The German Energiewende

Uwe Nestle

Agda Energi Seminar

Brussels, June 19, 2015

EnKliP

Energy and Climate Policy | Consulting

Content

General Aspects of the Energiewende

Electricity Market Design

The New Renewable Energy Sorces Act (EEG)

Costs of Renewable Energy in the Power Sector

The „Climate Levy“

Challenges

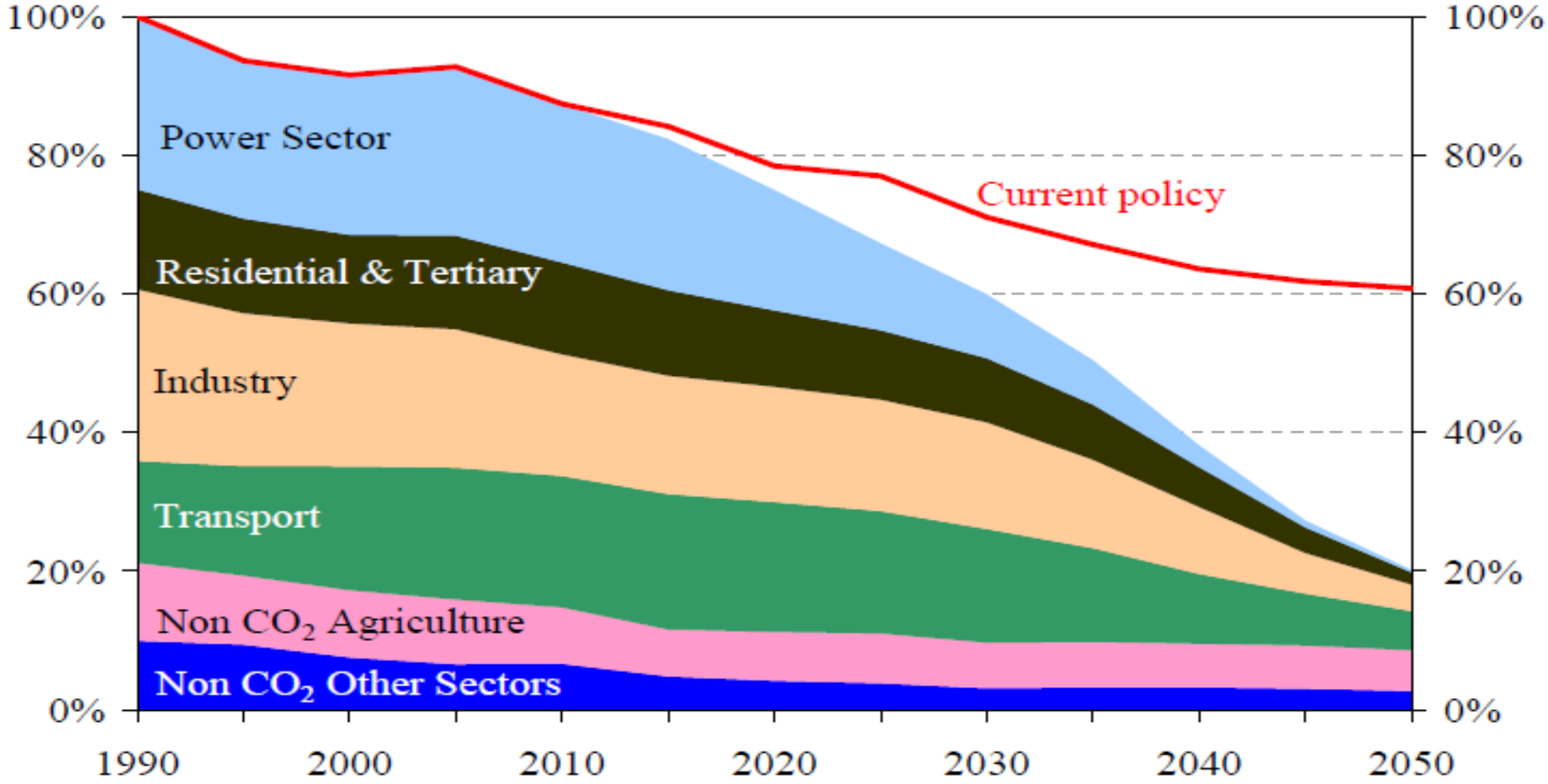
Kofi Annan 2014

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 generation system needs modernisation

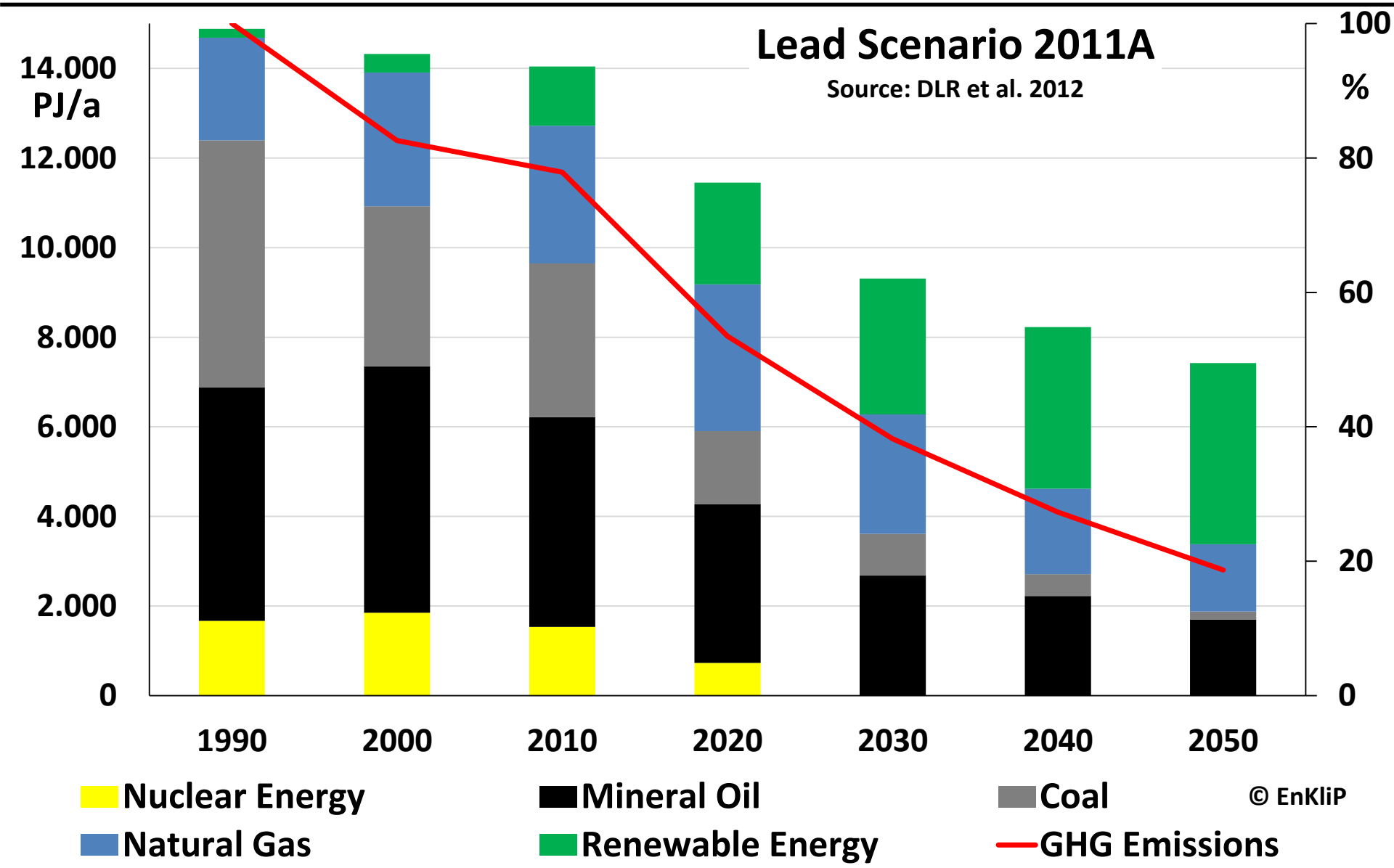
A) For climate protection reasons

B) Many power plants are old

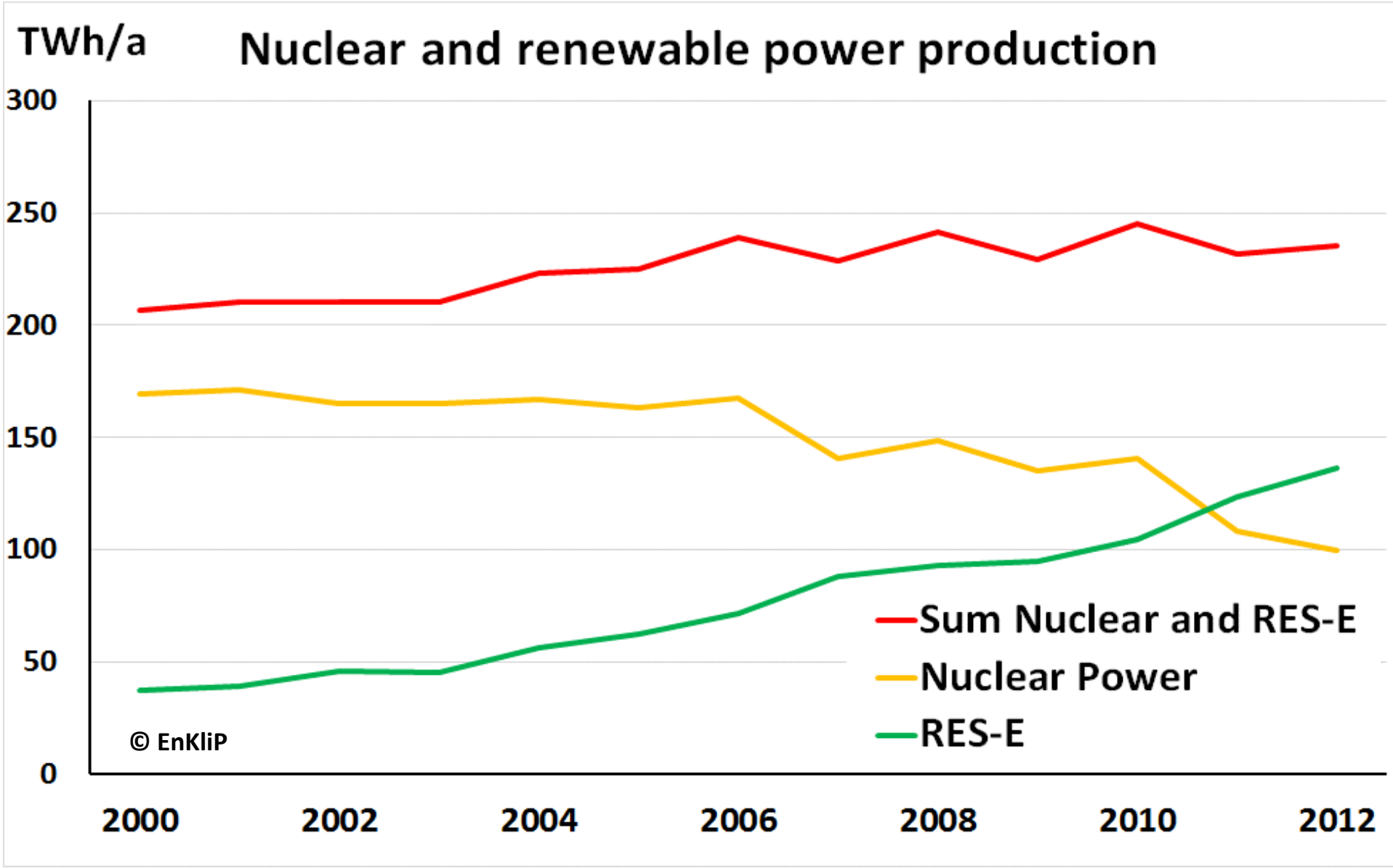
- 50% of installed coal capacity is older than 30 years
- 25% of installed coal capacity is older than 40 years
- 40% of installed natural gas capacity is older than 30 years
  (source: BNetzA)

C) Phase out of nuclear power until 2022

Possible energy future of Germany (Government Study)



The Energiewende is a success



CO2-emissions in the power sector 1990 to 2014

Source: Agora Energiewende 2015

Reduced CO2-emissions by the power sector:

➔ **Minus 6 % since 2000, minus 16 % since 1990**

Source: www.epexspot.com

Content

General Aspects of the Energiewende

Electricity Market Design

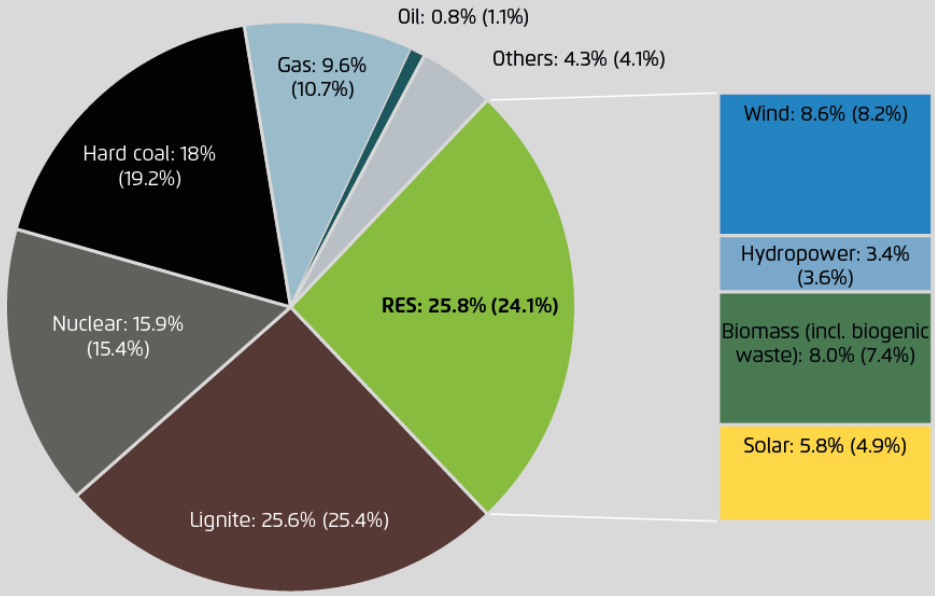
The New Renewable Energy Sorces Act (EEG)

Costs of Renewable Energy in the Power Sector

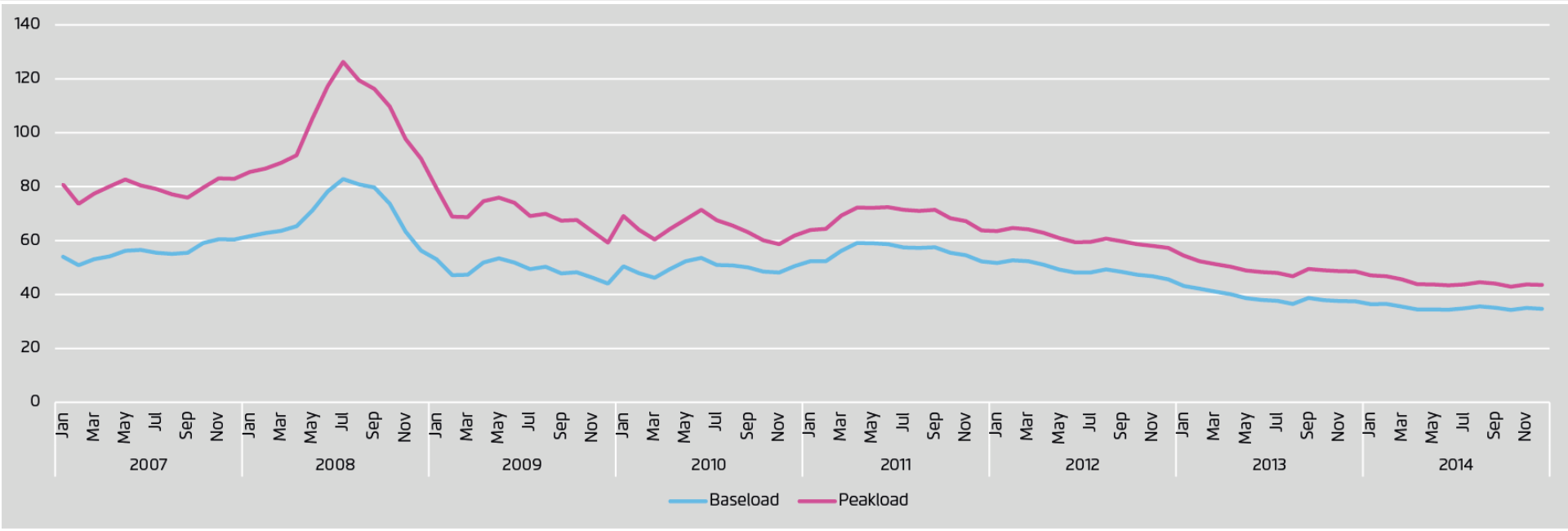
The „Climate Levy“

The structure of the power generation system

Source: Agora Energiewende 2015



Electricity Prices at the EEX (Annual Futures) form 2007 to 2014



Source: Agora Energiewende 2015

- **Prices for electricity at the gross market (e.g. EEX) have been dropping for years and will continue to drop**
- **Therefore, new investments in power plants are not profitable**
- **Even some existing power plants are not profitable anymore**

➔ **This development can be seen in other countries that liberalised their power market (USA, UK, France)**

Source: www.epexspot.com

The challenge

Due to steady low and dropping prices for electricity,

many existing power plants do not make profits any more,

in particular gas power plants might be phased out,

no investments in new power plants – except of RES-E.

➔ This might become a problem for the security of power supply – if renewables can´t do it alone

Decision of principle is required

Optimised electricity market (Electricity Market 2.0)
or
Additional market (Capacity Market)

Proposal: Electricity Market 2.0

Expanding and otimising power grids

Accept extreme price peaks

Capacity reserve as a safeguard (outside teh marked!)

Content

General Aspects of the Energiewende

Electricity Market Design

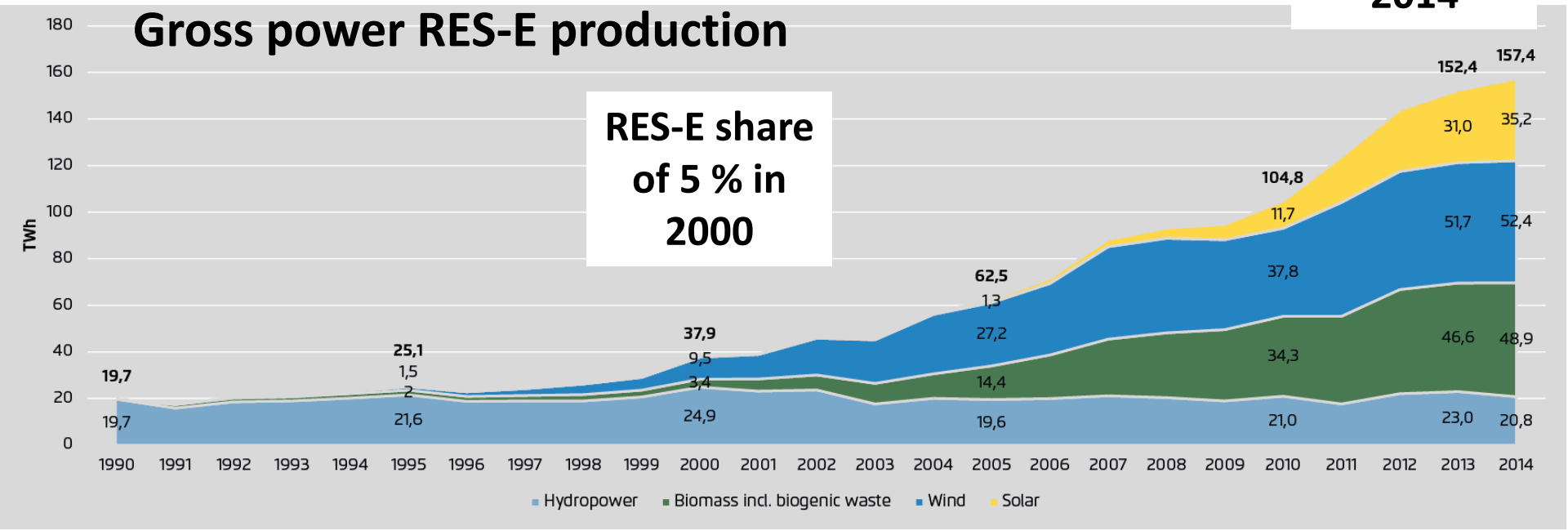
The New Renewable Energy Sorces Act (EEG)

Costs of Renewable Energy in the Power Sector

The „Climate Levy“

RES-E development 1990 to 2014

RES-E share of 27,2% in 2014



Source: Agora Energiewende 2015

More positive effects of the EEG

- RES-Costs dropped, with photovoltaik strongly

➔Great deal for global development and climate protection

- 380.000 jobs
- 90 Mio. t CO2 emissions reduced (10 % of total German emissions)

Changes in the EEG

- Fixed strike price is abolished
  Obligatory direct marketing (basis premium tariff)
  (EEG 2012: mandatory direct marketing)
  ➔ For variable RES-E not resonable
  ➔ Leads to higher costs (0,4 Ct/kWh)
  ➔ Puts big players in a better position
- „Sun tax“ for own consumption of RES-E
  (mainly photovoltaic, 30 – 40 % of the EEG surcharge is to be payed)
- Reduction of feed-in-tariff for onshore wind

Fundamental changes in the EEG (1/2)

➔ **Corridor for RES-E-Expansion**

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

➢ *Corridor will clearly reduce RES-E expansion*

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

Fundamental changes in the EEG (2/2)

➔ **Change to bidding process**

- scheduled for „latest 2017“
- pilot project for open space photovoltaics

➢ *International experience: few evidence for cost savings*

➢ *First bidding round led to a price of 9,17 Ct/kWh*
Renumeration after former EEG at date 8,99 Ct/kWh
Reduction of 0,5 % per Month

➢ *Disadvantage for small and medium companies*

➢ *Risk for the dynamic expansion*

Content

General Aspects of the Energiewende

Electricity Market Design

The New Renewable Energy Sorces Act (EEG)

Costs of Renewable Energy in the Power Sector

The „Climate Levy“

RES-Costs

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

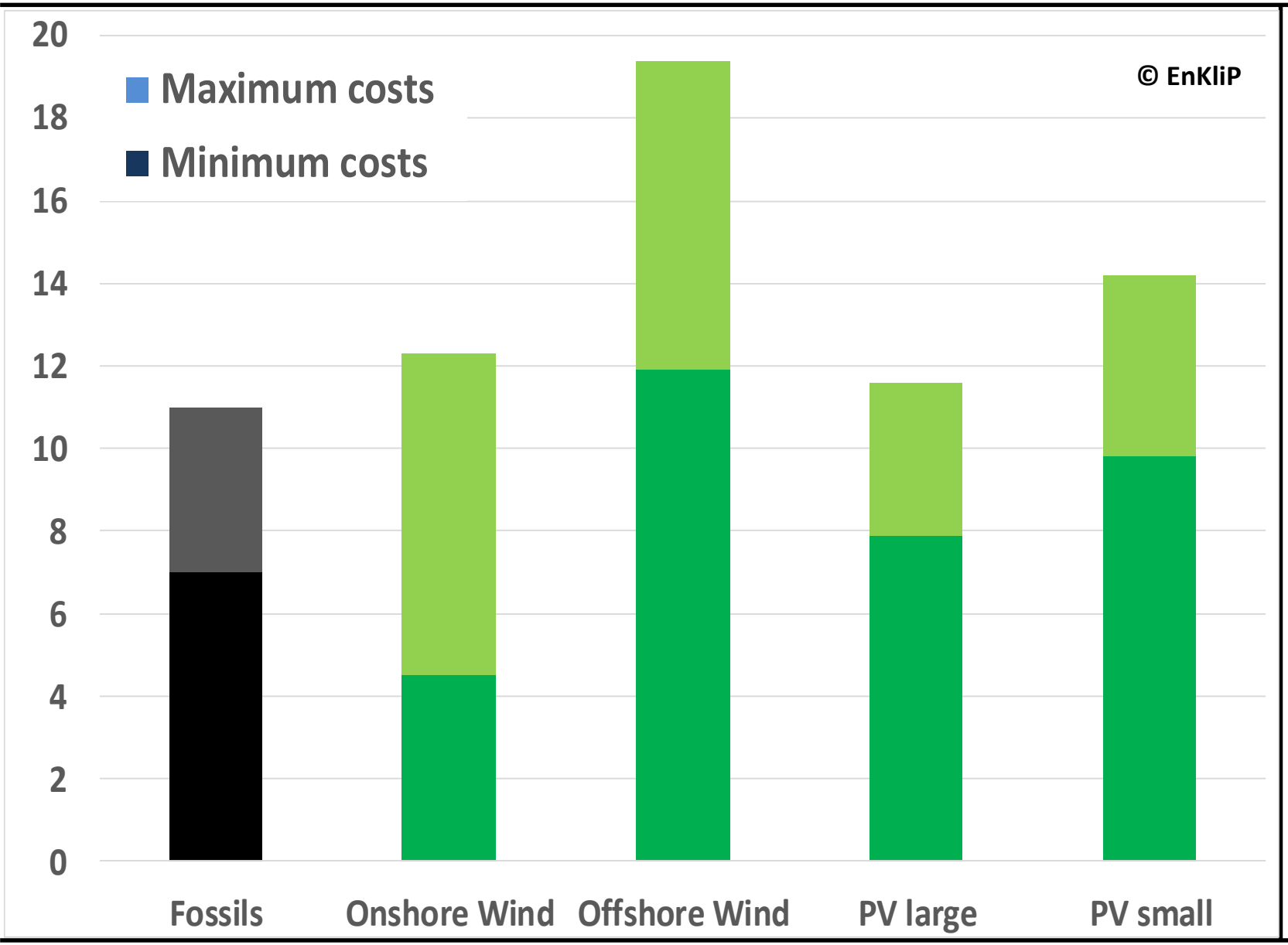
EEG-surcharge ≠ extra costs for RES-E extansion

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 renewable power plants***

Production costs for power generation with new power plants



Sources:

Prognos 2013

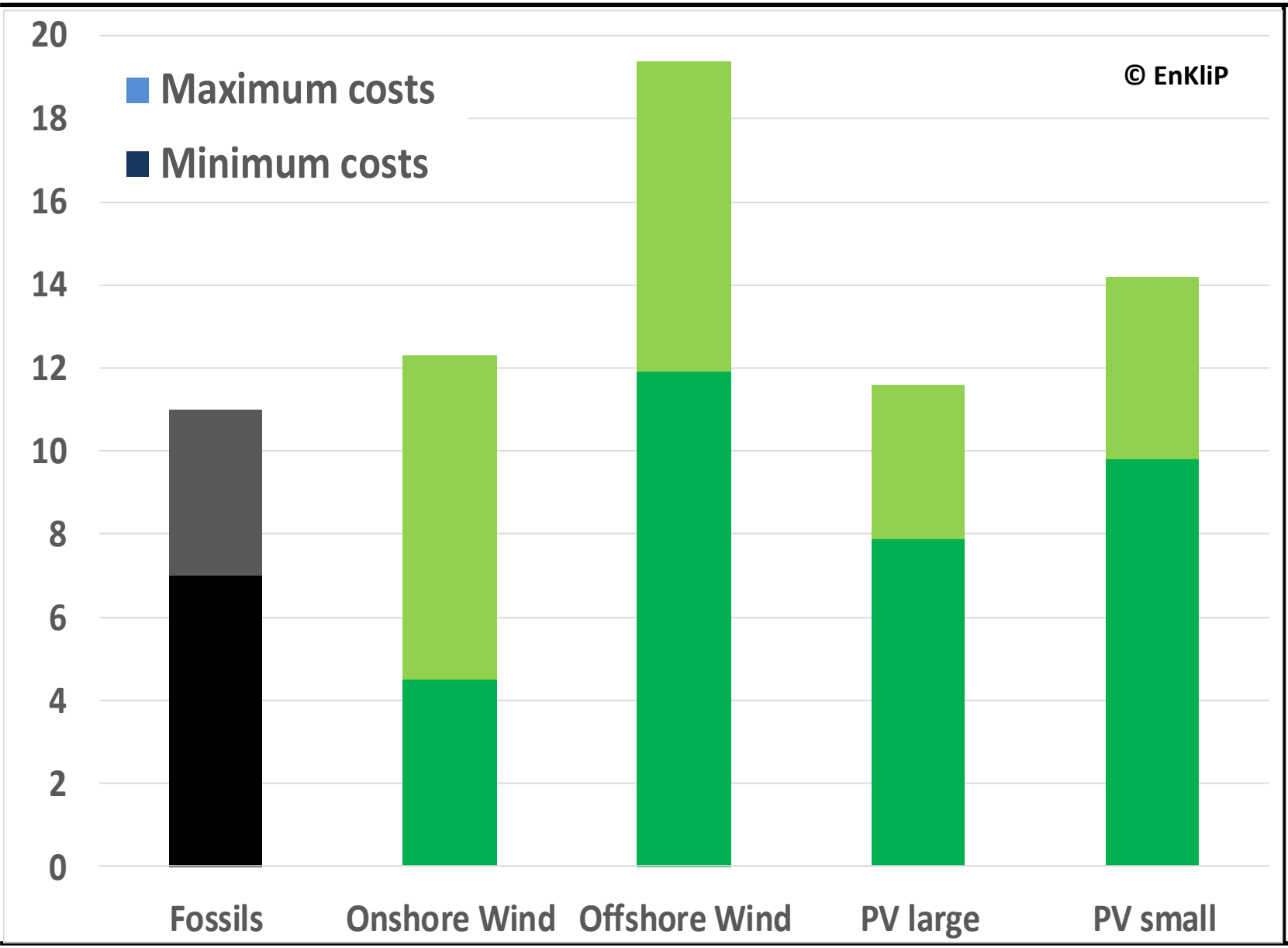
Agora 2013

DECC 2012

Fhg ISE 2013

FÖS 2012

Production costs for power generation with new power plants



External costs:

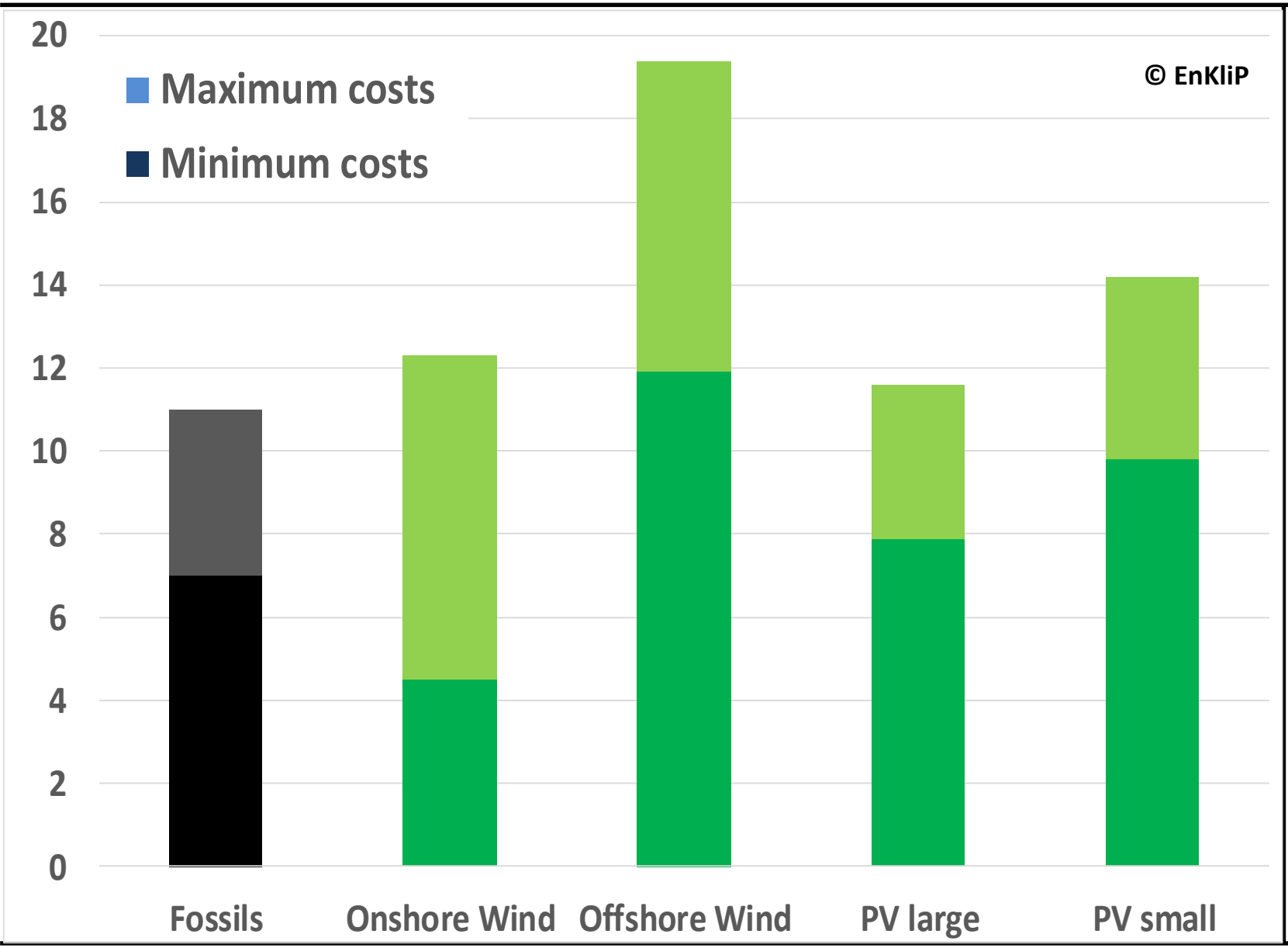
Brown coal:
9,2 Ct/kWh

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



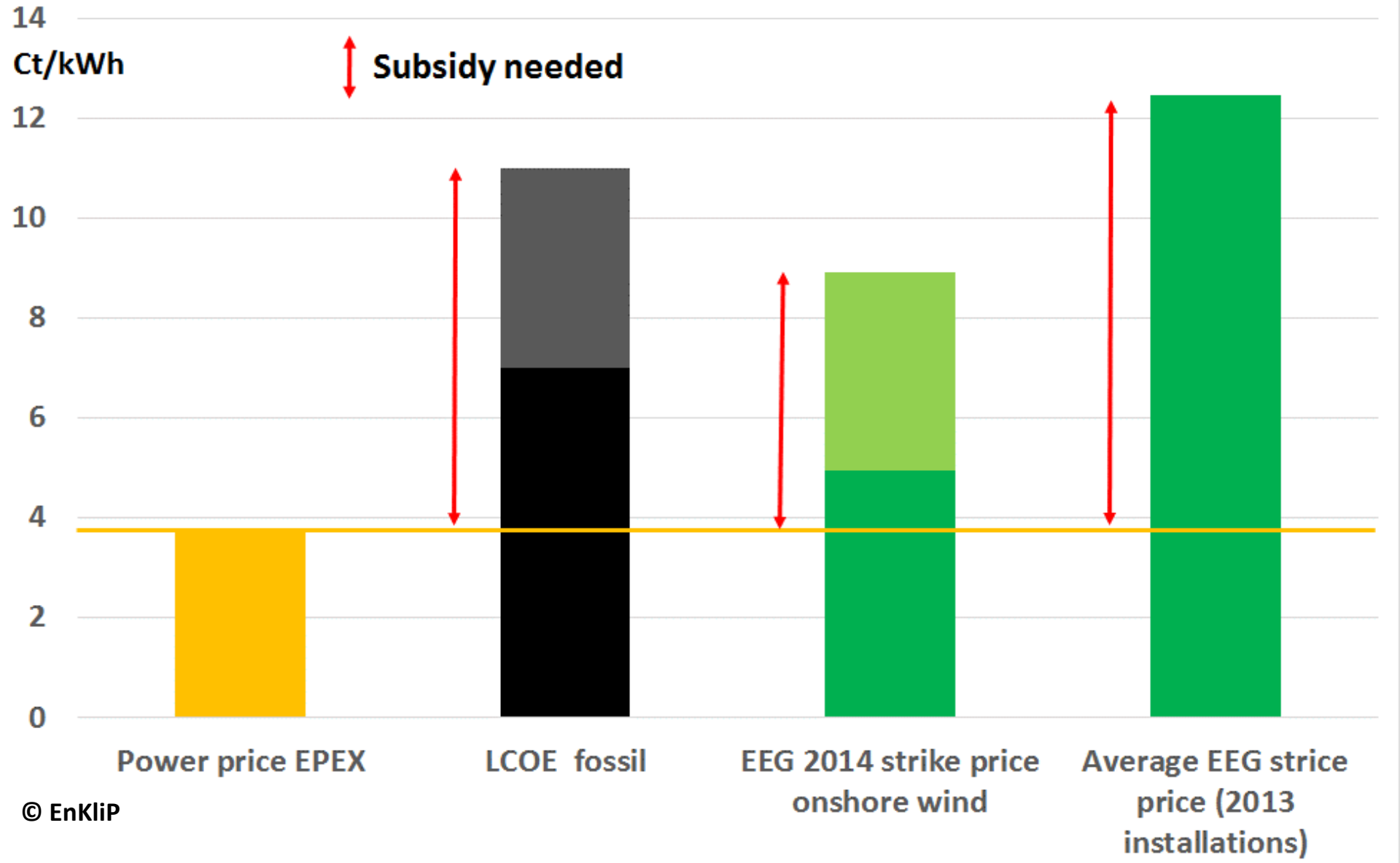
Trend:

RES-E ↘

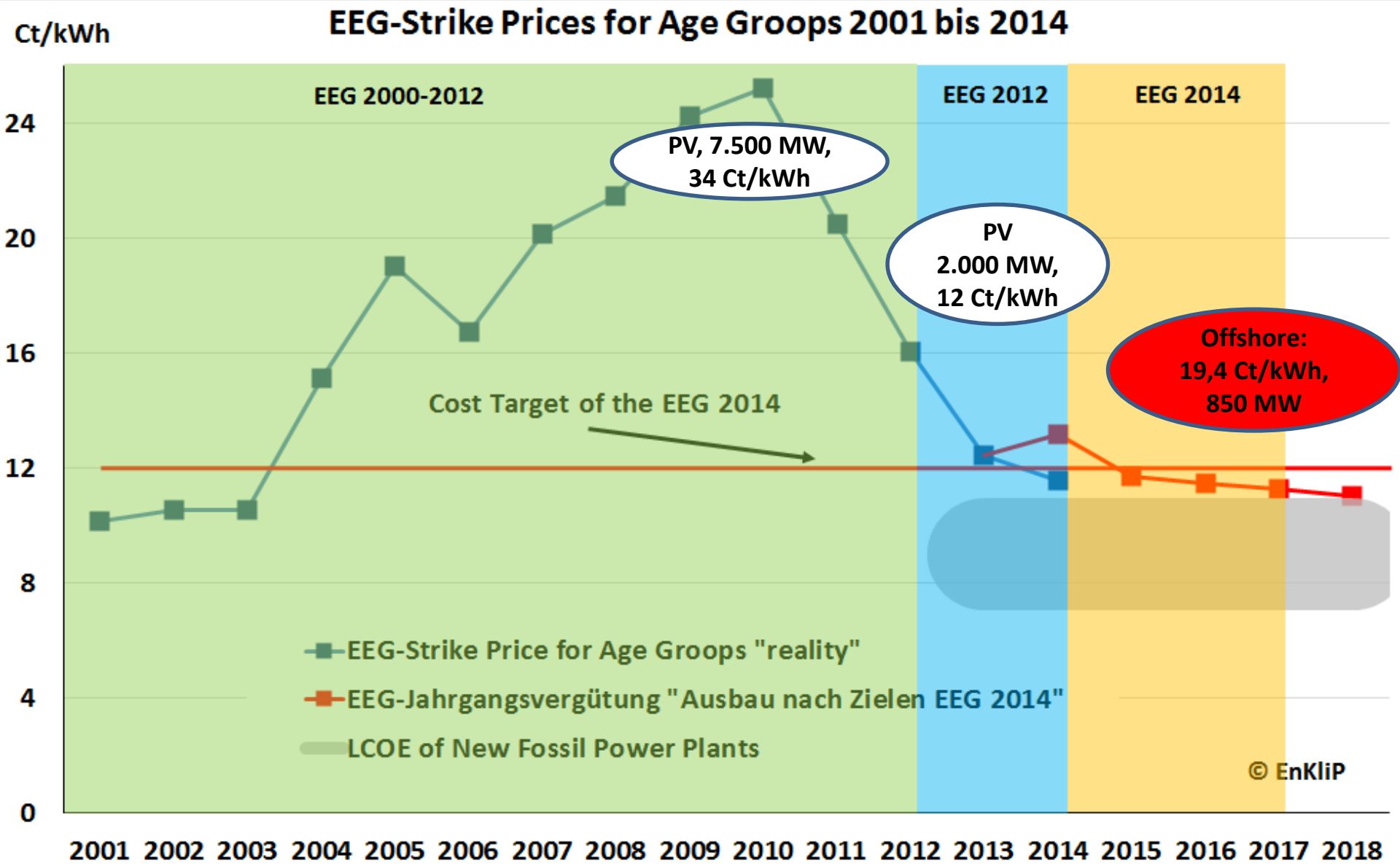
Fossil ↗

Nuclear ↗

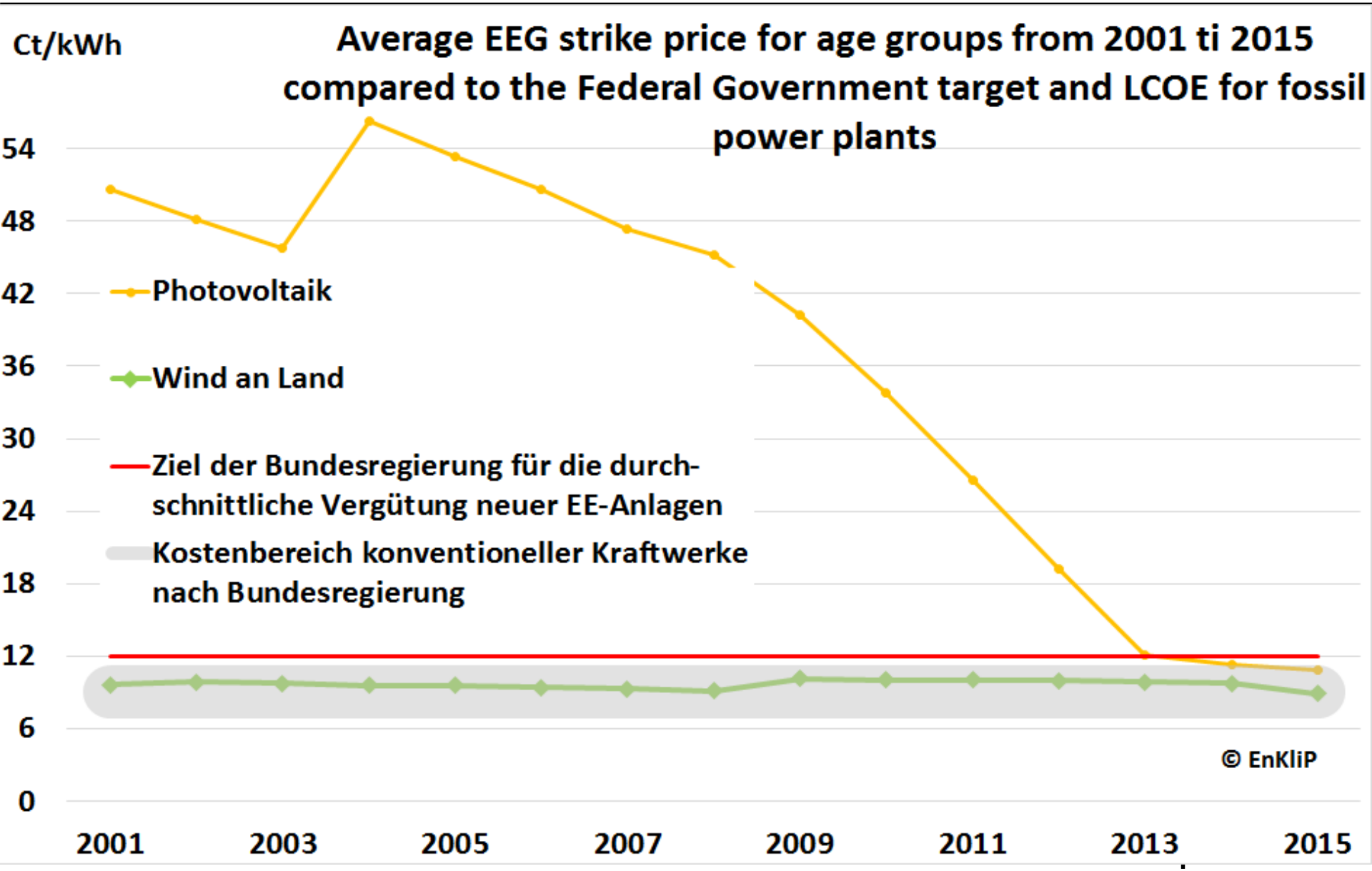
EEG surcharge: The wrong indicator



Cost effects of the EEG 2014: Average Strike Price of Age Group



Price drops with photovoltics 2001 to 2015



Content

General Aspects of the Energiewende

Electricity Market Design

Costs of Renewable Energy in the Power Sector

The New Renewable Energy Sorces Act (EEG)

The „Climate Levy“

The excess of 22 Mio. Tonnes of CO_2

Climate Target: Minus 40 % GHG-Emissions by 2020

Climate Action Programm

- All sectors have to do something (Buildings, Traffic, Industry, Power Producer, etc.)
- Power Sector has to reduce by additional 22 Mio tonnes

The excess of 22 Mio. Tonnes of CO_2

The Climate Levy of the Ministry for Economic and Energy

- Fossil power plants older than 20 years have to pay CO2-tax, additional to Emission Trading System (in the range of 15-20 €/t)
- Examption for a part of the emissions for each plant
- The older the plant, the smaller the examption

➔ The oldest – and dirtiest plants become uneconomical

➔ Minimum effect on the electricity price

The excess of 22 Mio. Tonnes of CO_2

The Climate Levy of the Ministry for Economic and Energy

- Worker unions, and some politicans were strongly against it
- Chancellor Merkel did not back energy minister
- It seems that the climate levy will be skipped

The excess of 22 Mio. Tonnes of CO_2

The alternative

- Old coal powert plants go into the marked reserve
- More state aid for energetic modernisation of the building sector

➔ Change from policy to force to policy of subsidise

Thank you for your attention

Uwe Nestle

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

Uwe.Nestle@EnKliP.de

www.EnKliP.de
www.DasEnergieQuiz.de