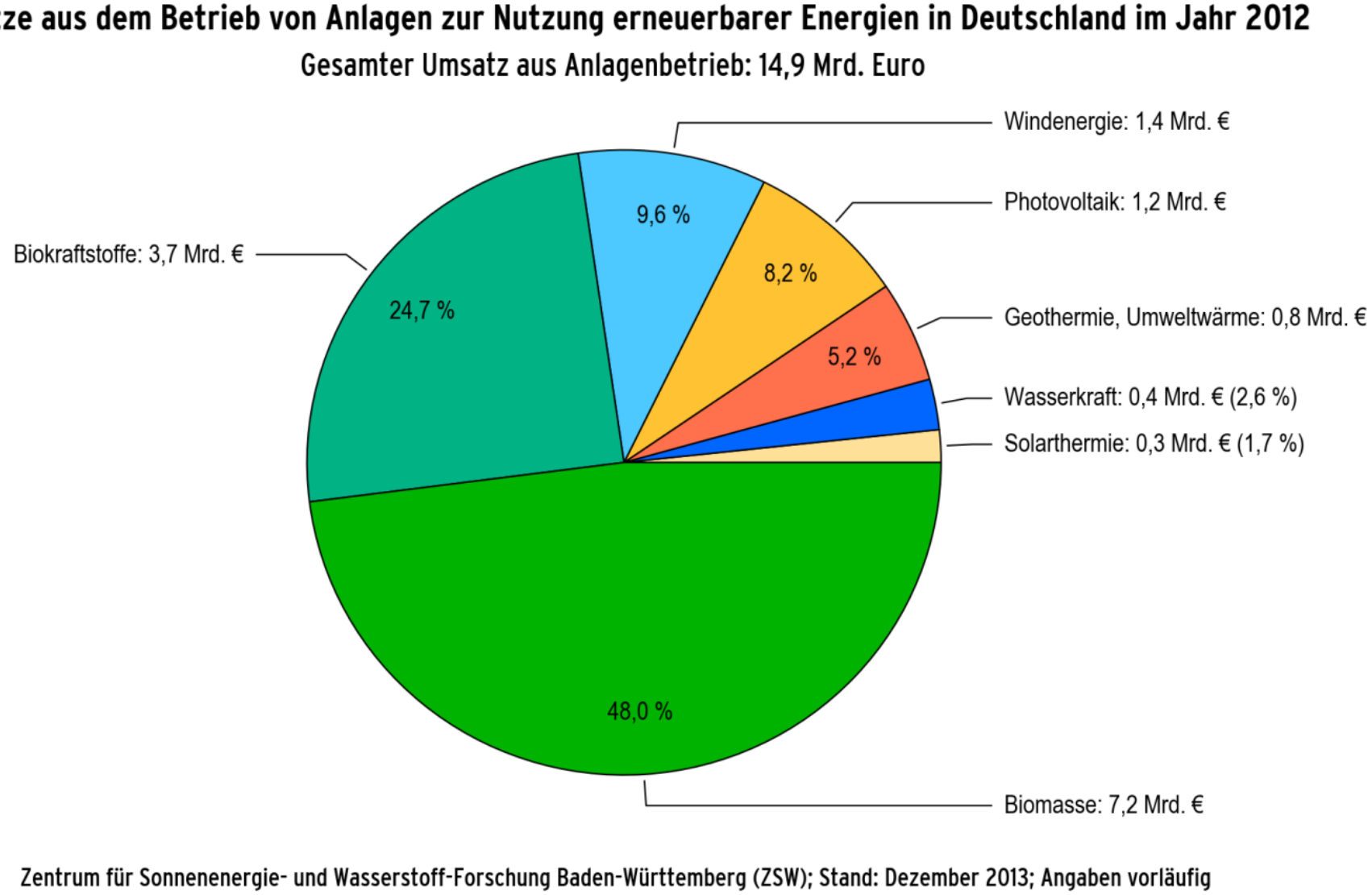


Source: Agora Energiewende 2015

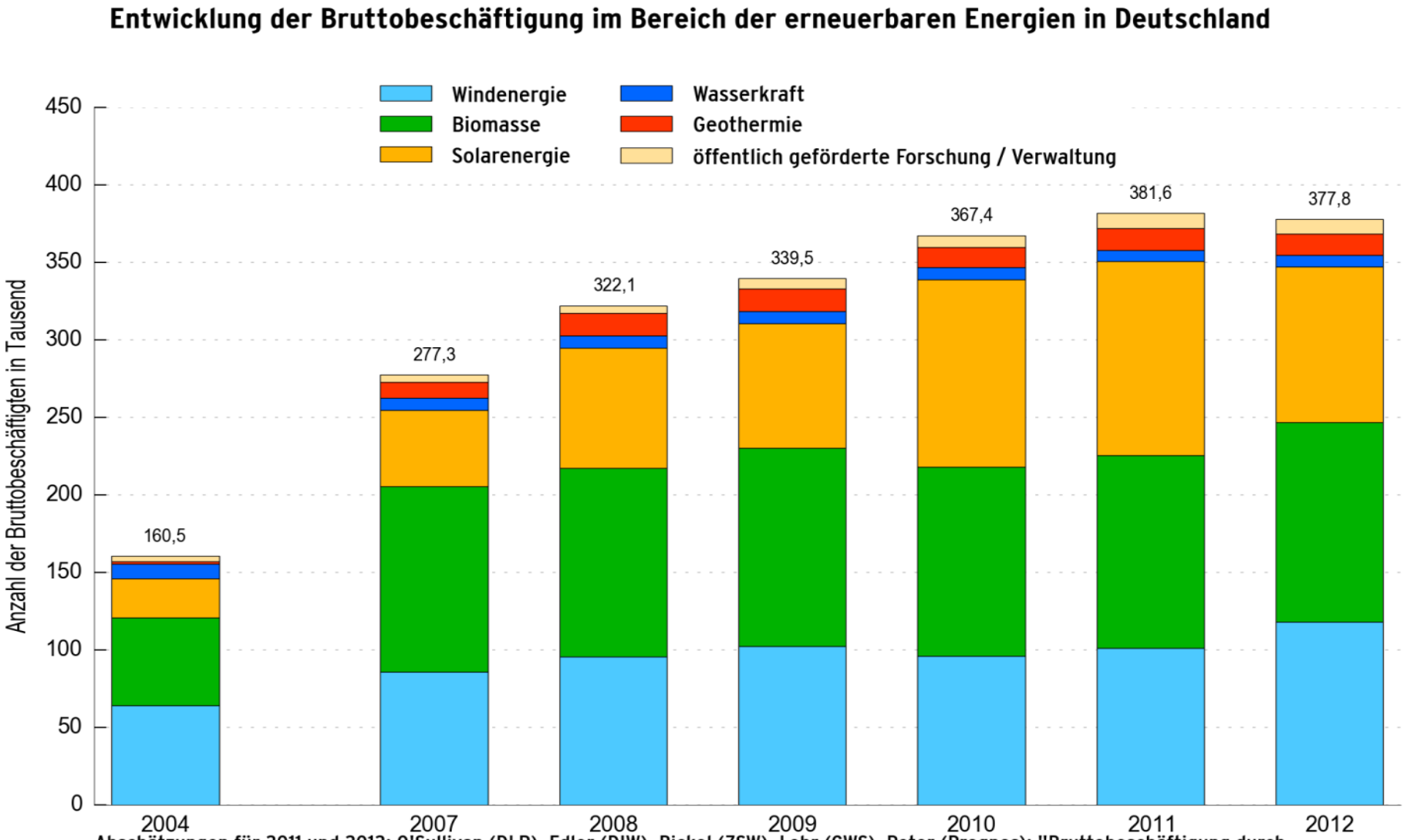
Investments into RES-installations in 2012



Turnover in the RES-sector (excluding investments)



RES-Jobs 2004 to 2012



Abschätzungen für 2011 und 2012; O'Sullivan (DLR), Edler (DIW), Bickel (ZSW), Lehr (GWS), Peter (Prognos): "Bruttobeschäftigung durch erneuerbare Energien im Jahr 2012 - eine erste Abschätzung"; Stand: März 2013; Zwischenbericht des Forschungsvorhabens "Kurz- und langfristige Auswirkungen des Ausbaus erneuerbarer Energien auf den deutschen Arbeitsmarkt".

Structure of the RES-E-Industry

Financing system of the EEG provided in general

- **relatively high investment security**
- **relatively low rates of return**

Traditional large utilities did not invest

Many new small players jumped into the market

- **Private households**
- **Farmers**
- **Cooperations and citizen groupes**
- **Other new companies**

➔ **This lead to more competition, more technical development, lower prices**

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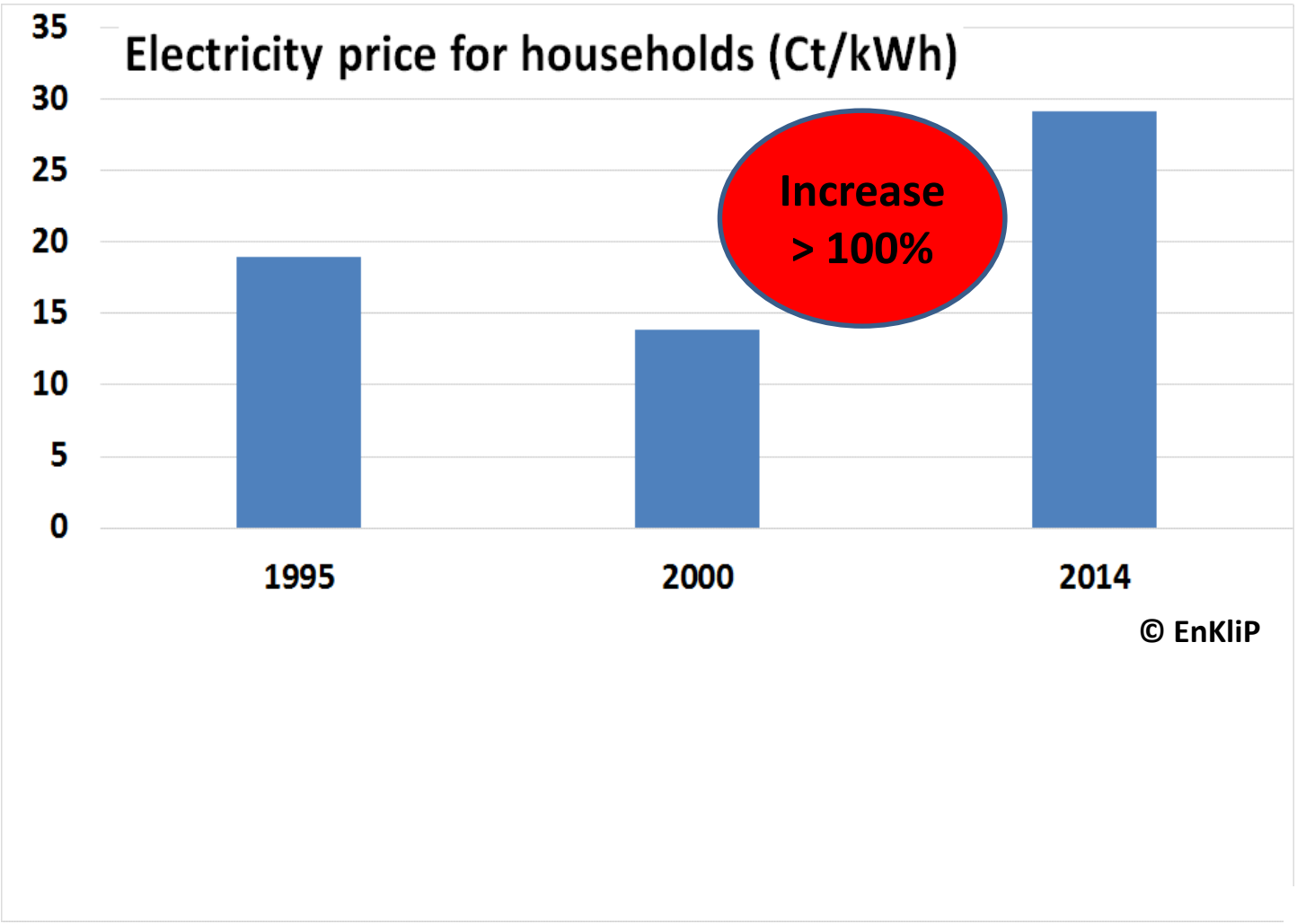
RES-Costs



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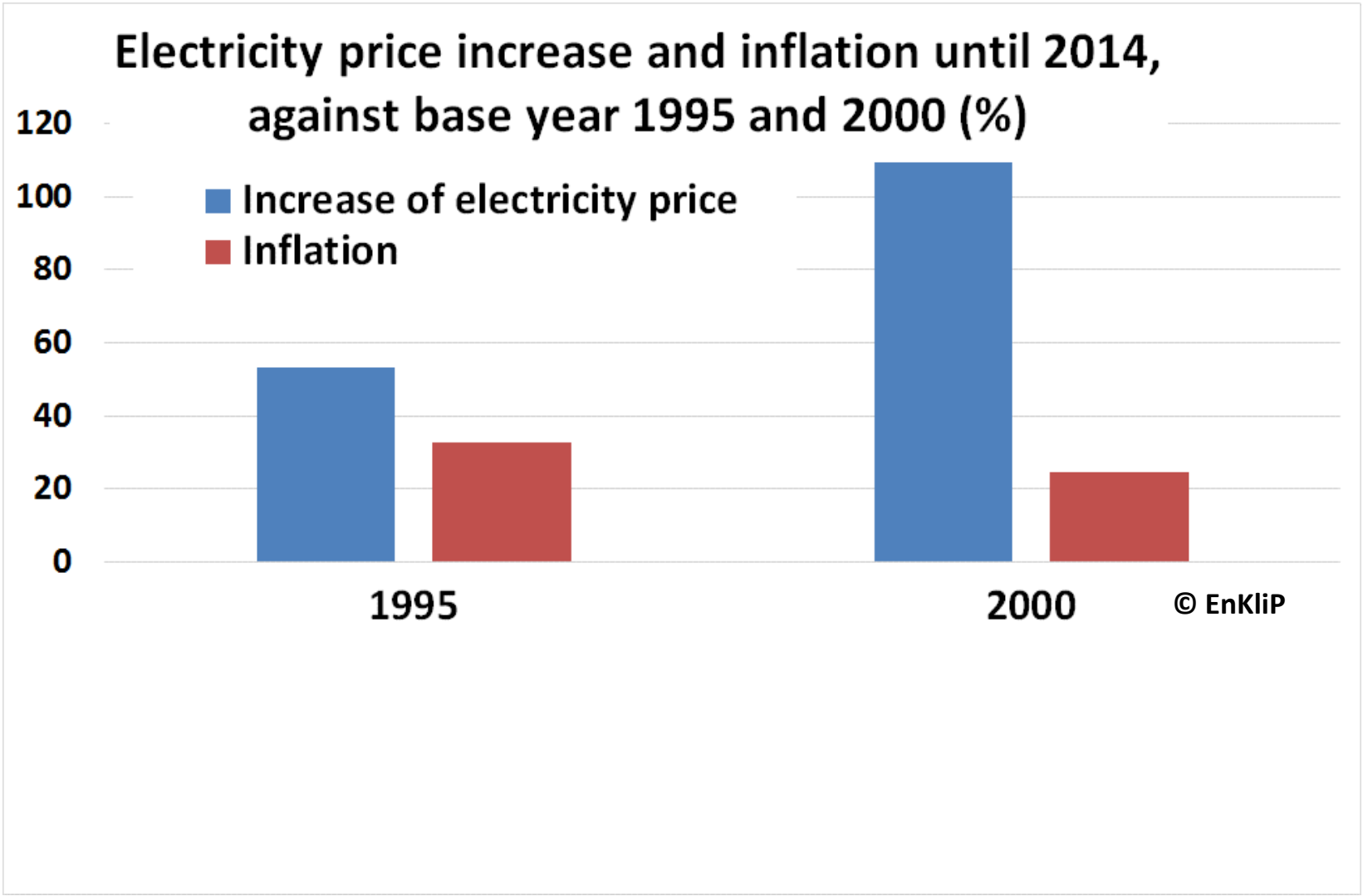
RES-Costs


Electricity price increase and inflation until 2014,
against base year 1995 and 2000 (%)
120
100
80
60
40
20
0
Increase of electricity price
Inflation
1995
2000
© EnKliP

RES-Costs

EEG-surcharge 2015: 6,2 Ct/kWh, for 27 % RES-E

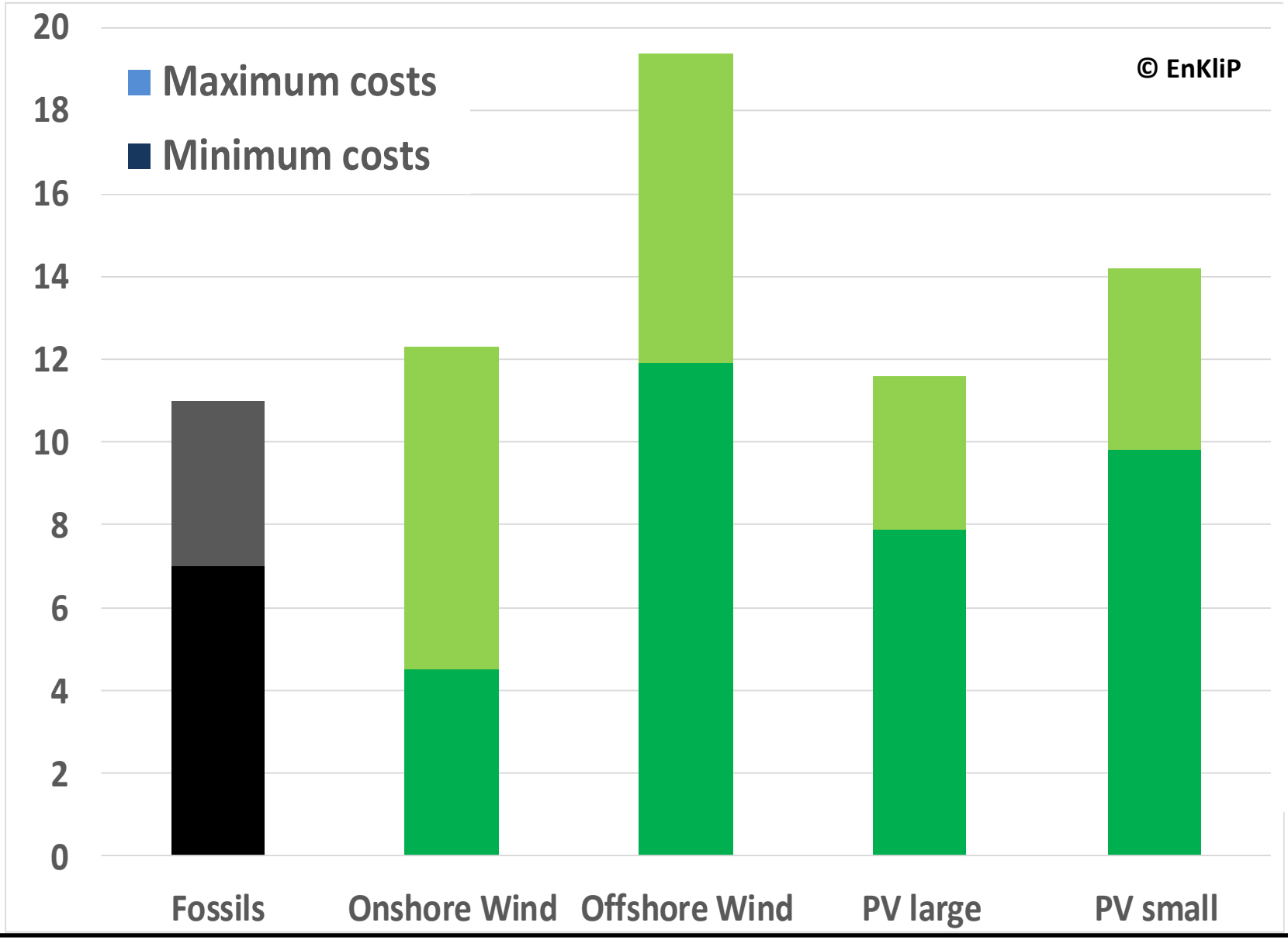
EEG-surcharge ≠ extra costs for RES-E extension

EEG-surcharge compares

- **full costs of new RE-installations with**
- **operation costs of old, written down and subsidised conventional power plants**

➢ ***A fair calculation would compare the electricity generation costs of <u>new</u> conventional and <u>new</u> renewable power plants***

Production costs for power generation with new power plants



Sources:

Prognos 2013

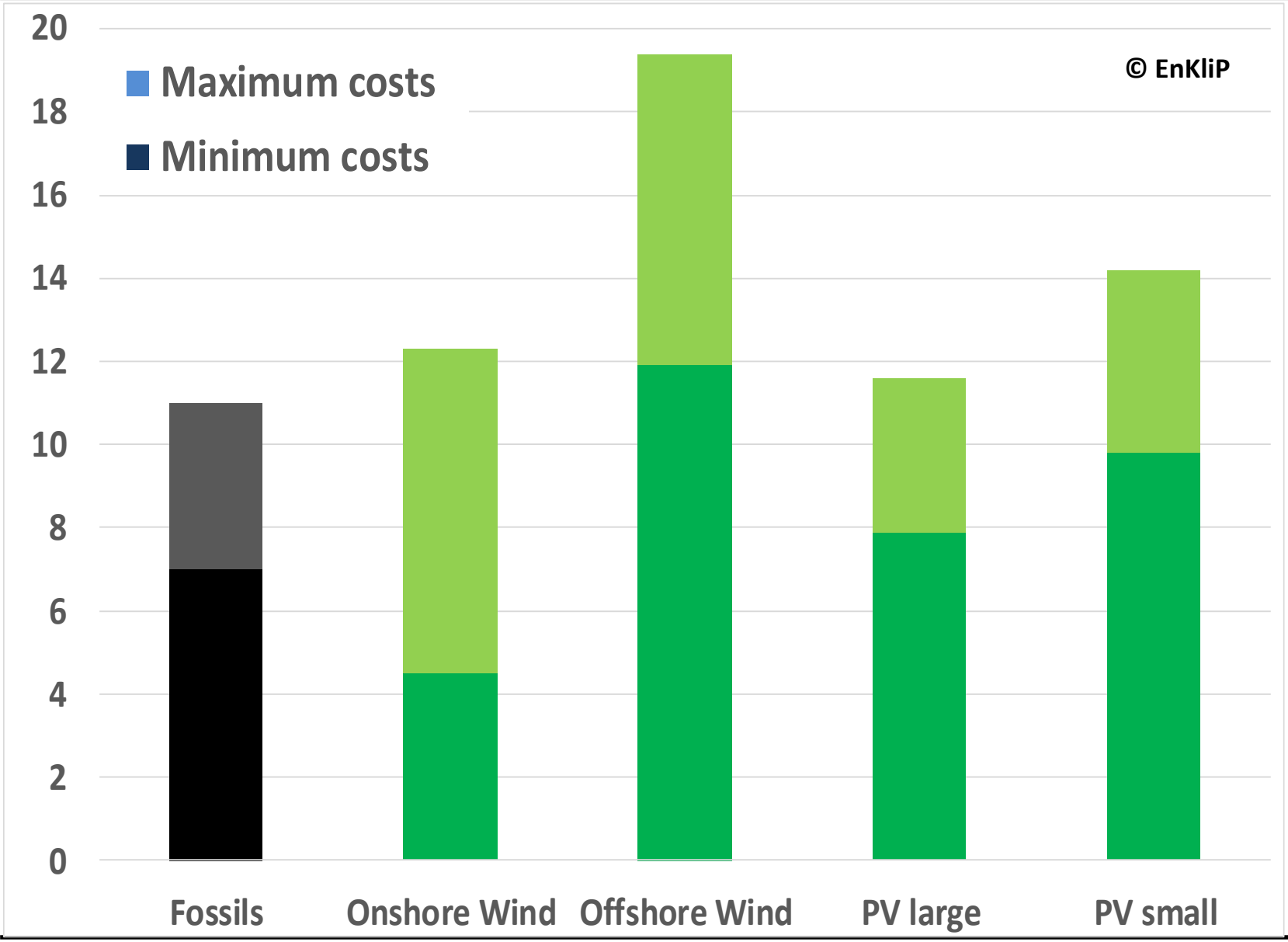
Agora 2013

DECC 2012

Fhg ISE 2013

FÖS 2012

Production costs for power generation with new power plants



External costs:

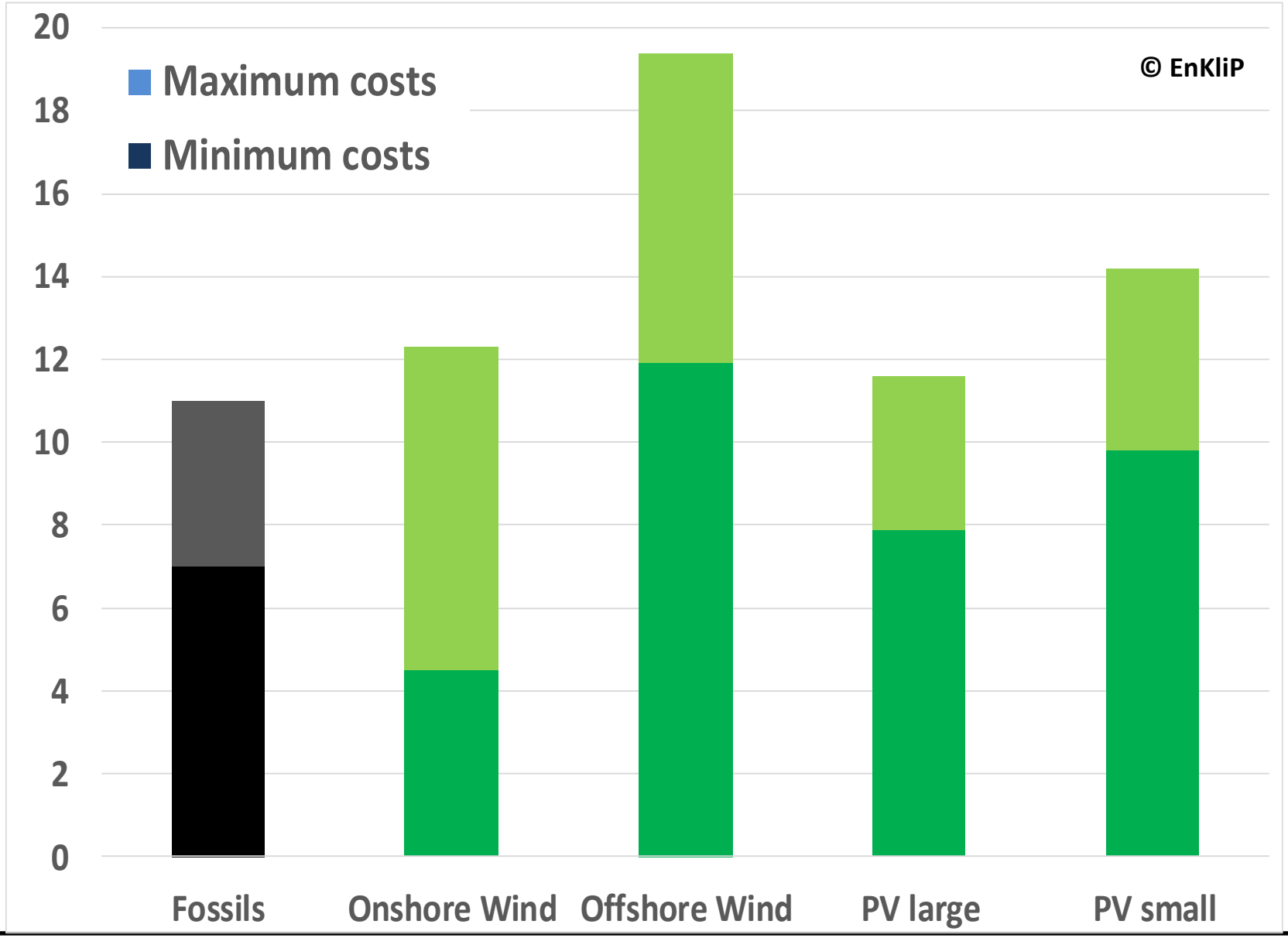
Brown coal:
9,2 Ct/kWh

Hard coal:
7,5 Ct/kWh

Gas:
3,8 Ct/kWh

Nuclear:
9-35 Ct/kWh

Production costs for power generation with new power plants



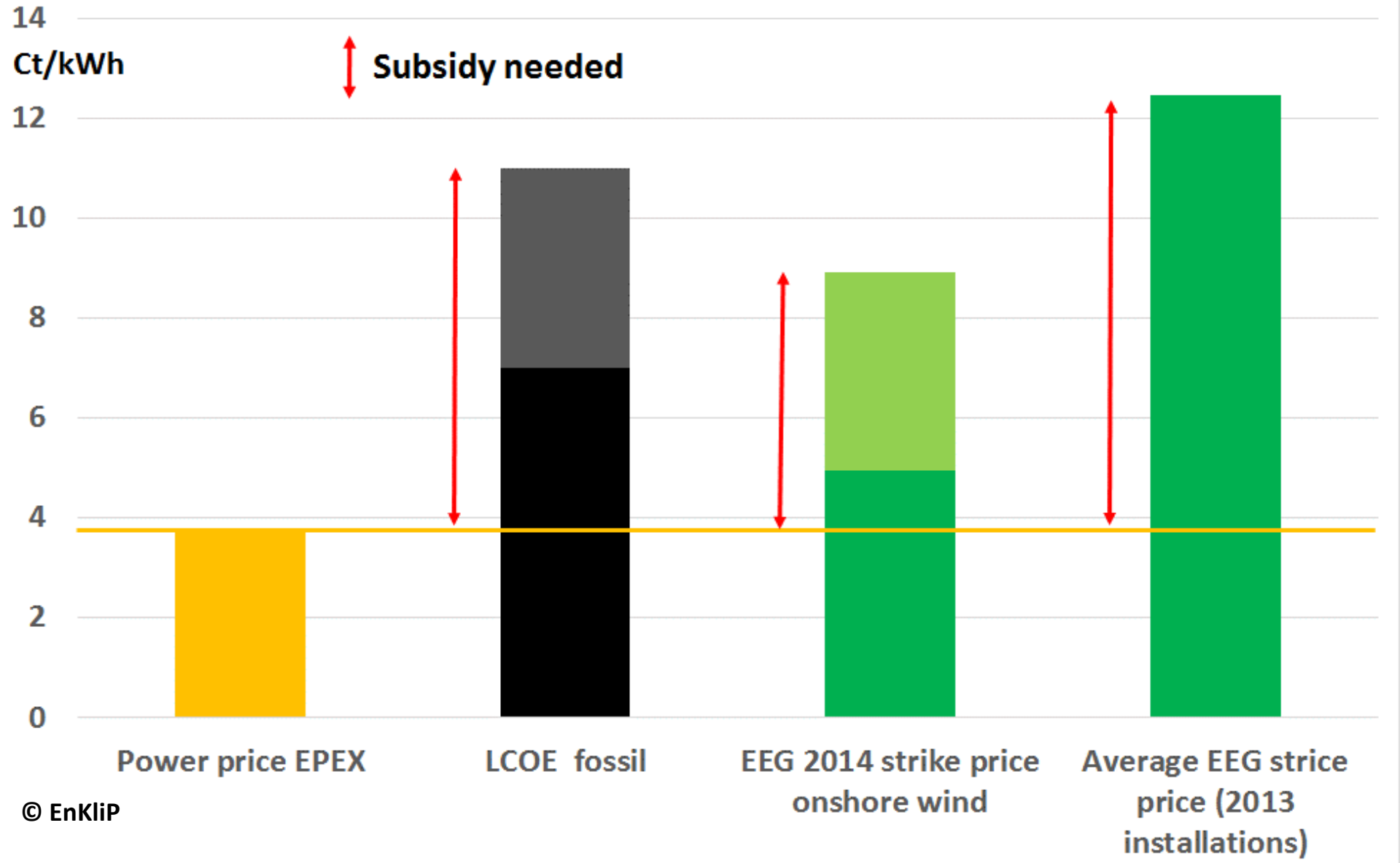
Trend:

RES-E ↘

Fossil ↗

Nuclear ↗

EEG surcharge: the wrong indicator



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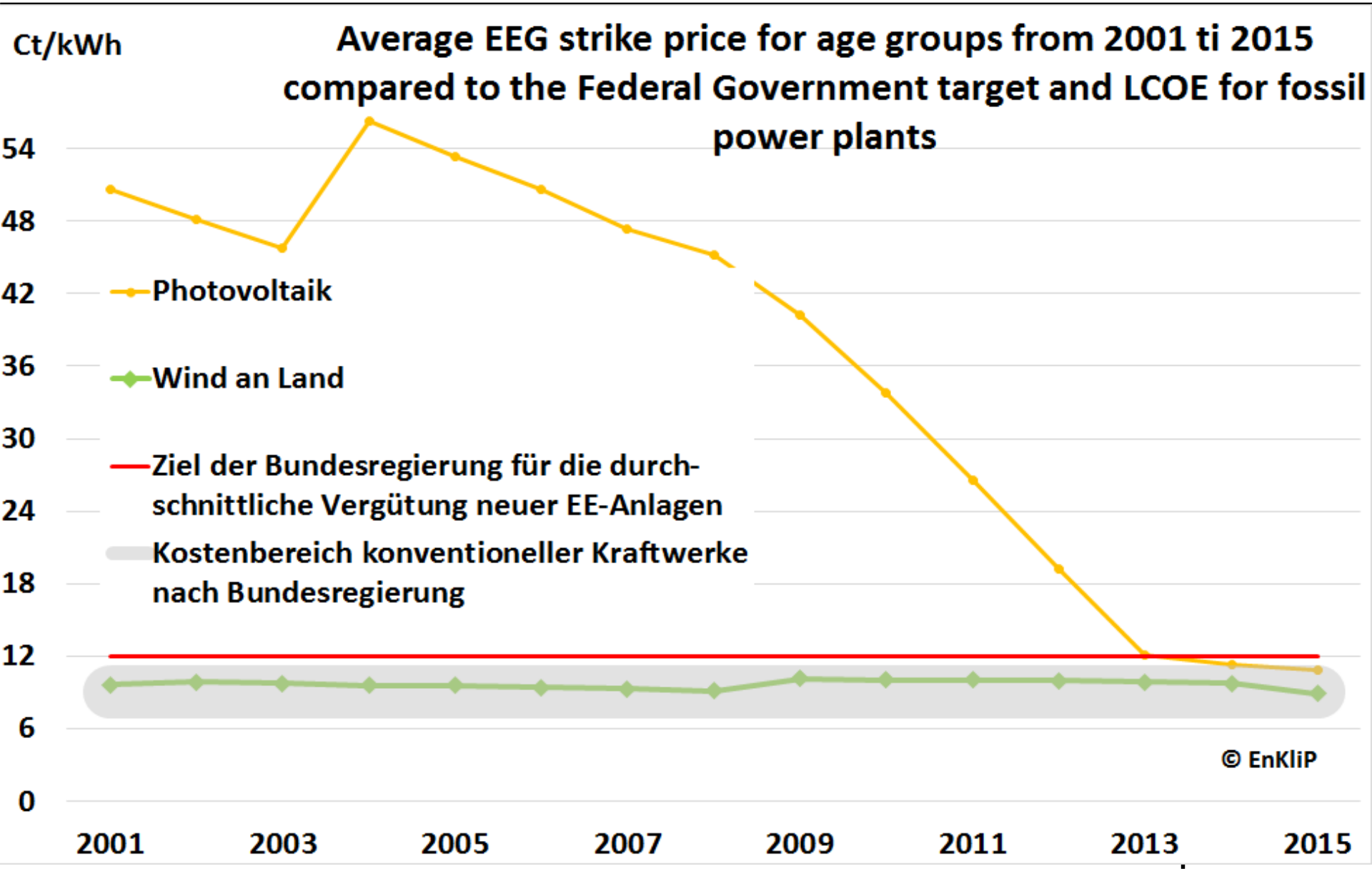
Balancing of fluctuating RES-E



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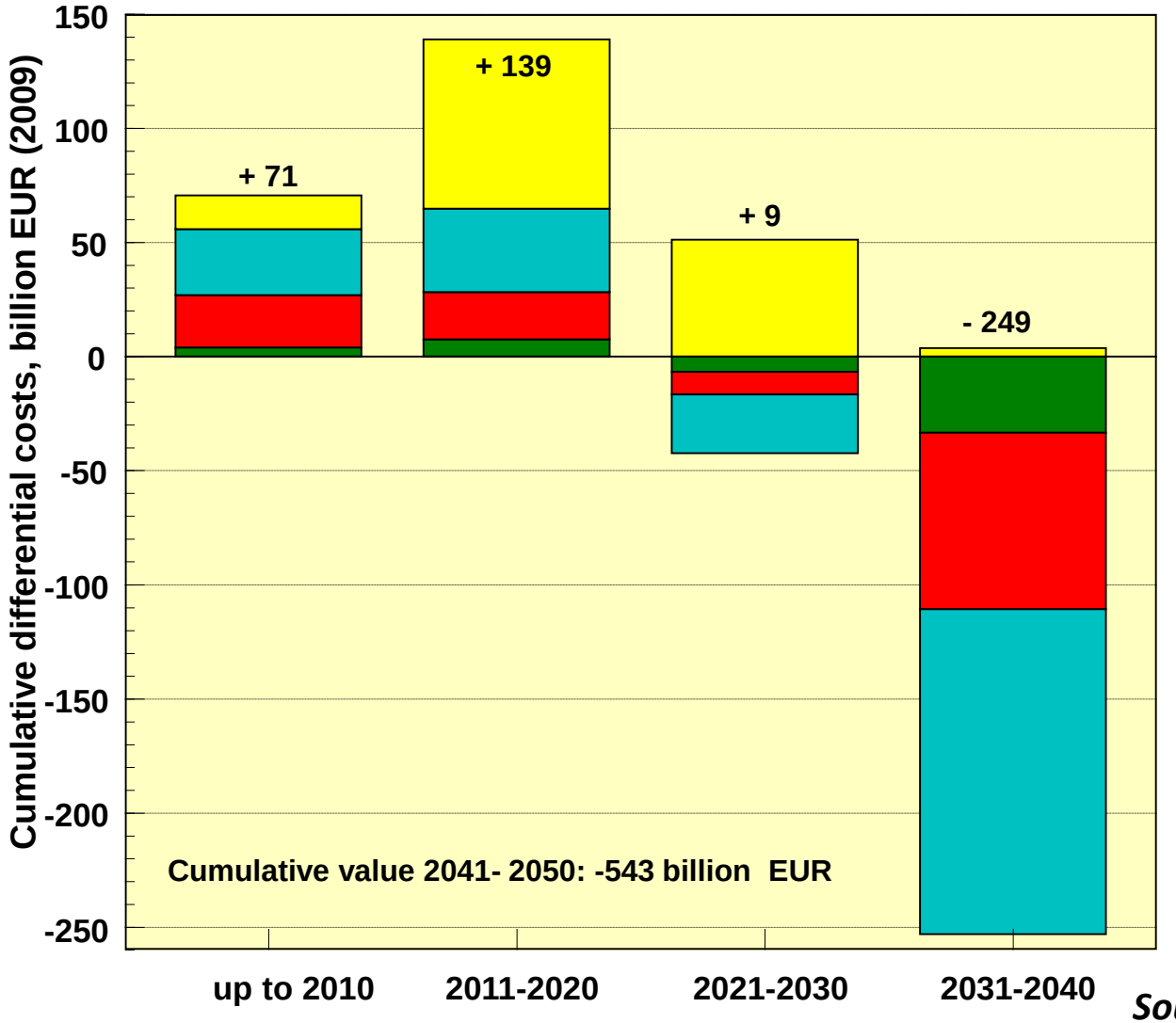
German Government study on RES extension: Cumulative differential costs

- Scenario 2011 A; all renewables; pricepath A -



Photovoltaic

Electricity w/o photovoltaic

Heat

Fuels

Szen11/DIFKUMGES; 12.11.11

RES-share 2040

Total	50%
RES-E	75%
Heating	40%
Fuels	30%

GHG-reduction: 72%

Source: DLR et al. 2012

Conclusions on the costs of renewables

- Some RES-E are no more expensive than conventional energies, such as onshore wind and photovoltaics
- Photovoltaics cost reduction is a great deal for the global development and climate protection
- If external costs are internalised, most RES-E are cheaper than conventional energies
- RES extension is an investment in the future – also from the economical point of view

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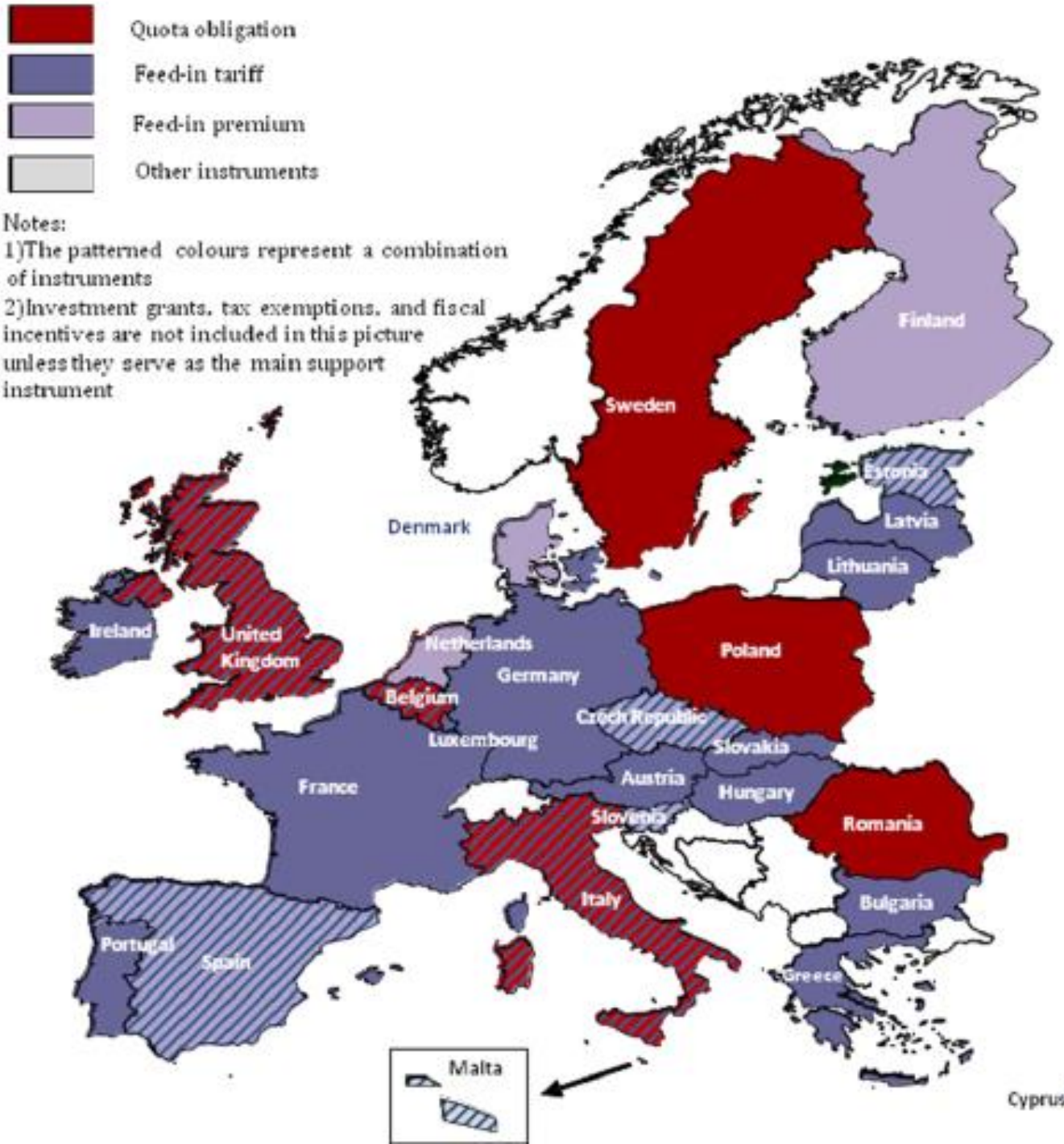

Source: Fraunhofer ISI et al. 2011

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 23.1.2008
SEC(2008) 57

COMMISSION STAFF WORKING DOCUMENT

The support of electricity from renewable energy sources

"This report presents an updated review of the performance of support schemes using the same indicators presented in the 2005 report. It finds that, as in 2005, well-adapted feed in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity."

Effectiveness of RES-E financing instruments

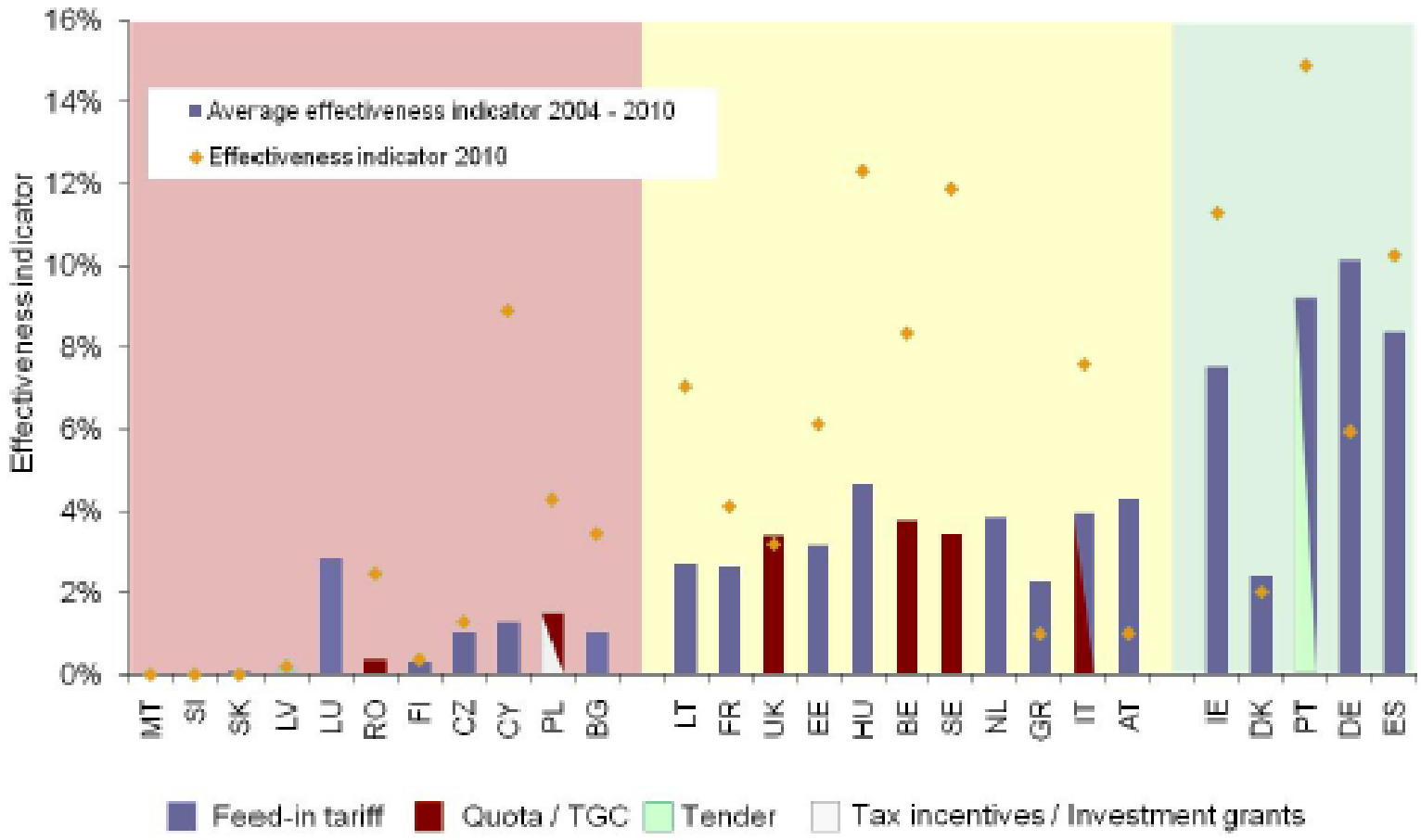

Figure 4-3: Policy Effectiveness Indicator for wind onshore power plants in the period 2004 – 2010. Countries are sorted according to deployment status indicator

Source: Fraunhofer ISI et al. 2011

Efficiency of RES-E financing instruments

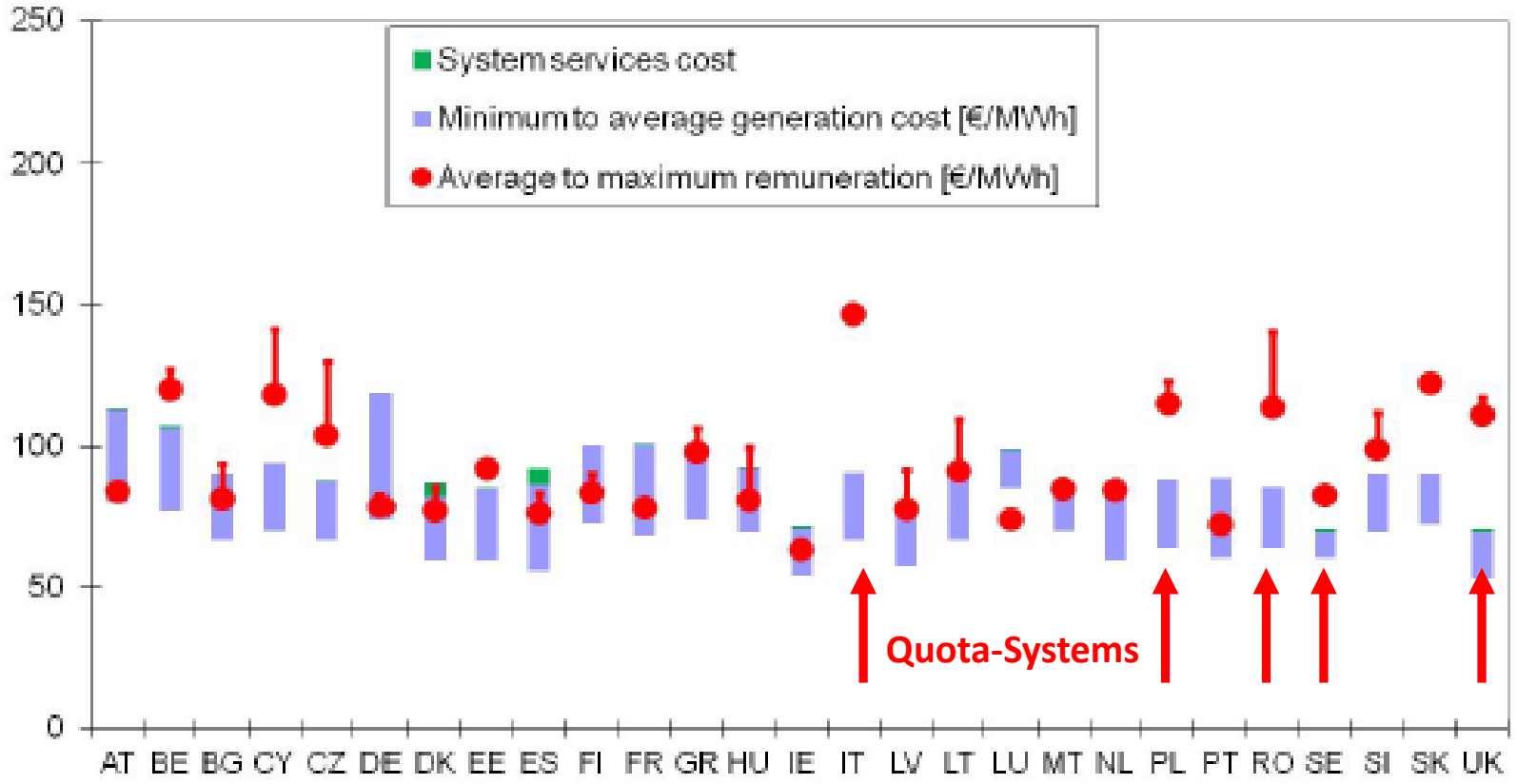

Figure 4-5: Remuneration ranges (average to maximum remuneration) for Wind Onshore in the EU-27 MS in 2011 (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs)

Source: Fraunhofer ISI et al. 2011

EU policy switch

In 2014, EU COM decided to request from all MS to switch to a tendering system

- **Only little experience in the EU and global**
- **Unclear if Germany is suspect or victim**
- **Safe instrument to prevent fast RES-E extension**
- **Will most likely put large utilities in better position**

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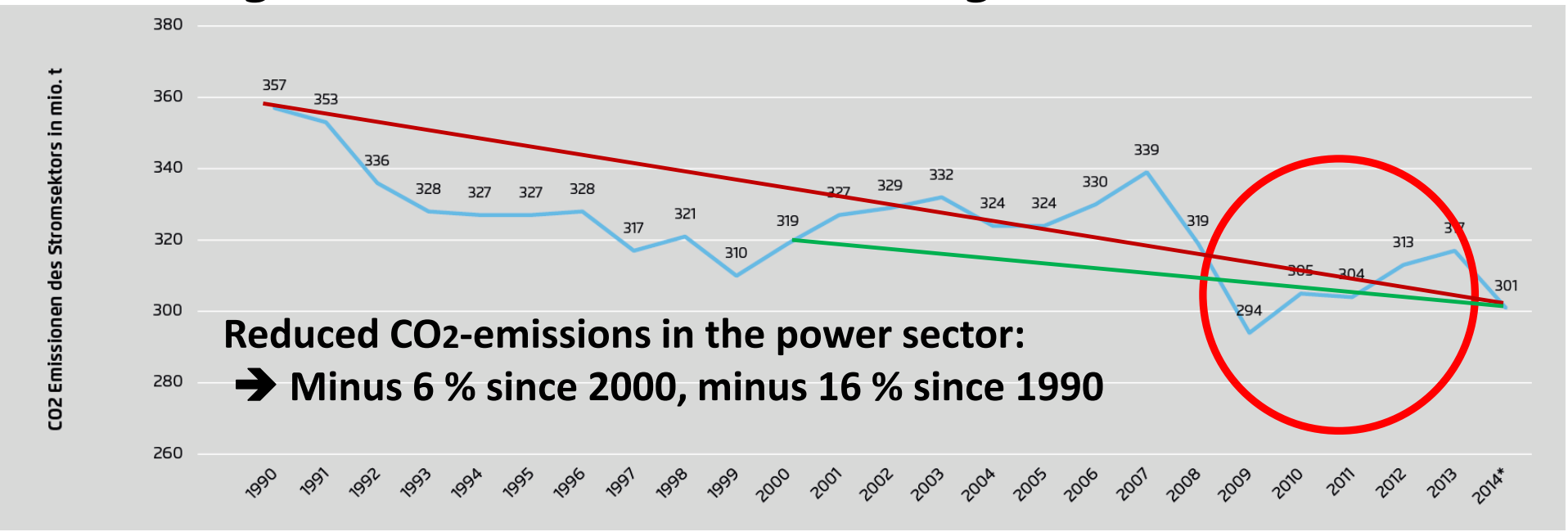
The new EEG and new energy policy in Germany

Discussion lead by

- **Misunderstandings**
- **Market oriented thinking**
- **More negative atmosphere against RES**
- **Unfavorable responsibilities**

Misunderstandings I

Increasing RES-E-shares and increasing CO_2-emissions?



Reasons for the increase of CO_2-emissions from 2010-2013:

- **Emission trading system: Dramatically dropped CO_2-price**
- **Phase out of 8 nuclear power plants in 2011**
- **Increasing power export**
- **Increasing price for natural gas**

Source: Agora Energie-wende 2015

Misunderstandings II

More market is needed

- **Market integration of wind and solar power plants**
  ➔ With and without market: Wind and sun provide energy only if wind blows and sun shines
- **Change to tender system**
  ➔ EU-COM 2008: „well-adapted feed in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity.“
- **RES-E investors should take more investments risks, e.g. long time price risks**
  ➔ Not reasonable as long as states sets extension targets

Fundamental changes in the EEG

➔ RES-E corridor: From minimum to maximum targets

- Max. 2500 MW/a onshore wind and photovoltaics
- Max. 750/500 MW/a offshore wind
- Max. 100 MW/a biomass

➢ *Corridor will clearly reduce RES-E extension*

➢ *Still strong increase, share of 80% in 2050 can be reached*

➔ Change to tender system

- Scheduled for „latest 2017“
- Pilot project for open space photovoltaics

➢ *International experience: few evidence for cost savings*

➢ *Disadvantage for small and medium companies*

➢ *Risk for the dynamic extension*

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Major RES-E are no more expencive than conventional power

Who ever wants to head for more RES-E does not have to take the burden Germany did

Phase out of nuclear power and climate protection can be combined

Feed-in-tariff-system is still the best instrument to finance RES-E

Political discussion is lead by misunderstandings

Conclusions

There are a number of positive side effects with the Energiewende

- **Job creation**
- **More competition in the energy market**
- **Reduction of dependence from fuel from geopolitical instable regions with unpredictable price changes**
- **Reduction of dependence from fuel with unpredictable price changes**
- **Reduction of traditional environmental damages**

Political disandvantage:

Energiewende comes with (strong) structural changes

Thank you for your attention

Uwe Nestle

+49-431-53677053
+49-1520-8177456

Uwe.Nestle@EnKliP.de

www.EnKliP.de
www.foes.de