The German Energiewende from an Industry Perspective

Dennis Rendschmidt

BDI The Voice of German Industry

Conference - SGEI in the electricity sector

Vilnius, 23 June 2015

PRELIMINARY VERSION

The BDI – as the federation of German industries – is representing 38 German industry associations vis-à-vis policy makers.

Introduction: BDI - Bundesverband der Deutschen Industrie

Umbrella organisation

38 industry associations

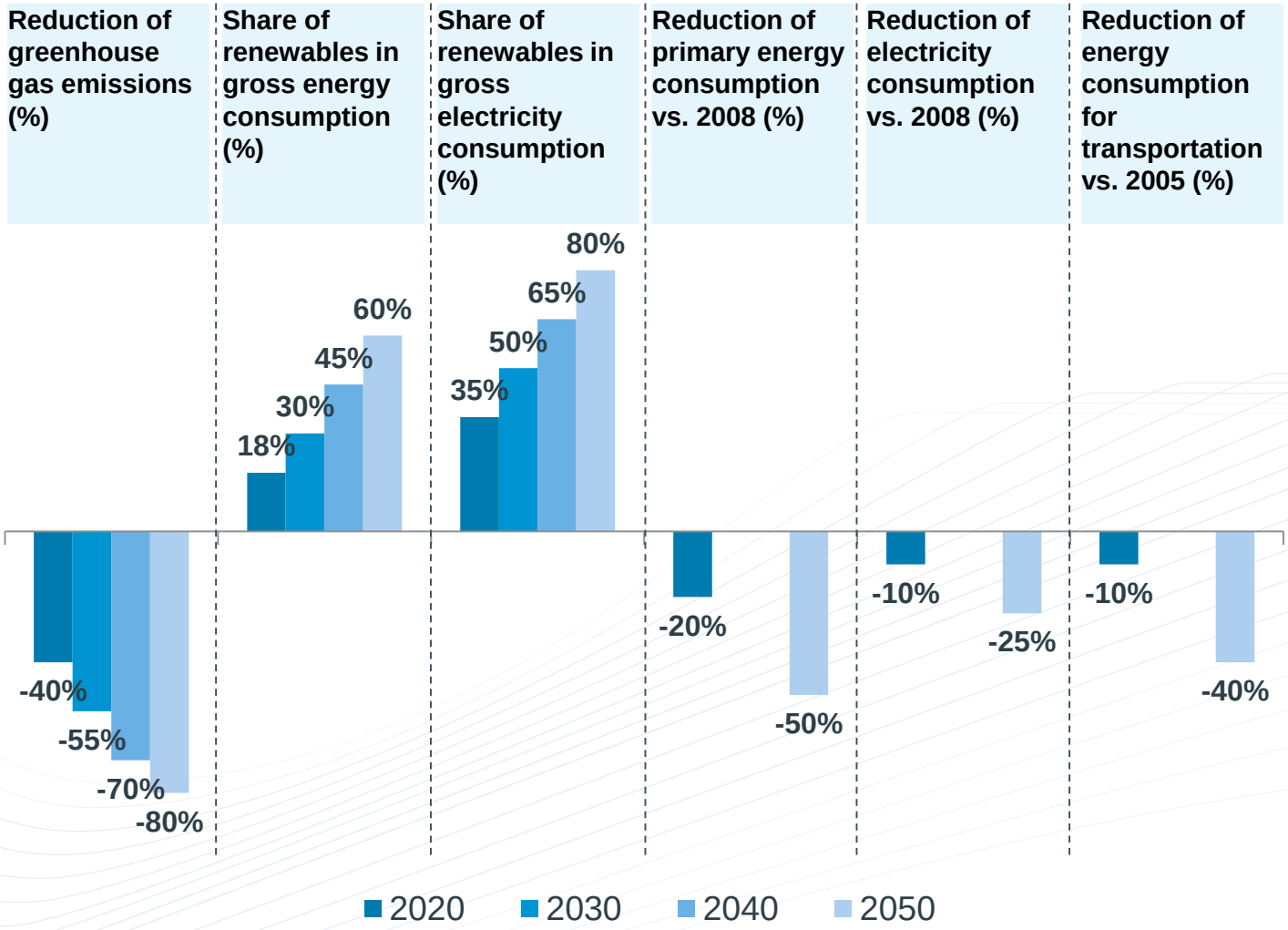
~100.000 Companies
~ 8 Mio. employees

- **Voice of German Industry** vis-à-vis:
  - German Government,
  - European Union (EU),
  - Public and Press
  - international partners

PRELIMINARY VERSION

The German government has set different targets to shift the whole energy system to amore sustainable one.

Selected Energiewende targets

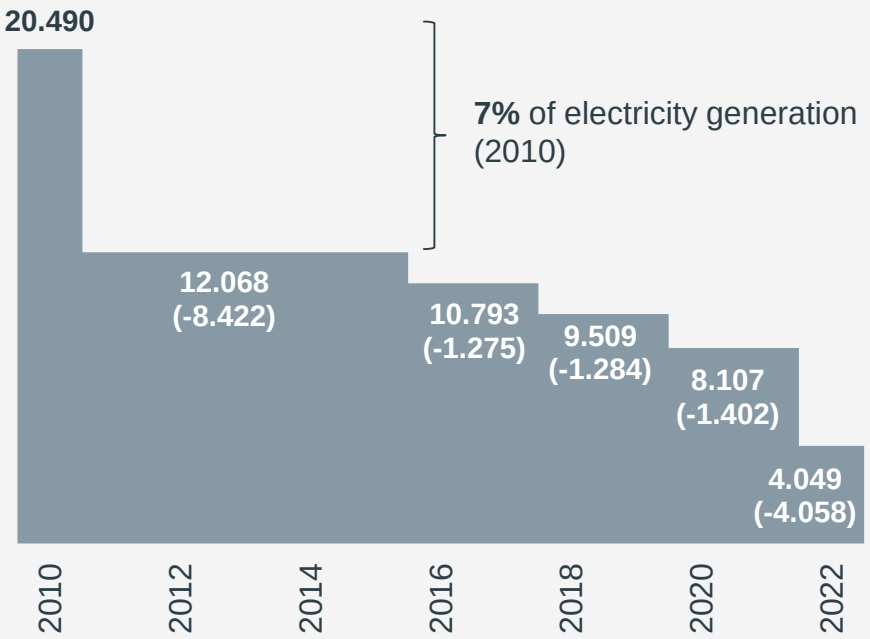


PRELIMINARY VERSION

No nuclear power plant is going to generate electricity in Germany from 2022 onwards.

Timeline of scheduled nuclear phase-out in Germany

Development of installed capacity of nuclear power in Germany (MW)



Baseload capacity will need to be replaced.

Yet: quantity of future necessary baseload still unclear.

Current market environment discourages investment in conventional generation.

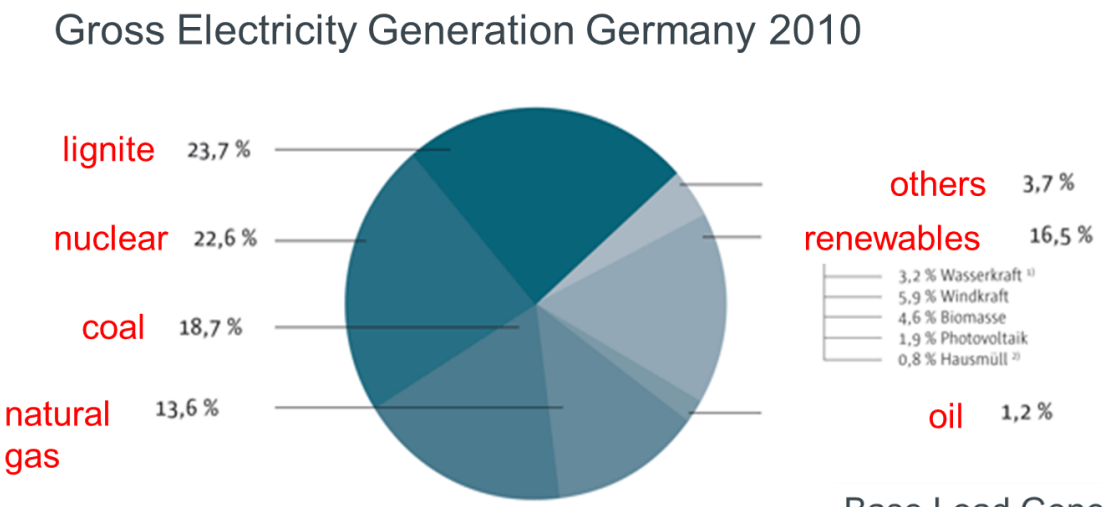
Regional perspective to the nuclear phaseout. Southern-Germany especially affected.

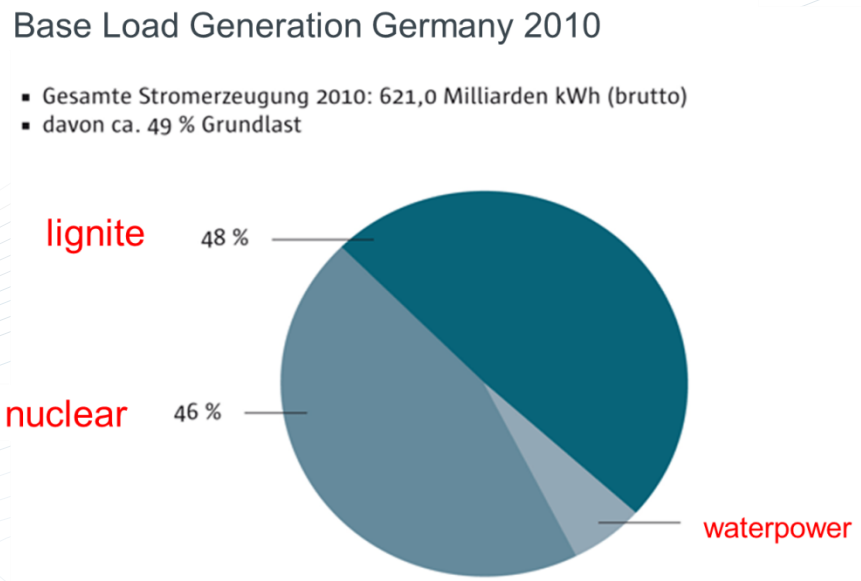
Source: BDEW

PRELIMINARY VERSION

Electricity generation in Germany has been highly dependent on fossil fuels and nuclear.

Gross electricity generation and base load in Germany 2010





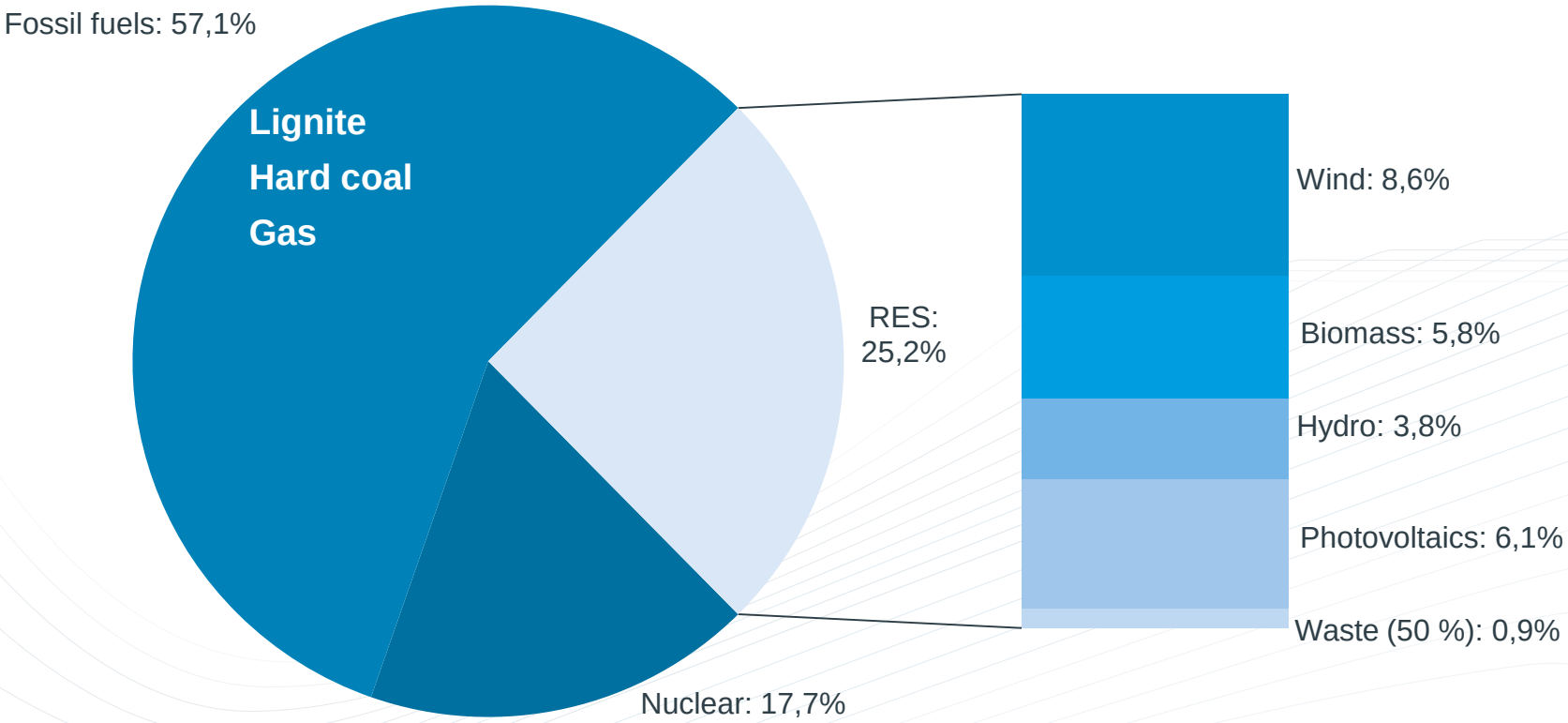
Source: BDEW

PRELIMINARY VERSION

During the last years the share of renewables has increased.

Gross electricity generation 2012

Gross electricity production Q1-Q3 2012 in Germany: **408,1 bn. kWh**

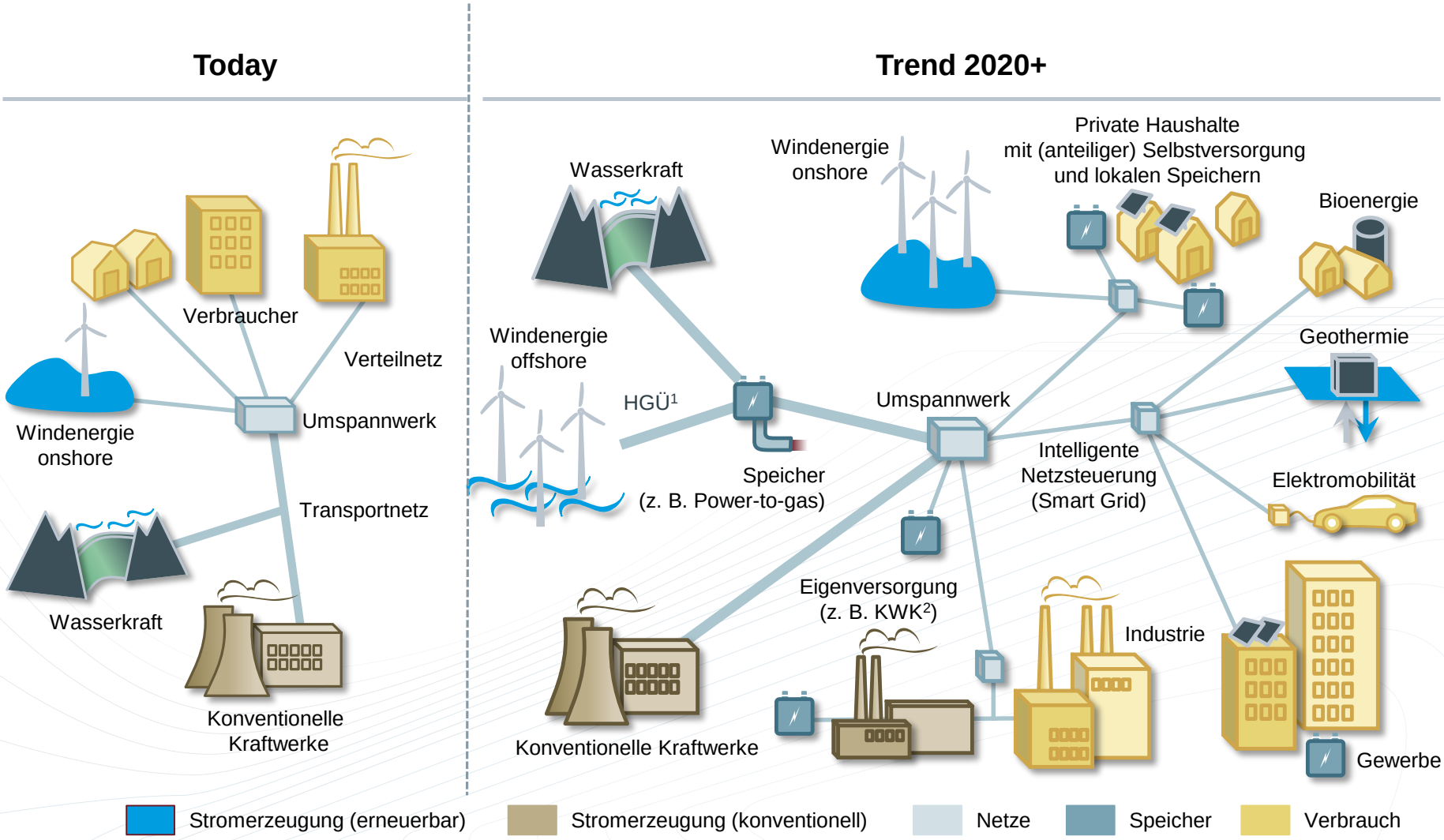


Source: BDEW

PRELIMINARY VERSION

The Energiewende is fostering various technologies and changing the German energy landscape.

Change of energy landscape in Germany (schematic)

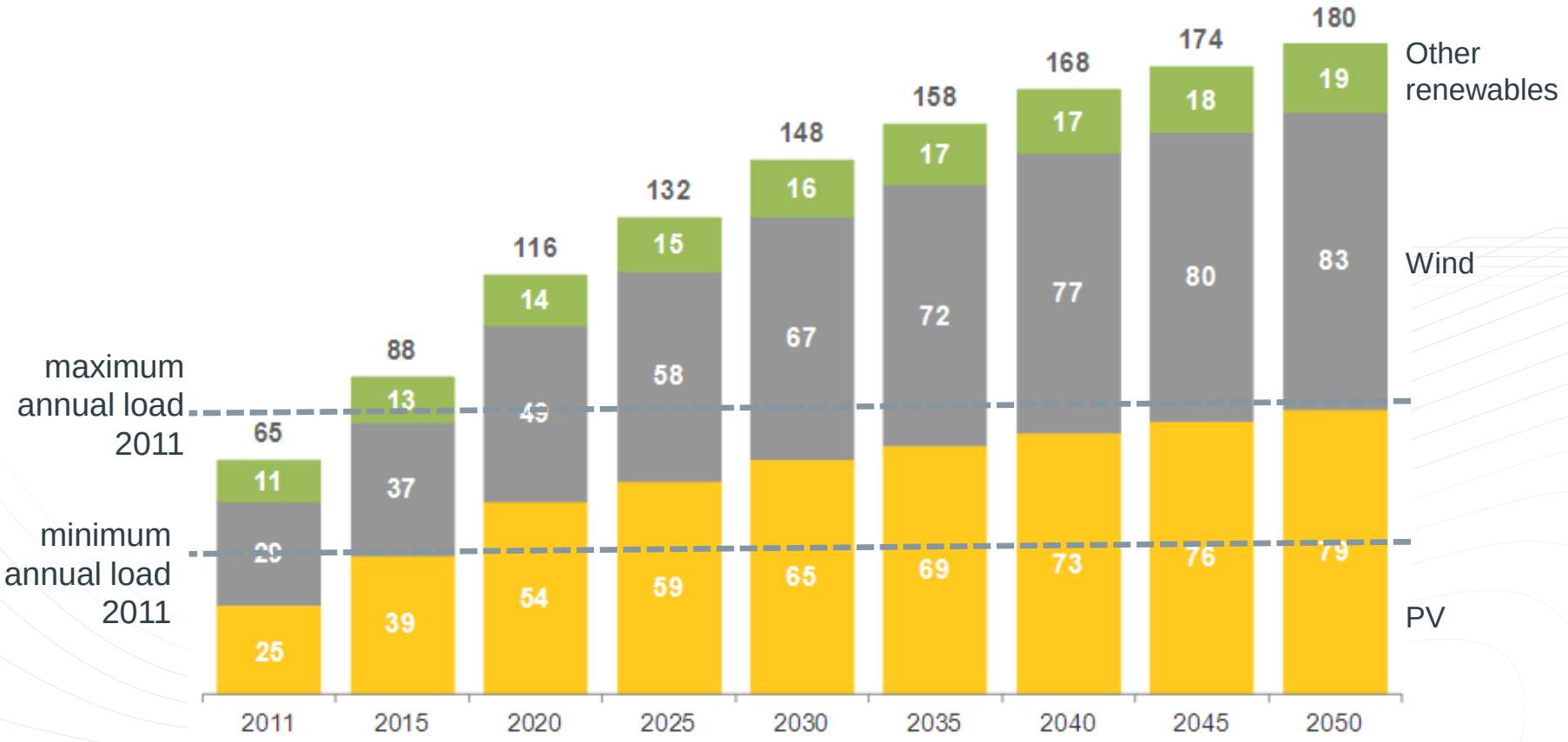


1. HGÜ = Hochspannungsgleichstromübertragung 2. KWK = Kraft-Wärme-Kopplung
Source: BCG

PRELIMINARY VERSION

The expansion of renewable energies will be largely based on volatile energy sources.

Forecast of installed capacity of renewable energy

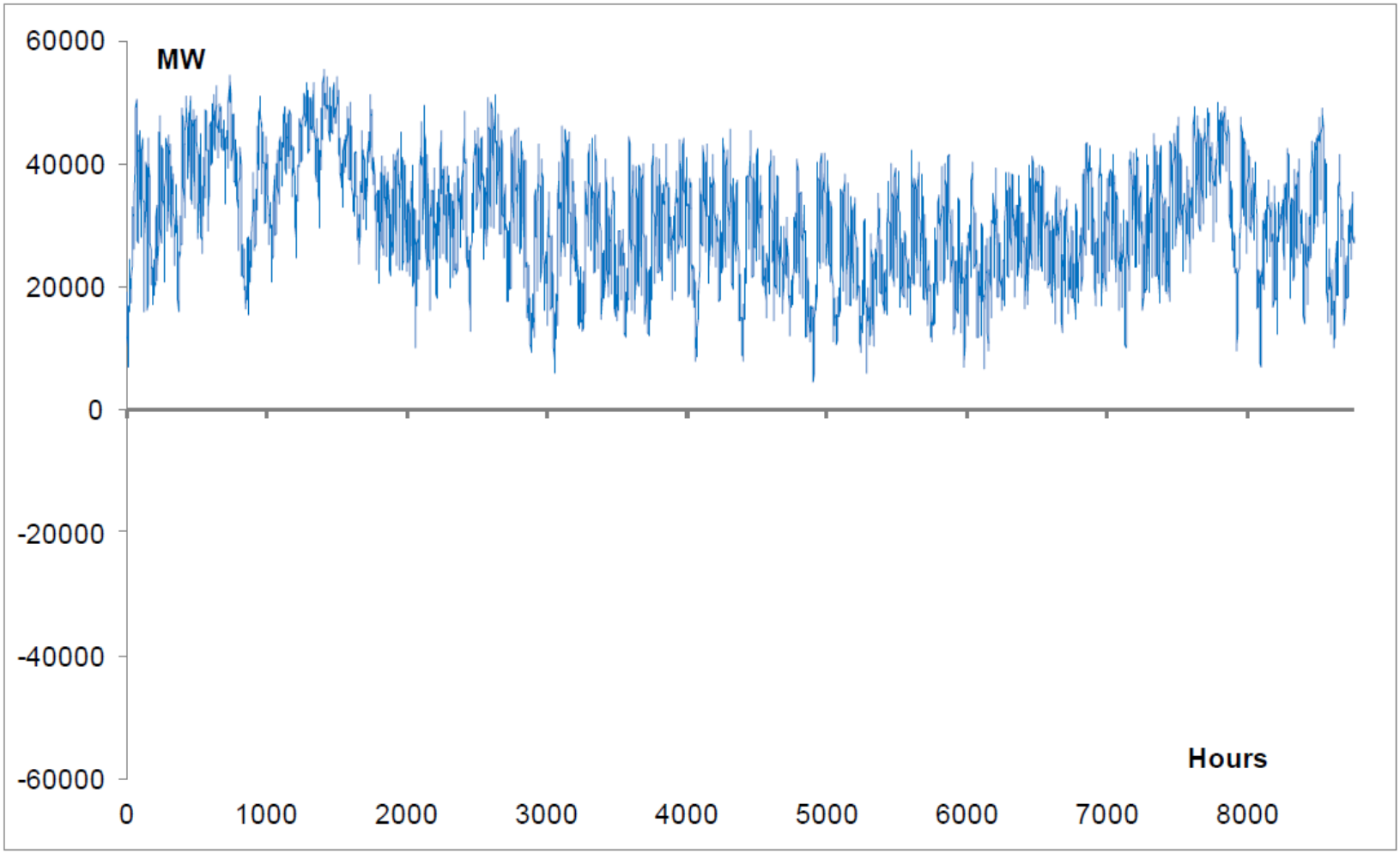


Source: Prognos

PRELIMINARY VERSION

Currently loads in Germany exhibit rather moderate fluctuations…

Residual load curve 2012 (load minus renewable feed-in) Germany

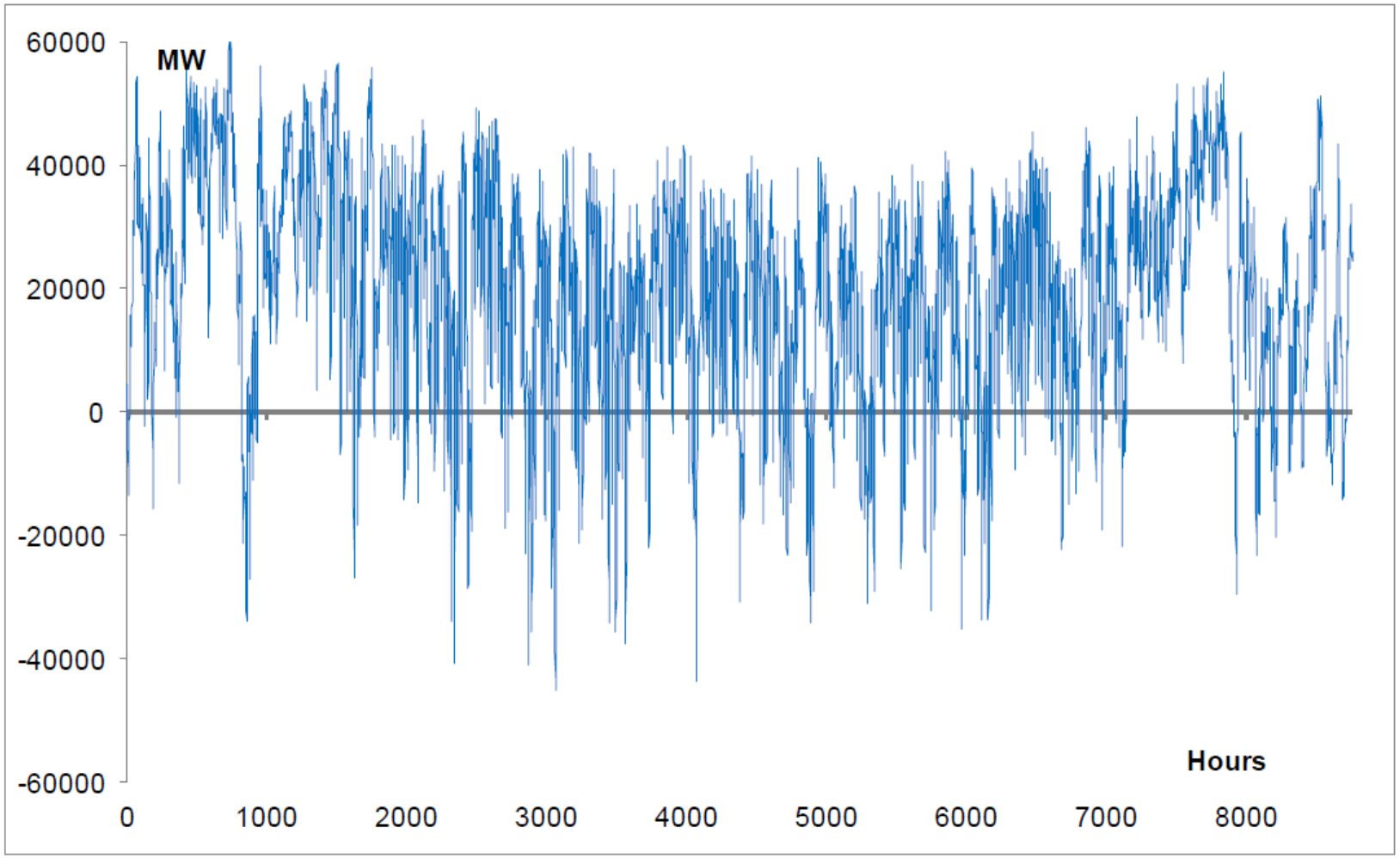


Source: Prognos
Assumption: must-run-capacity: 20 GW

PRELIMINARY VERSION

… whereas volatility will be much higher in 2030 including negative values.

Residual load curve 2030 (load minus renewable feed-in) Germany

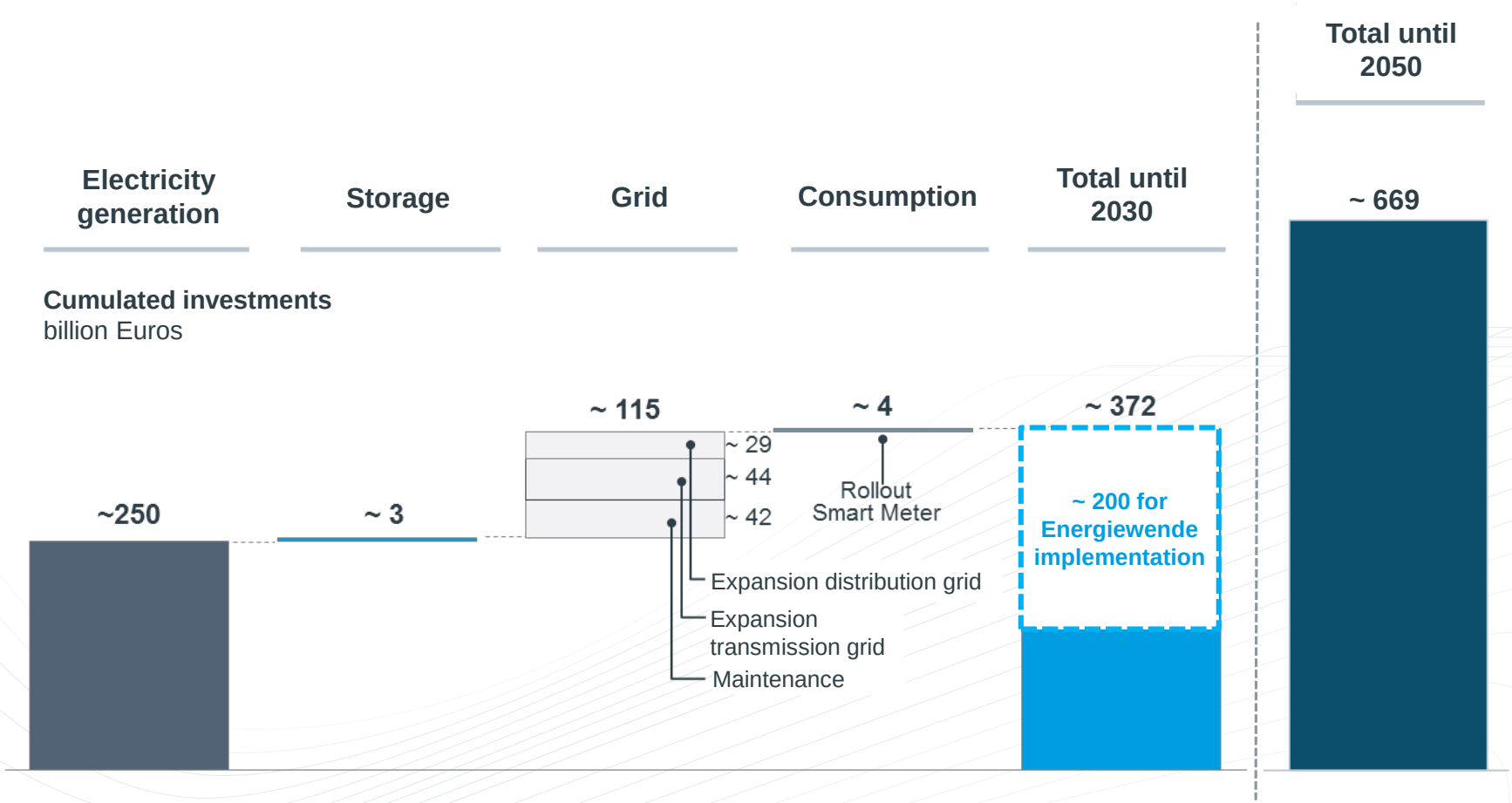


Source: Prognos
Assumption: must-run-capacity: 10 GW

PRELIMINARY VERSION

Implementing the Energiewende requires investments of ~ € 200 b into the German electricity sector until 2030.

Forecast of cumulated necessary investments into German electricity system (target scenario)



Source: BCG

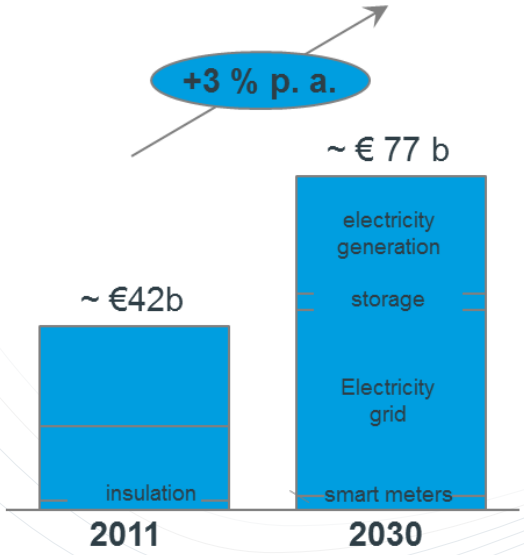
PRELIMINARY VERSION

The Energiewende means worldwide revenue potentials with end products of more than € 70 b p.a. for German enterprises in 2020.

Forecast of revenue potentials, fuel imports and CO2 emissions

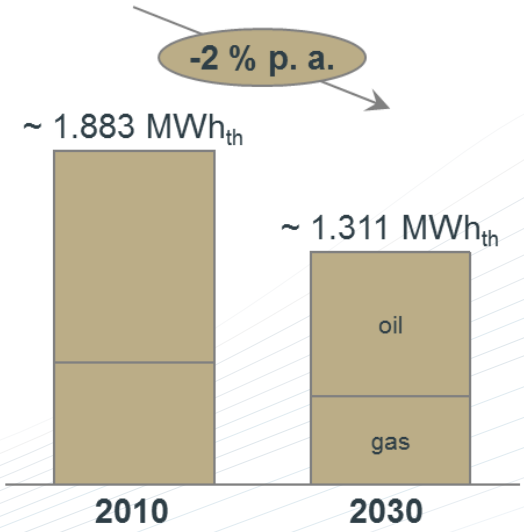
Revenues

Increase of revenue potentials for German technology producers



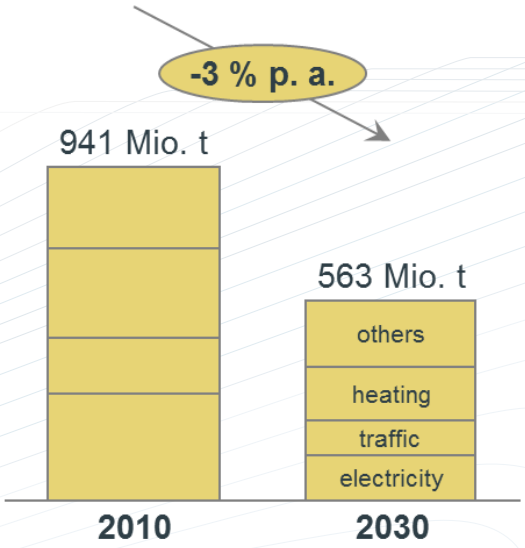
Energy Independence

Decrease of fuel imports



Climate Protection

Reduction of CO_2 emissions in Germany

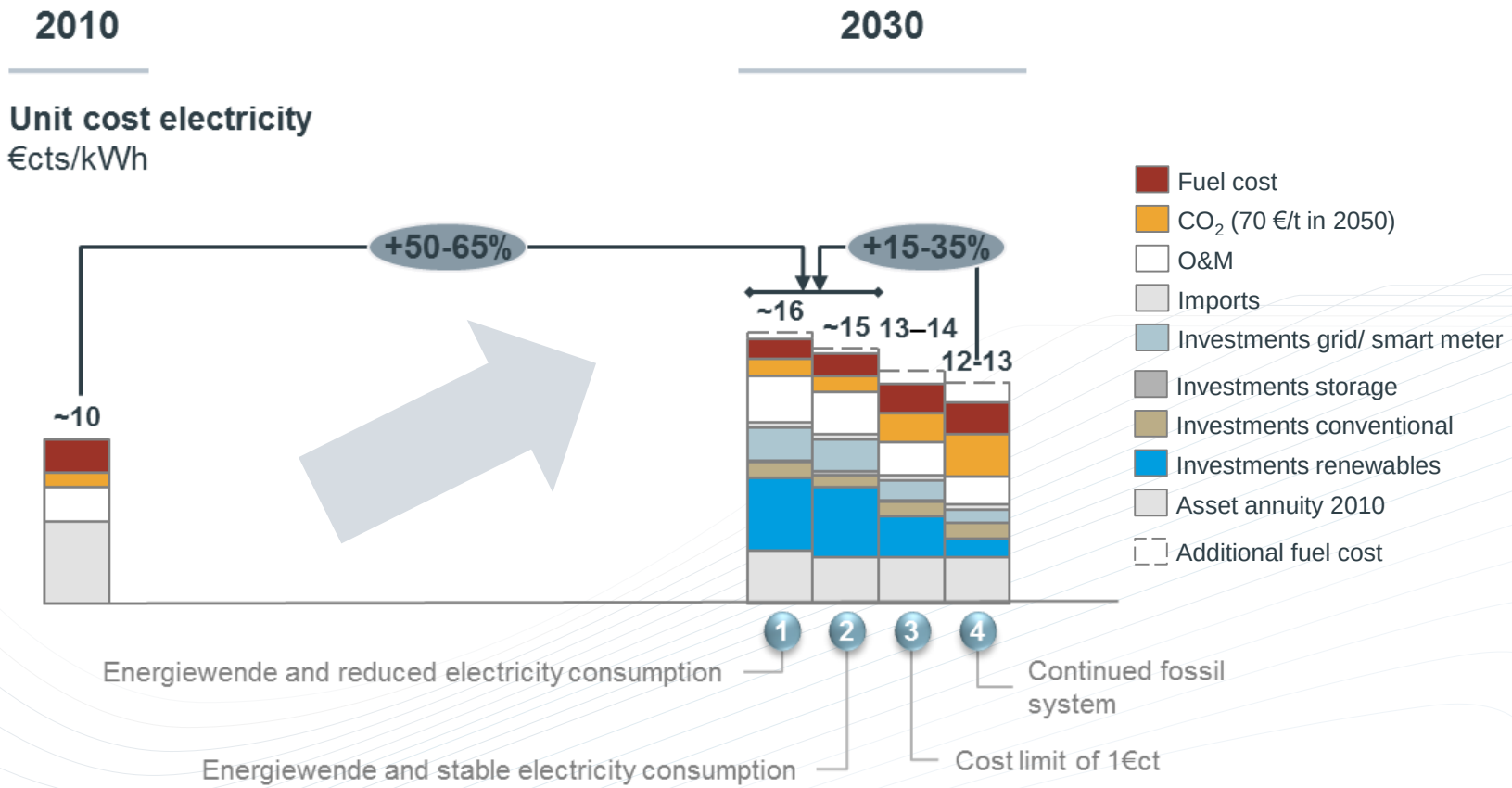


Source: BCG

PRELIMINARY VERSION

On the other hand unit cost of electricity will rise by 15 – 35% compared to continuing the current system until 2030.

Forecast of unit cost development of electricity



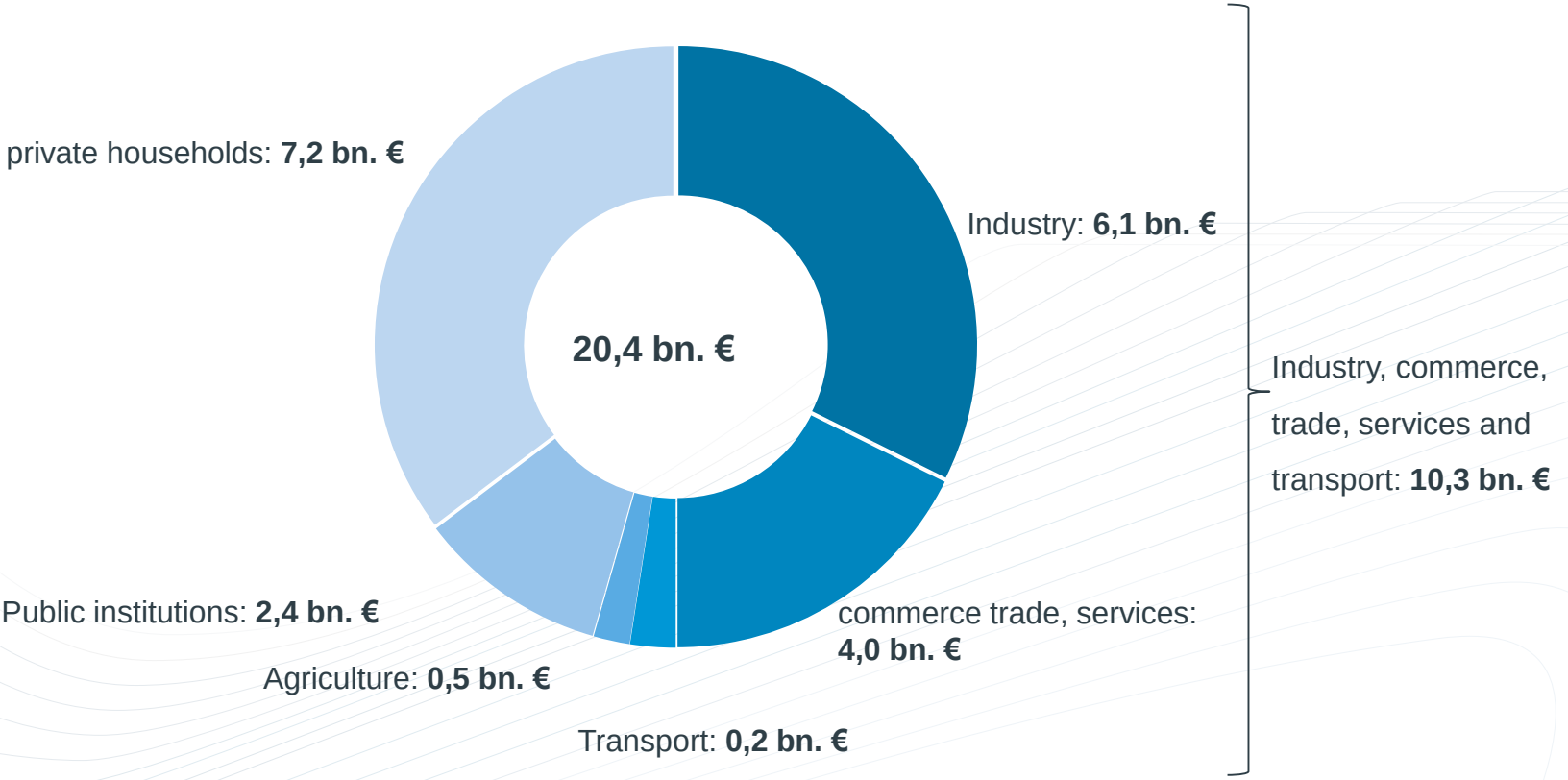
Source: BCG

PRELIMINARY VERSION

Currently, households and industry cover more than 2/3 of Energiewende cost.

Energiewende cost distribution for electricity consumers

Costs that have to be borne by the customers for the EEG 2013: **20,4 bn. €**

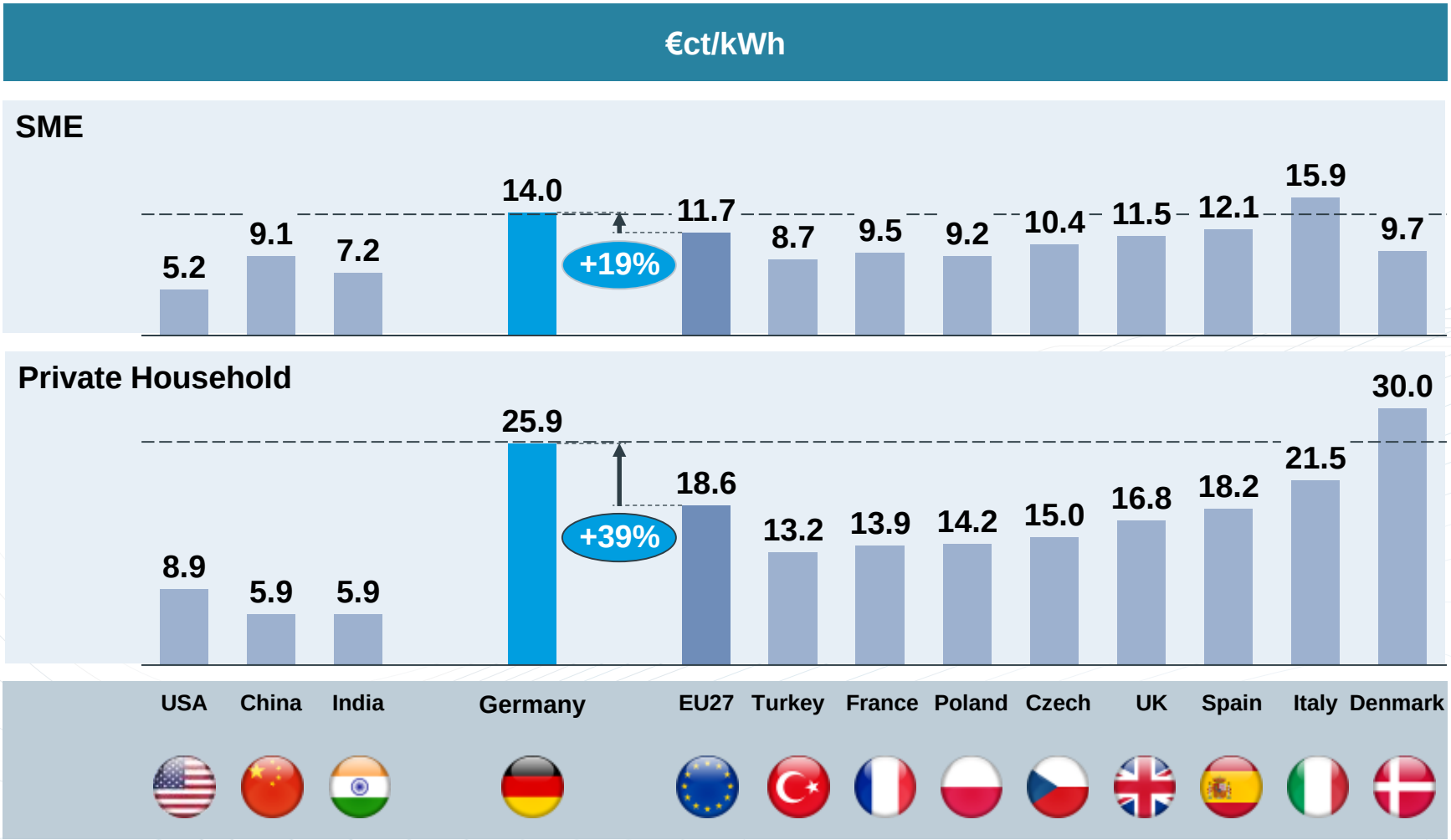


Source: BDEW

PRELIMINARY VERSION

German electricity prices are already very high in international terms.

Comparison of electricity prices



PRELIMINARY VERSION

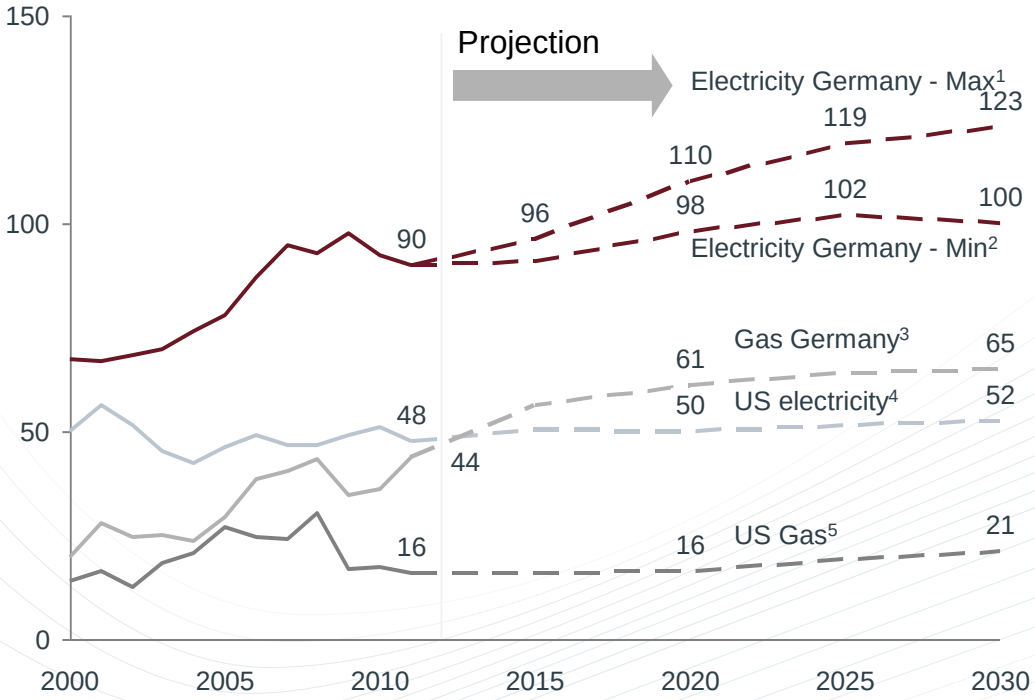
Source: Eurostat; IEA.

Electricity and gas prices evolve into locational disadvantages in Germany and over Europe.

Industry prices electricity and gas – Germany vs. USA

Industry prices electricity and gas – Germany vs. USA

Gas cost (industry)/electricity cost (industry)
(in €/MWh$_{th}$/€/MWh$_{el}$ w/o tax & dues)



Cost advantage of industrial base US

Shale gas revolution in US: gas price drop for industry ~ 40 % between 2008 and 2010

Dampening affetcs on US electricity prices

Low European shale gas potentials; no significant US LNG exports before 2020

No real potential for price reductions of gas and electricity in Europe until 2020

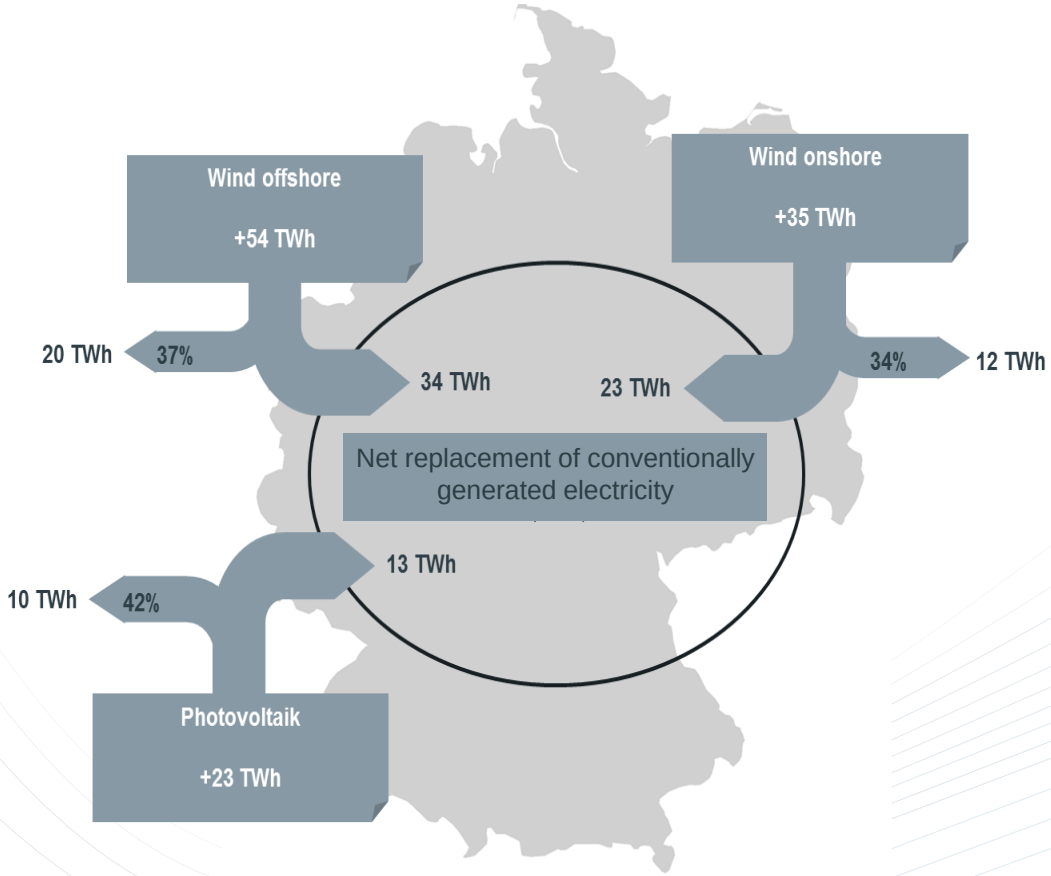
US advantage (compared to Europe) in terms of energy cost at least until 2020

1. Entwicklung basierend auf Trendstudie 2030+ Szenario "Zielerreichung Klimaschutz" Preispfad B, ohne Steuern und Abgaben **2.** Entwicklung basierend auf Trendstudie 2030+ Szenario ""Fiktives fossiles System" Preispfad A ohne Steuern und Abgaben **3.** Annahmen Gaspreisentwicklung basieren auf Trendstudie 2030+ Preispfad A, ohne Steuern und Abgaben **4.** Preise Industriestrom, ohne Steuern und Abgaben (EIA) **5.** Preise Industriegas, ohne Steuern und Abgaben (EIA)
Quelle: Eurostat; EIA; BCG

PRELIMINARY VERSION

More than one third of additional renewable generation in 2022 will only contribute to the increase of German export surplus.

Overview: selected expected electricity flows in 2022 (target scenario)



- Generation and load in Germany will diverge
- Hours of high feeding-in of renewables and low demand create market incentives to export electricity abroad
- In 2022 the electricity generated from renewables can only be integrated into the German electricity market by about two third

The Energiewende is a European challenge and therefore has to be approached on the European level.

Source: EWI

PRELIMINARY VERSION

Current status of Energiewende: mixed picture

BDI-Energiewende-Navigator 2013 – results at a glance

Impact on climate and environment 97 % → 99 %	**Good progress by fast development in RES** ▪ Anteil EE am Bruttoendenergie- und Stromverbrauch mit voller Zielerreichung ▪ Verkehrssektor hinter den Erwartungen (Elektrofahrzeuge, Anteil EE am Kraftstoffverbrauch) ▪ Tendenz: mögliche Übererfüllung EE-Ziele, CO_2-Zielerreichung bleibt ambitioniert
Economic feasability 62 % → 64 %	**Competitiveness critical due to high energy prices and efficiency lagging behind** ▪ Strompreise für Industrie und Haushalte im internationalen Vergleich auf sehr hohem Niveau ▪ Energieproduktivitätsentwicklung unter den Zielen der Bundesregierung ▪ Tendenz: Strompreise und Zielerreichung der Verbrauchsreduktion weiterhin kritisch
Security of supply 91 % → 89 %	**Sufficient generation capacities, but slow development in grid extensions** ▪ Stromerzeugungskapazitäten derzeit ausreichend – regionaler Handlungsbedarf teils dringend ▪ Netzkapazitäten noch ausreichend, Ausbau Stromnetze allerdings mit Verzögerungen ▪ Tendenz: weiterhin negative Entwicklung aufgrund von stockendem Netzausbau
Acceptance 76 % → 68 %	**General acceptance of Energiewende, but cost increase is seen as critical** ▪ Generell breite Unterstützung in der Bevölkerung; Preiserhöhungen jedoch kritisch gesehen ▪ Industrie erwartet weitere Kostensteigerung; Sorgen um Versorgungssicherheit nehmen zu ▪ Tendenz: Befürchtungen überwiegen, Akzeptanz zunehmend in Gefahr
Innovation 73 % → 80 %	**R&D investments in energy sector remain on low level** ▪ Öffentliche energiebezogene Forschungsausgaben ziehen 2012 wieder an ▪ Anteil der „Green Energy Patents“ zudem weiter steigend ▪ Tendenz: weitere Verbesserung durch Forschungsprogramme der Bundesregierung

Grün Zielerreichung (10 % Toleranz) Gelb Von 89 % bis 75 % Zielerreichung Rot Weniger als 75 % Zielerreichung

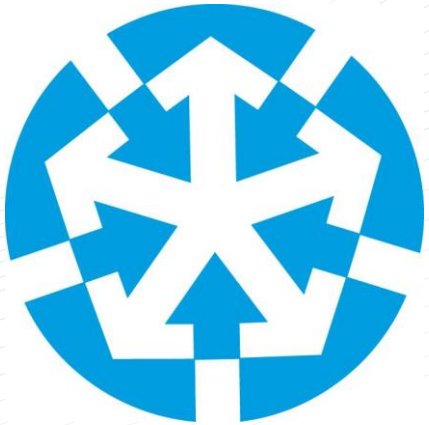
PRELIMINARY VERSION

In case of any questions please do not hesitate to contact us.

Contact data

Dennis Rendschmidt
d.rendschmidt@bdi.eu
+49 (0)30 2028-1407

www.energiewende-richtig.de



PRELIMINARY VERSION