



# The post Fukushima energy policy changes in Germany – An impact assessment

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Journée de la Chaire

Prospective pour les enjeux Energie-Climat

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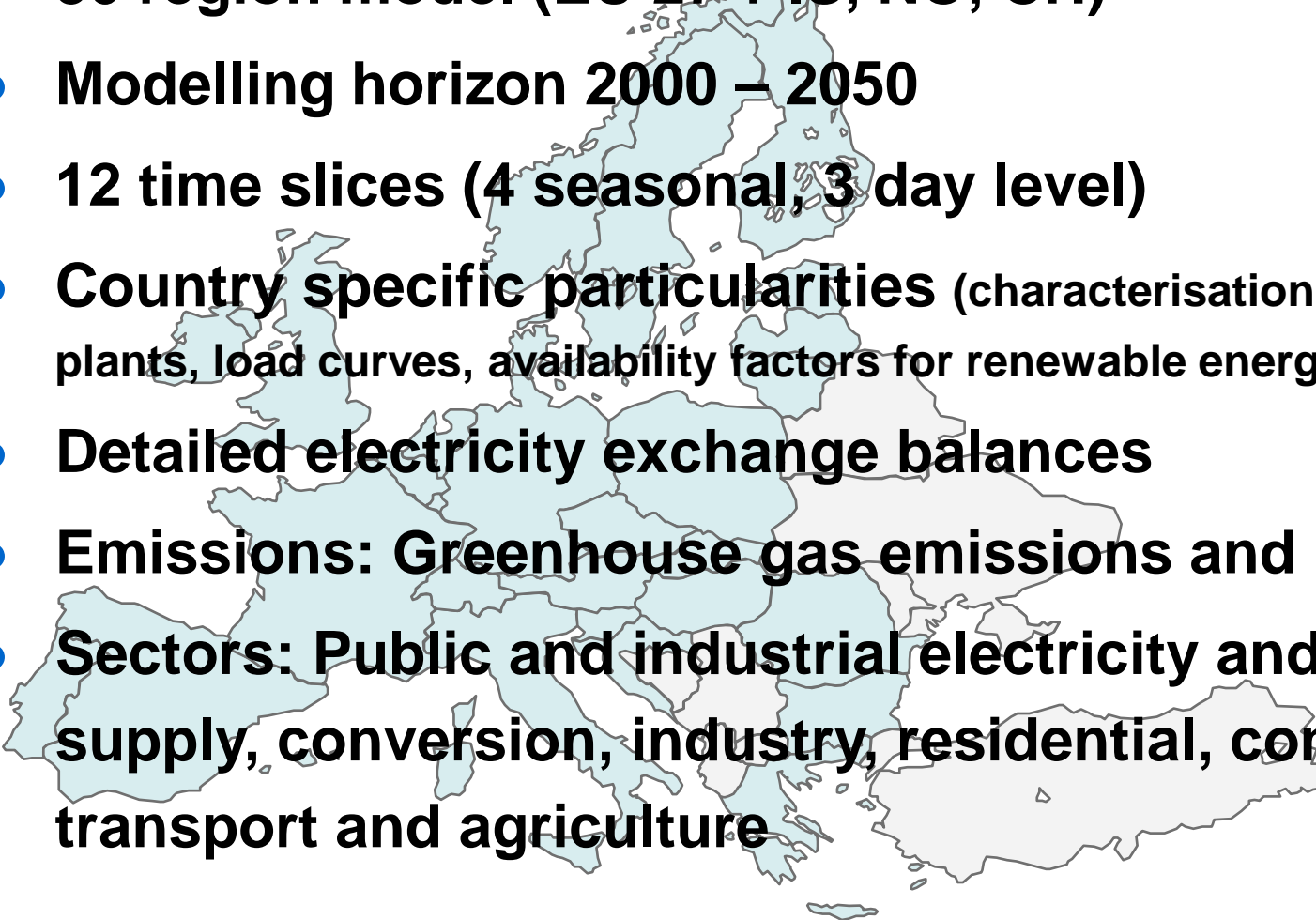


# „Energiewende“ – The Post Fukushima Energy Strategy

- The long-term vision – the age of renewables to start in 2050
- Faster expansion of the use of renewable energies, e.g. power production from renewables, 35% in 2020 and 80% in 2050
- Support and accelerate the expansion of the electricity network and storage systems
- Boosting energy efficiency to cut
  - primary energy consumption by 20% in 2020 and 50% in 2050
  - electricity consumption by 10% in 2020 and 25% in 2050
  - climate-neutral building in 2050
- The last German nuclear power plant is to be shut down by 2022
- Stick to GHG reduction targets: -40% in 2020; 80 to 95% in 2050
- Electric cars – the vehicles of the future: 2020 one million, 2030 six million electric cars

 *A roadmap to a low-carbon, secure competitive and affordable energy system?*

# TIMES PanEU model characterisation

- **30 region model (EU 27 + IS, NO, CH)**
  - **Modelling horizon 2000 – 2050**
  - **12 time slices (4 seasonal, 3 day level)**
  - **Country specific particularities** (characterisation of new power plants, load curves, availability factors for renewable energy sources, ...)
  - **Detailed electricity exchange balances**
  - **Emissions: Greenhouse gas emissions and Pollutants**
  - **Sectors: Public and industrial electricity and heat supply, conversion, industry, residential, commercial, transport and agriculture**
- 



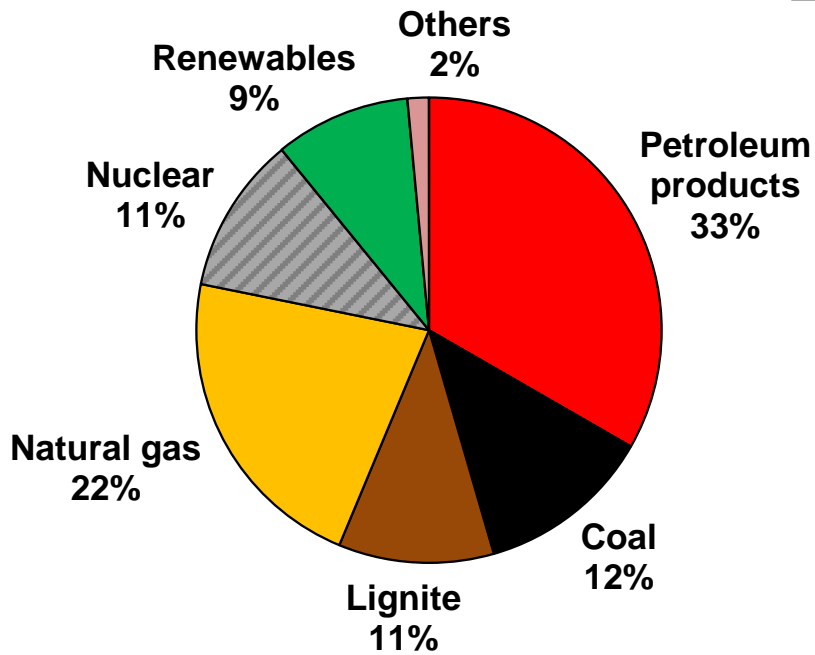
- Energy in Germany –  
situation at the outset



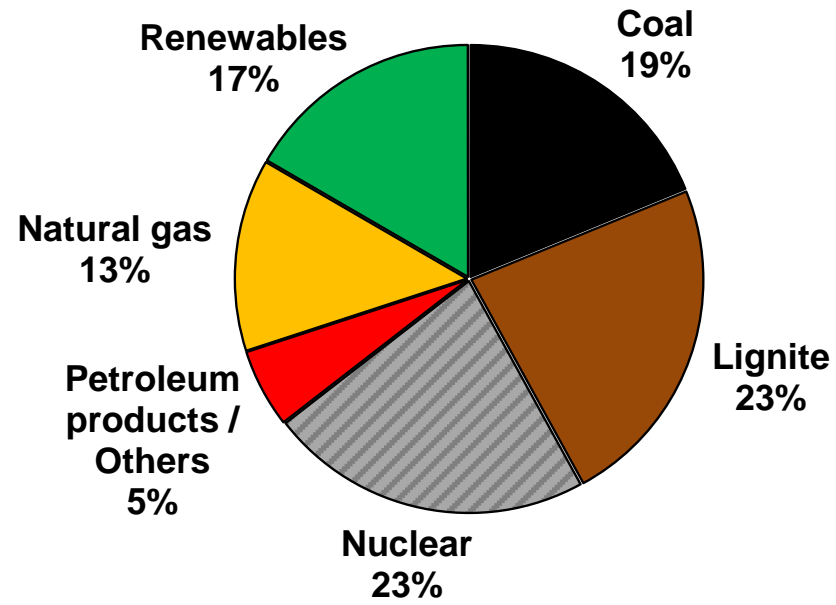
### Primary energy consumption

### Gross electricity generation

2010



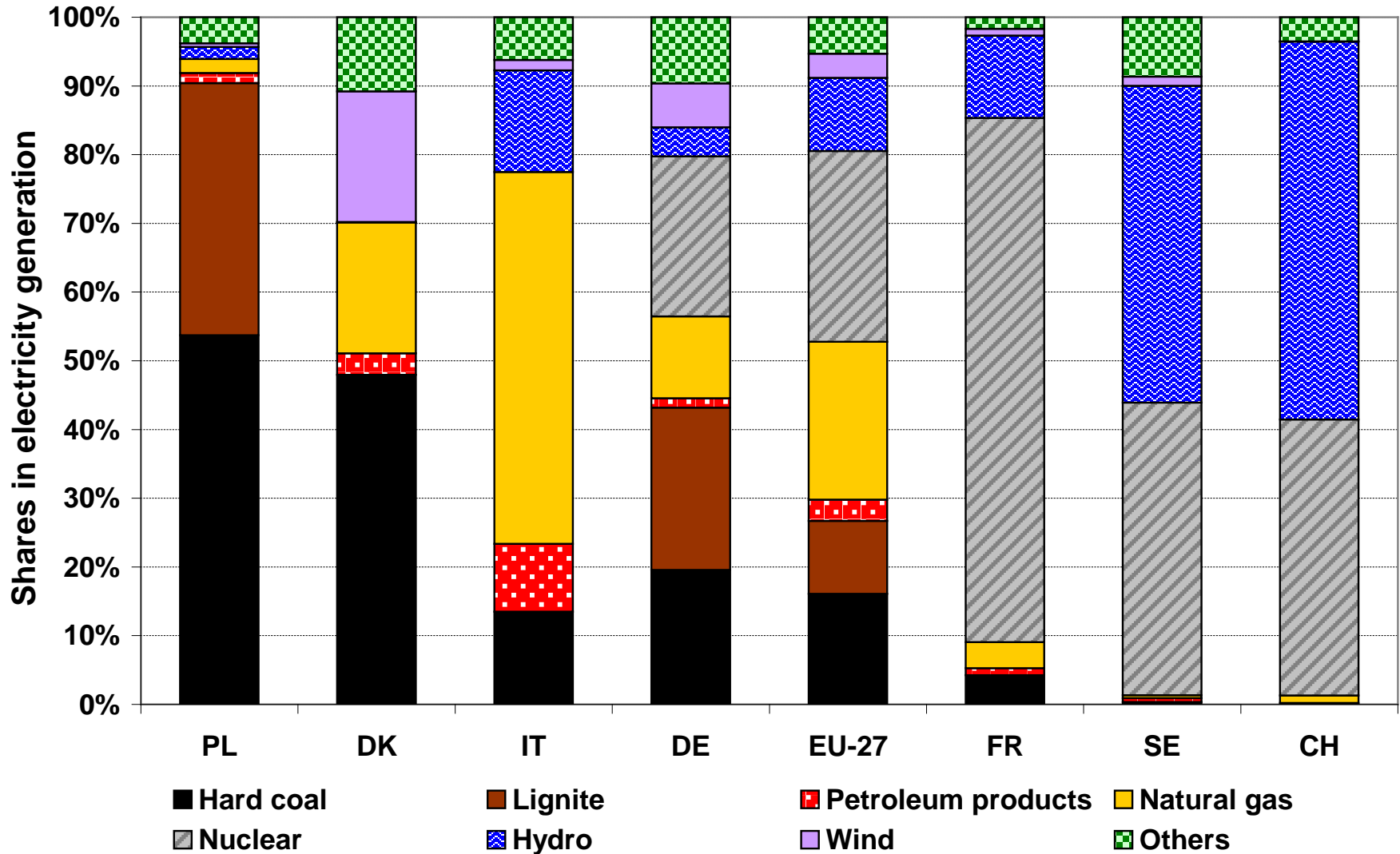
Total: 14 EJ



Total: 625 TWh

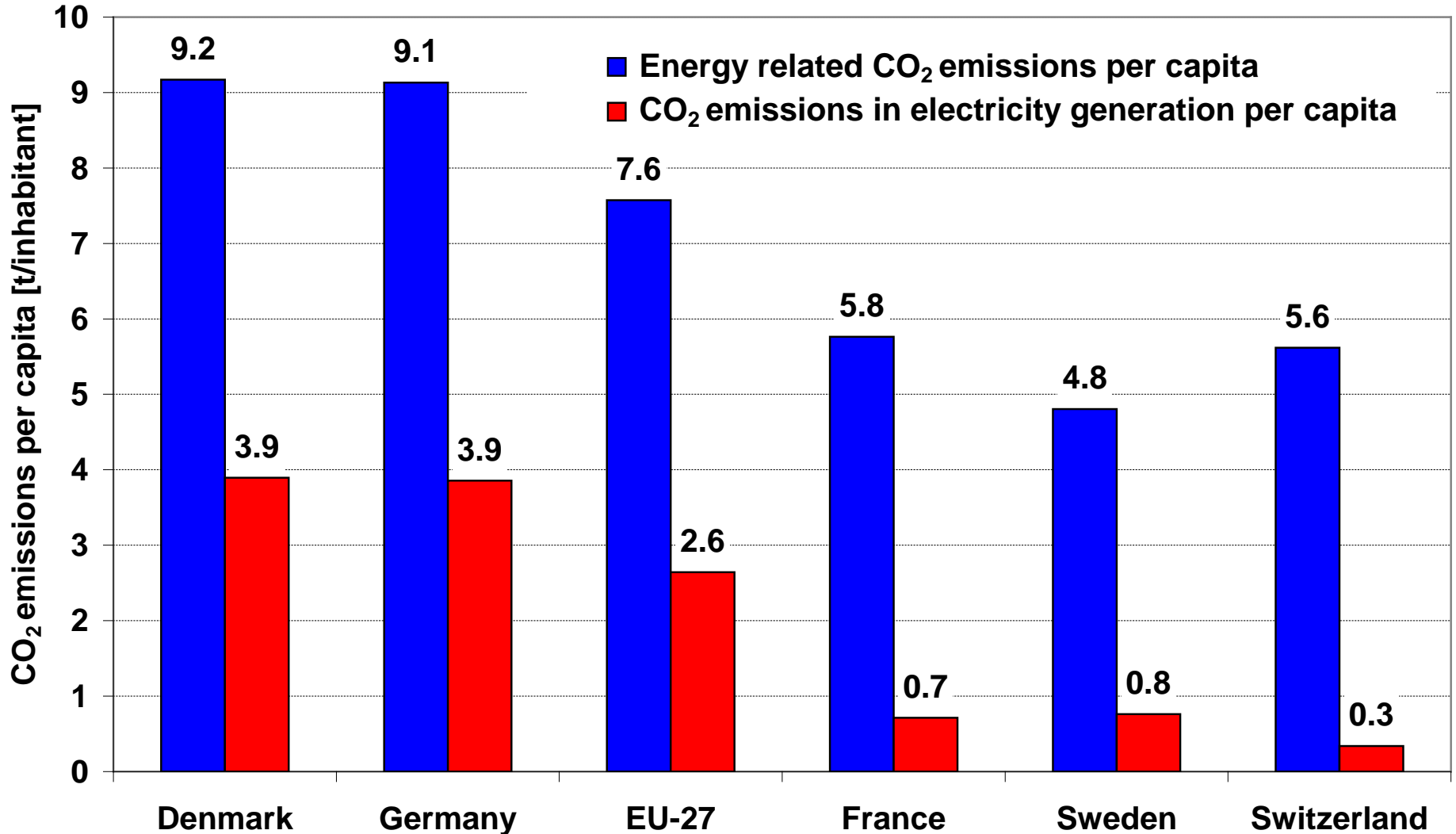
Source: BMWi (2011)

# Electricity generation by fuel in selected countries (2008)



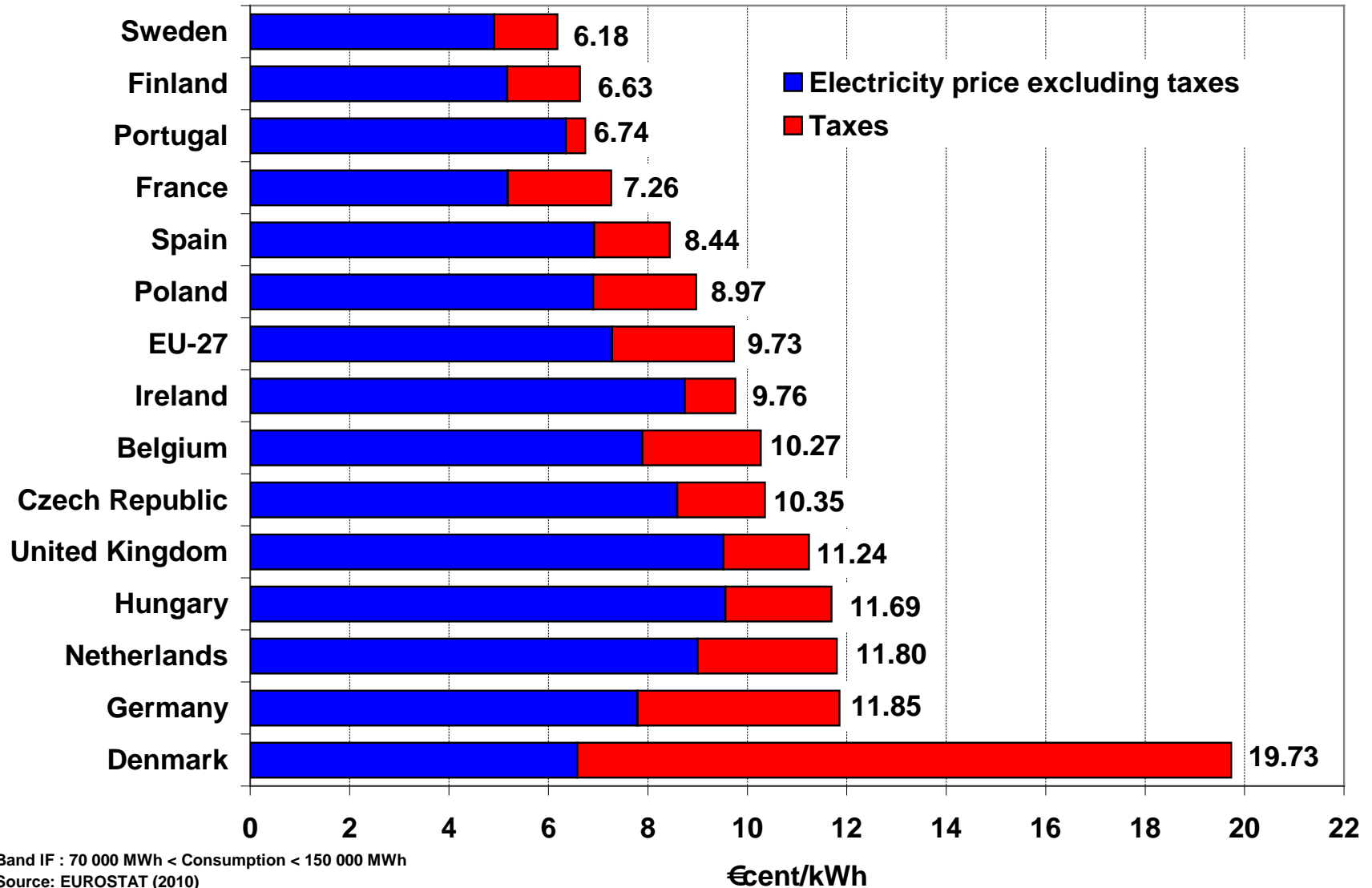
Source: EUROSTAT (2010)

# CO<sub>2</sub> emissions in Europe: selected countries



Source: UNFCCC (2010) and EUROSTAT (2010), own calculations;  
 CO<sub>2</sub> in electricity generation comprises emissions from public electricity and heat production

# Electricity prices in industry (1<sup>st</sup> half-year of 2009)







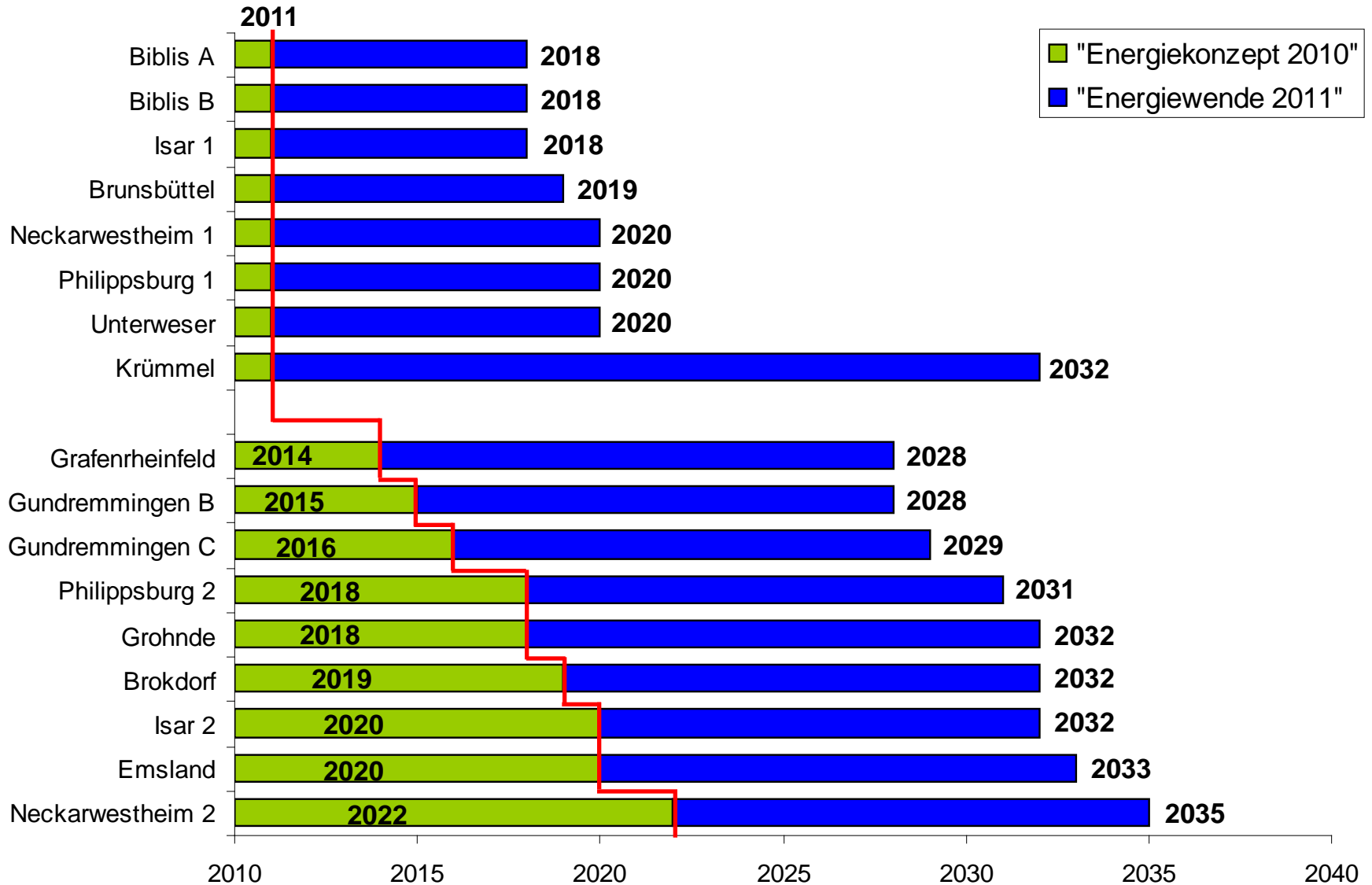
- Energy Outlook – Comparison of three pathways to a low-carbon energy system



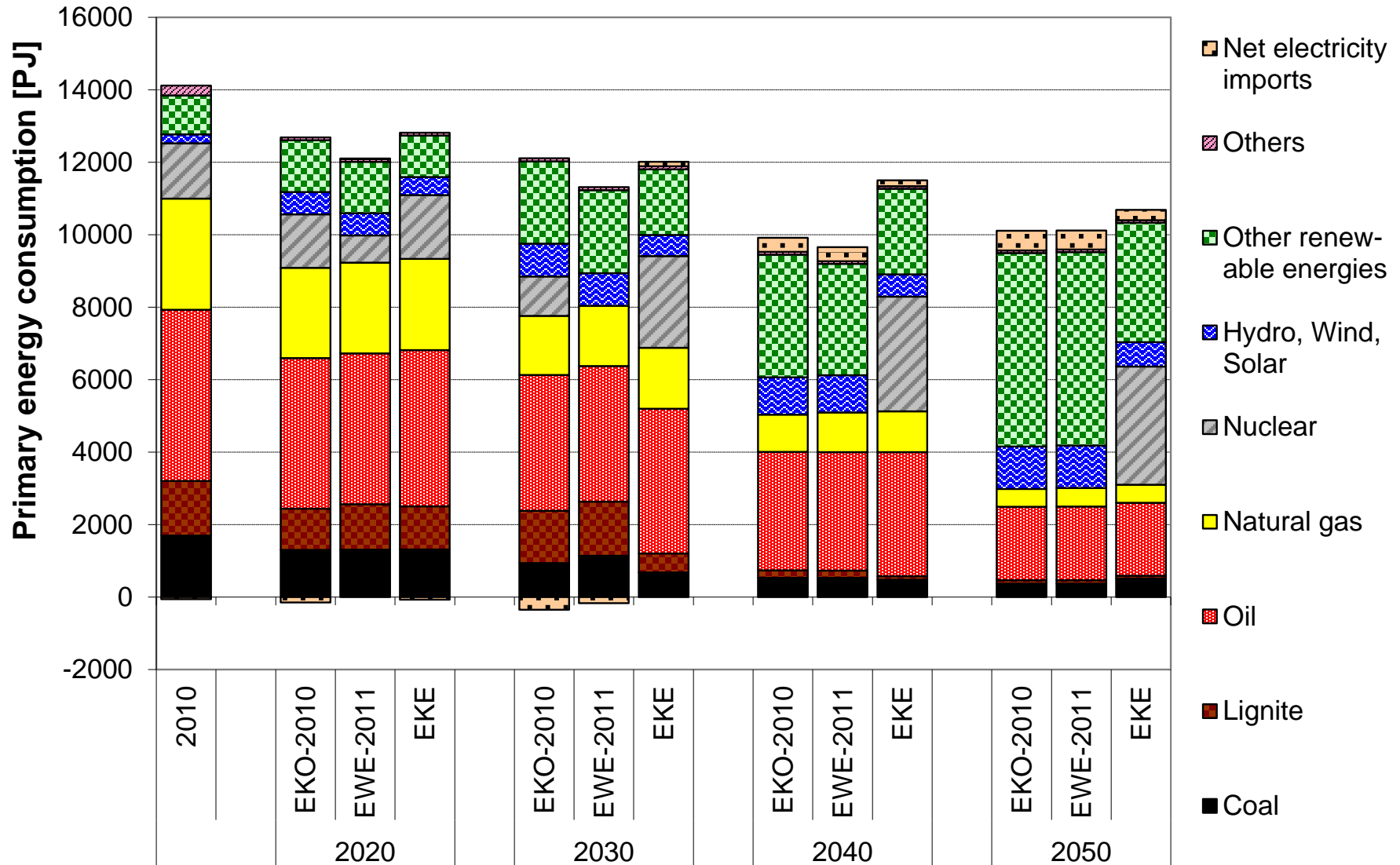
# Scenario Characterisation

<b>EKO-2010 Energy Concept 2010</b>	<b>GHG-Reduction</b>
<ul style="list-style-type: none"><li>• Nuclear phase out in Germany by 2035 (44 a lifetime)</li><li>• Increasing share of renewable energies e.g. electricity Germany: 35% in 2020 / 80% in 2050 EU: ~ 30% in 2020 / ~ 60% in 2050</li></ul>	Germany: 40% in 2020 80% in 2050
<b>EWE-2011 „Energiewende“ Concept 2011</b>	<b>EU-27</b>
<ul style="list-style-type: none"><li>• Nuclear phase out in Germany by 2022</li><li>• Increasing share of renewable energies (as in EKO-2010)</li></ul>	20%(30) in 2020 80% in 2050
<b>EKE Efficient climate protection in Europe</b>	(targets refer to Kyoto base year 1990)
<ul style="list-style-type: none"><li>• Lifetime extension to 60a and nuclear capacity extension possible in Germany and other EU-countries</li><li>• Moderate expansion of renewable energies</li></ul>	

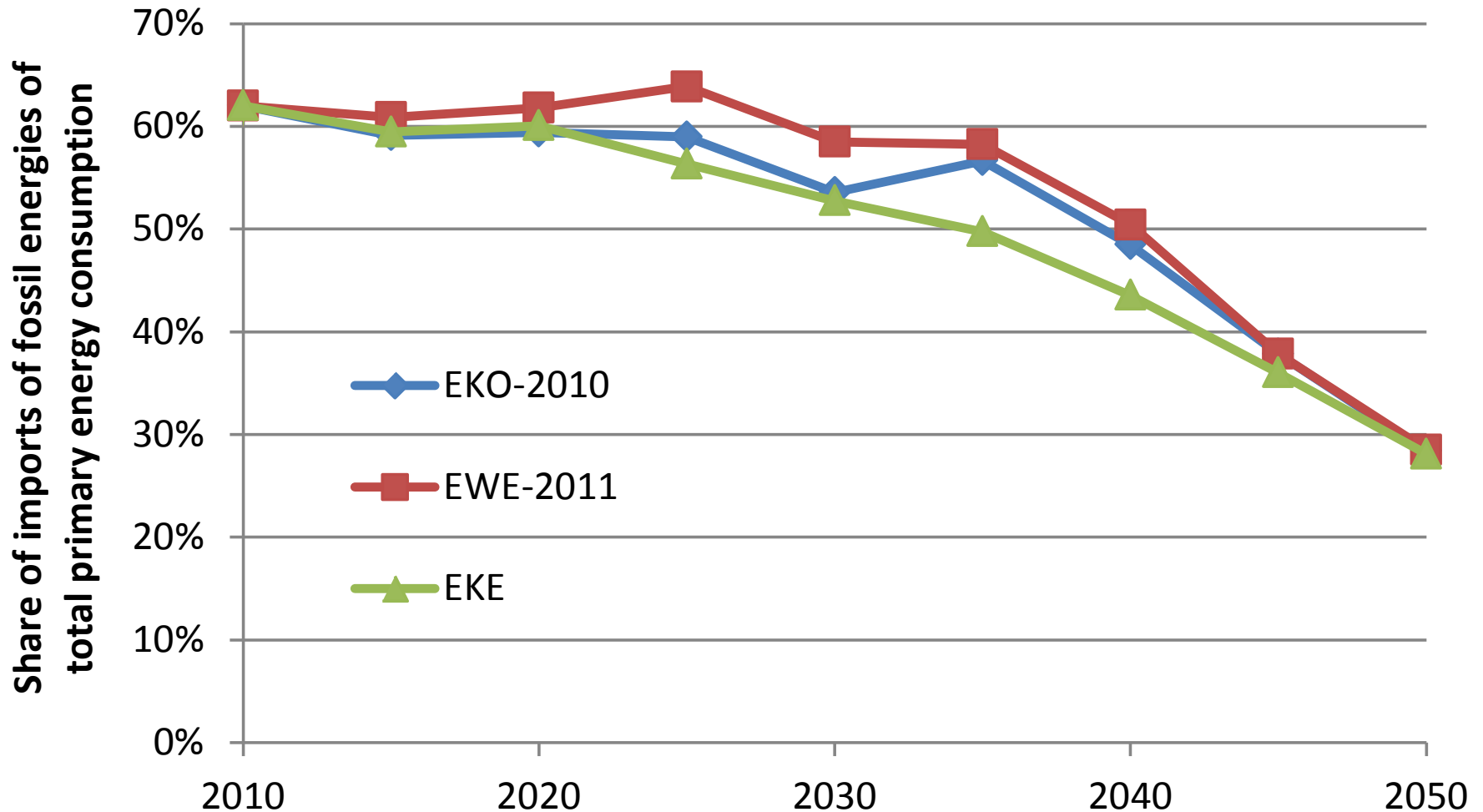
# Phase out of nuclear plants in Germany



# Primary energy consumption in Germany

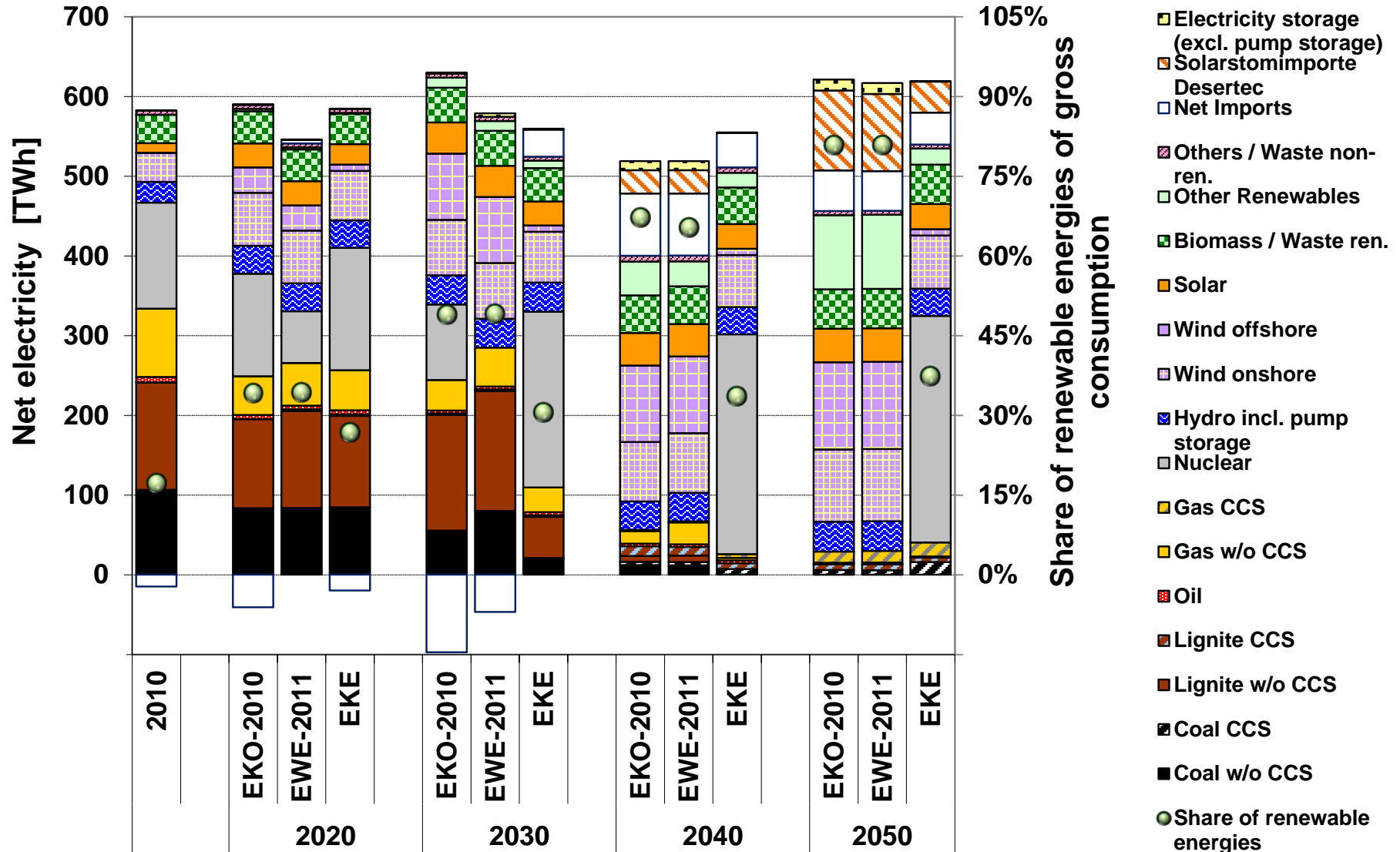


# Share of imports of fossil energies of total primary energy consumption in Germany



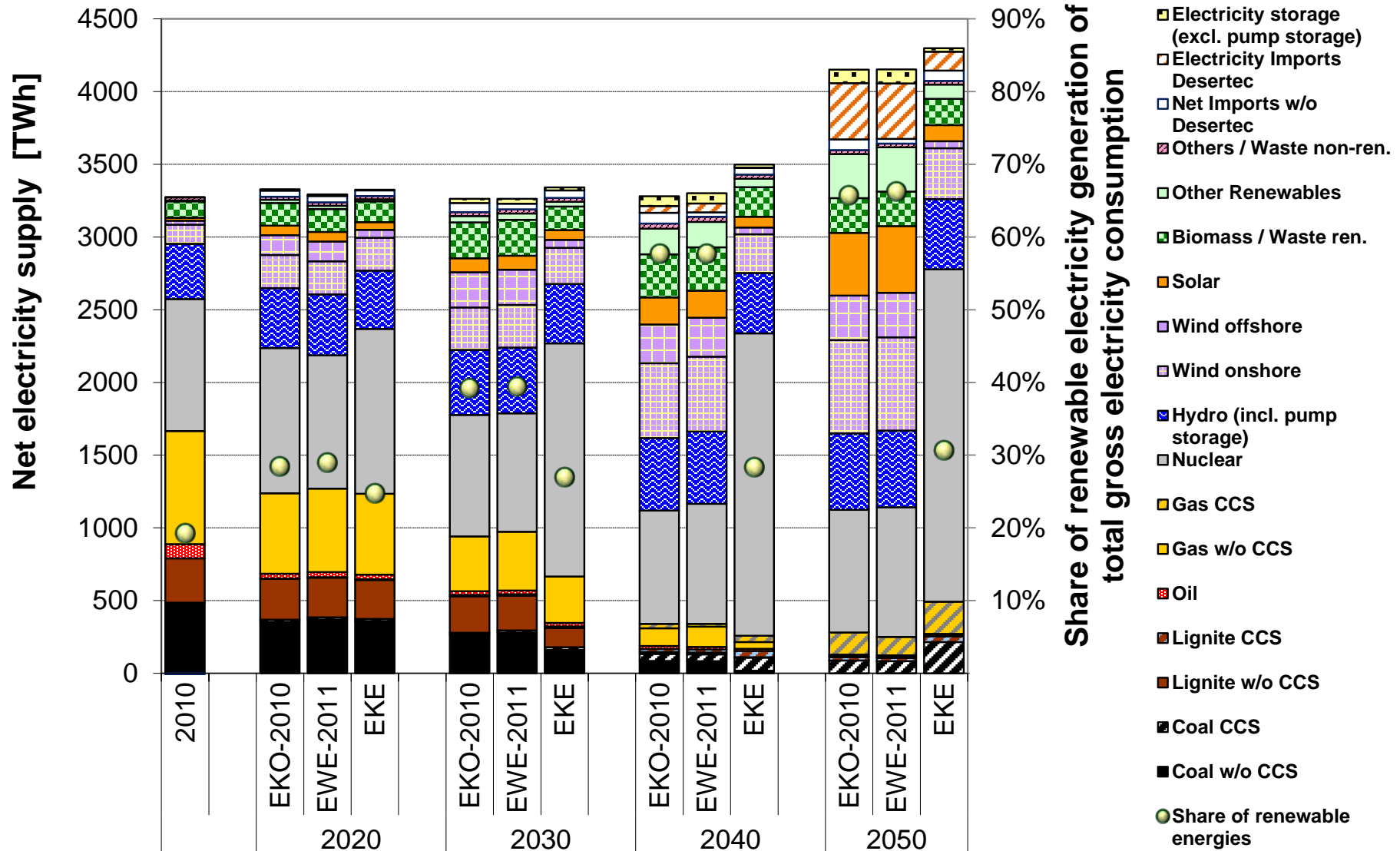


# Electricity supply in Germany

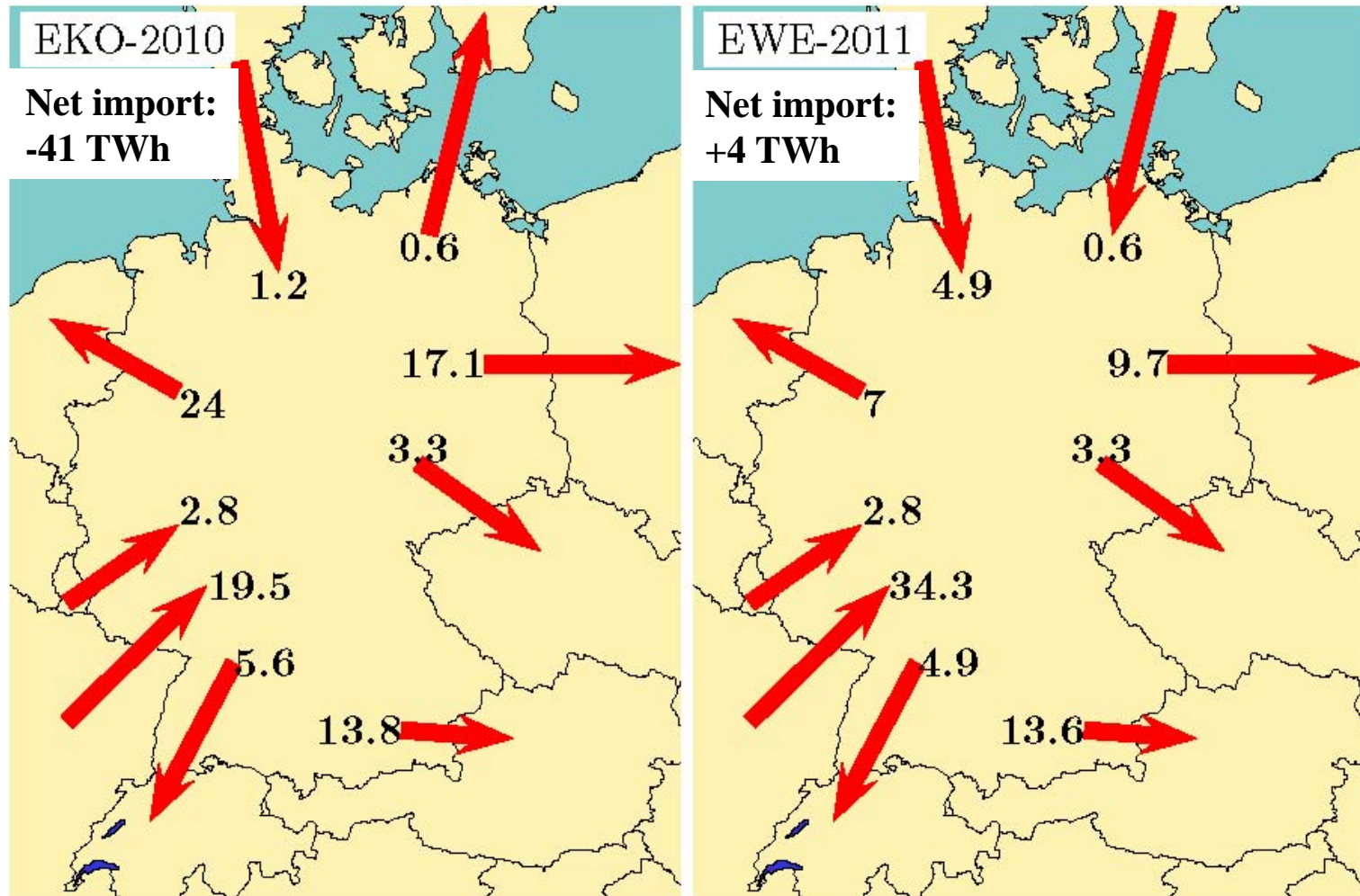




# Electricity supply in the EU-27

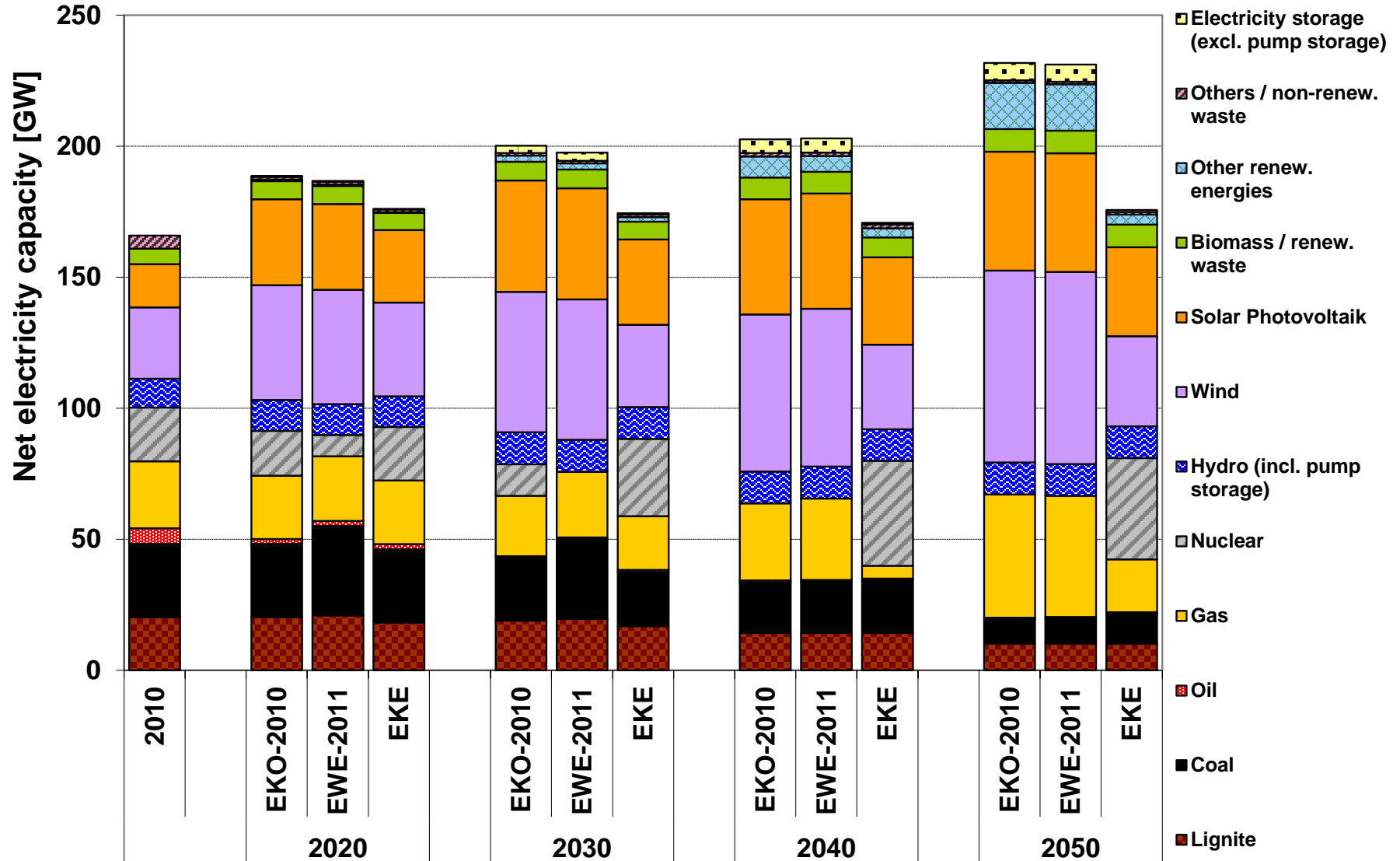


# Interregional net electricity trade of Germany in 2020 in the scenarios EKO-2010 and EWE-2011

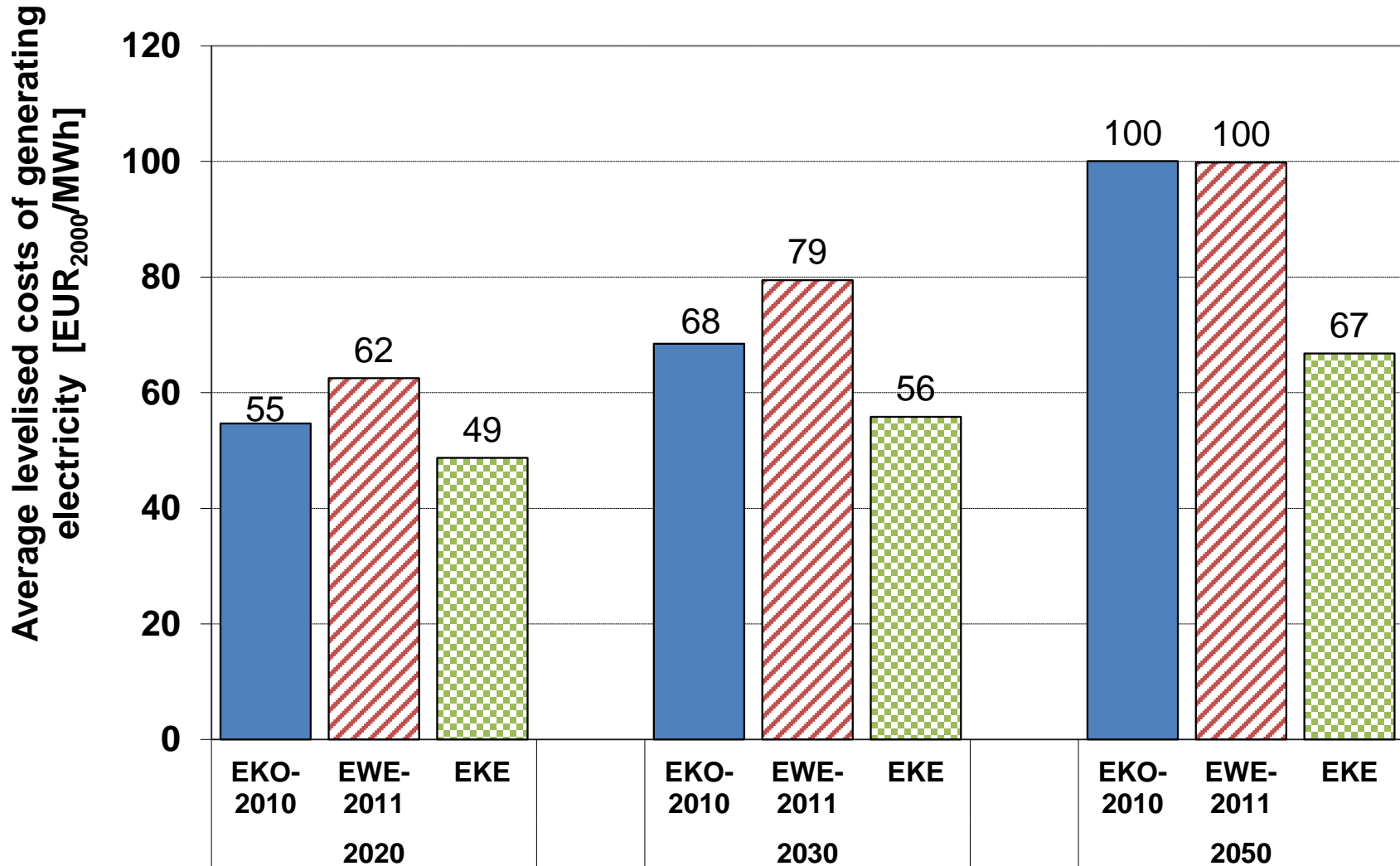




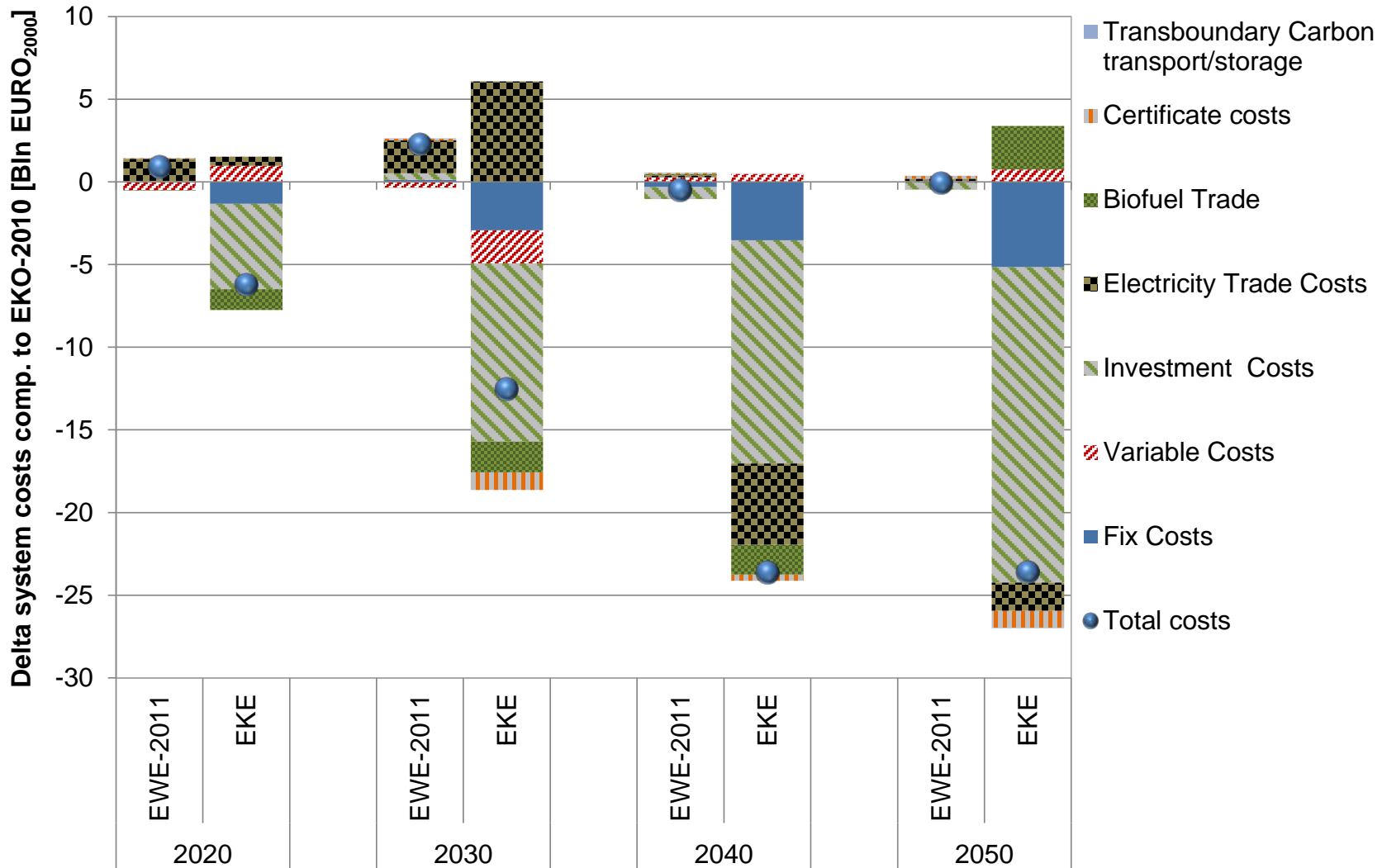
# Net electricity capacity in Germany



# Cost of electricity supply in Germany



# Annual energy system costs compared to EKO-2010 in Germany





# Cumulated energy system costs differences Germany and EU-27

Cumulated system costs compared to EKO-2010 [Bln € <sub>2000</sub> ]	2010 -- 2030		2010 – 2050	
	EWE-2011	30 49	46* 65*	35 65
EKE	-121 -571		-552 -2240	

\* EU-27 GHG reduction target: -30% by 2020



**Danke für Ihre  
Aufmerksamkeit!**