CLIMATE ACTION – WORLDWIDE, IN EUROPE AND IN GERMANY

BY

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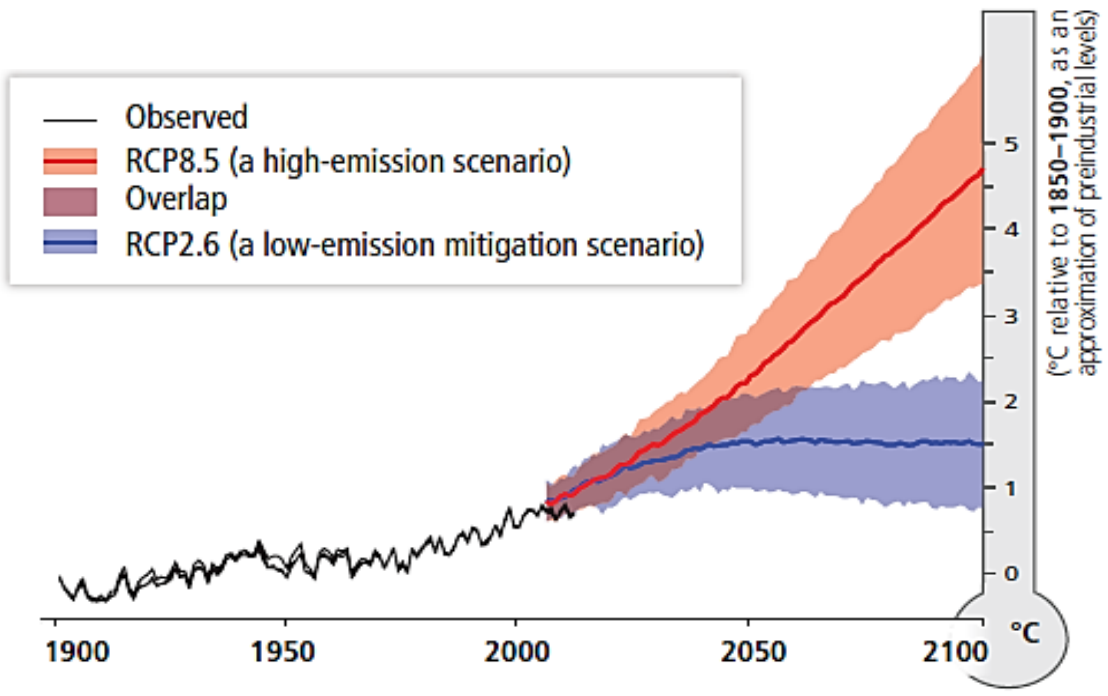
GLOBAL LEVEL

WHY DO WE NEED A GLOBAL ENERGY TRANSITION?

Climate change is already happening

- **Global temperature increase 0.8 °C compared to 1850-1900 average**
- **Current emission trends threaten global prosperity and security**
- **2°C limit: still feasible if we act now**



Source: IPCC 2013

INTERNATIONAL LEVEL
AIMS FOR THE PARIS PACKAGE

A new regime for a new world - Not just another environment treaty

- **Binding international agreement** under the UNFCCC that sets out post-2020 mitigation targets and robust rules for their implementation (accounting, monitoring, reporting, verification)
- An **inclusive outcome**: all states involved with commitments varying in light of national circumstances, responsibilities and capabilities
- **Provisions on <u>all</u> 6 pillars:** mitigation, adaptation, finance, technology, transparency, capacity-building with an explicit mitigation/adaptation balance, to be elaborated in a suite of decisions
- An **ambition mechanism** so that progressive states can go further, faster (and are incentivized to do so) and overall ambition will be enhanced over time

INTERNATIONAL LEVEL
AIMS FOR THE PARIS PACKAGE

- **Framework for pre-2020 action that accelerates ad-hoc cross-border cooperation with greater transparency on measures and their impacts**
- **Further and more rapid implementation of the existing institutional framework, especially to promote climate resilience and support the poorest states with adaptation and mitigation measures**
- **Unequivocal message to the real economy that mobilizes investment for low-carbon transformation**
- **Clear signal for the continued use of market mechanisms and a mandate to formulate rules**

WHILE PARTIES PREPARE FOR THE PARIS AGREEMENT THE G7 COUNTRIES HAVE TAKEN LEADERSHIP IN CLIMATE AMBITION AND ACTION.

- Commitment to below 2˚ C goal and emphasis on the need for **decarbonisation over the course of this century**; supporting global goal of upper end of IPCC recommendation minus 40-70% by 2050 vs 2010
- Commitment to strive for a **transformation of the energy sectors by 2050** and to develop longer term national low-carbon scenarios
- Strong determination to adopt a **legal agreement applicable to all that is ambitious, robust, inclusive** and reflects evolving national circumstances
- Agreement should have **binding rules to enhance transparency and accountability** and promote **increasing ambition** over time
- Call upon all countries to **submit INDCs** well in advance of COP21

G7 TAKING LEADERSHIP IN COMMITTMENT FOR GLOBAL SUPPORT FOR THE TRANSFORMATION TOWARDS DECARBONIZATION AND DECOUPLING FROM GHG EMISSIONS.

Re-affirm strong **commitment to Copenhagen Accord (USD 100 bn)**
Provide and mobilize increased finance and demonstrate that we are well on our way to meet USD 100 bn; call on multilateral developments banks (MDBs) to contribute

Call for progress in OECD on how **export credits** can contribute to address climate change

Eliminate **inefficient fossil fuel subsidies**

Committed to continued efforts to **phasing down HFCs**

Incentivize investment towards low-carbon growth opportunities by applying effective policies, including carbon market-based instruments

SUMMING IT UP, FROM A GERMAN PERSPECTIVE THE PARIS AGREEMENT WILL HAVE FOUR PILLARS TO ENSURE THAT ANTHROPOGENIC GLOBAL WARMING CAUSED BY GHG EMISSIONS WILL STAY WELL BELOW 2 DEGREES CELSIUS COMPARE TO PRE-INDUSTRIALIZED LEVELS.

1. **The legally binding Paris Agreement itself.**

2. **Binding mitigation targets by all parties (no back sliding).**

3. **Ensure the necessary support for climate finance and technology transition.**

4. **Increased climate change actions through multilateral cooperation and non-state actors.**

EUROPEAN LEVEL

EUROPEAN CLIMATE AND ENERGY FRAMEWORK

Europe is committed to climate mitigation.

	GHG emissions reduction (as compared to 1990 (*2005) level)	Share of renewable energy	Improvements in energy efficiency
2050	– 80-95 %	To be defined	To be defined
2030	– 40 % (at least)	27 % (at least)	27% (at least)
	ETS: – 43 %*		Review in 2020 ↑ 30%
	Non-ETS: – 30 %*		
2020	– 20 %	20 %	20 %
	ETS: – 21 %*		
	Non-ETS: – 10 %*		

- INDC submitted in March 2015
- scope for raising ambition in the context of the international negotiations

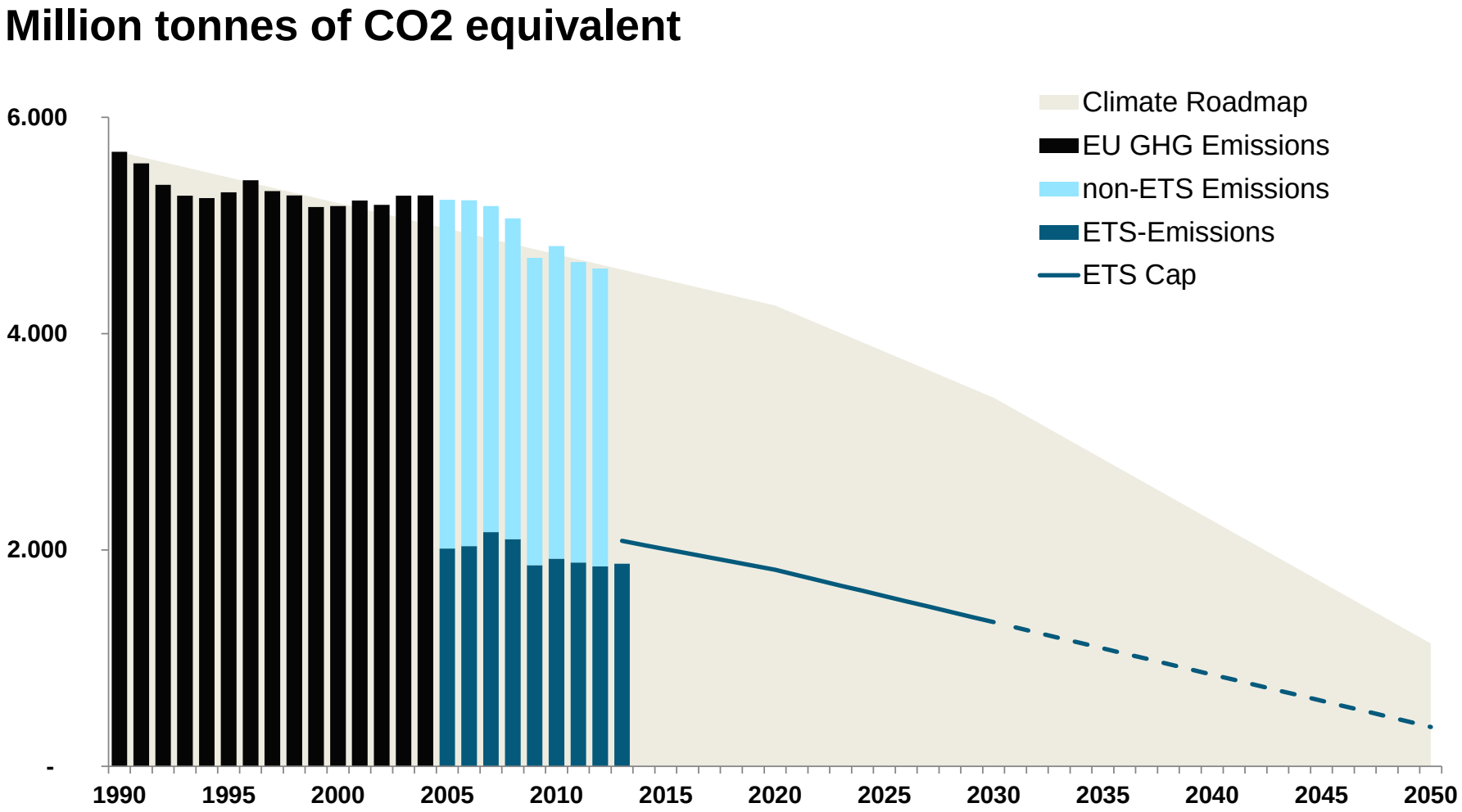
EUROPEAN CLIMATE AND ENERGY FRAMEWORK

Sending a strong message of solidarity to member states with relatively low GDP per capita

- Within the European Emission Trading System (ETS):
  - **10% of auctioning volume** of emission certificates redistributed
  - New **modernisation fund** for investments in energy system
  - Continued **free allocation** of certificates to power sector

- For non-ETS sectors:
  - Distribution of greenhouse gas emission reduction targets based on GDP per capita

EU GREENHOUSE GAS EMISSIONS PATHWAY



EU EMISSION TRADING SYSTEM SCOPE AND COVERAGE

The EU ETS covers about 11.500 installations.

Gases

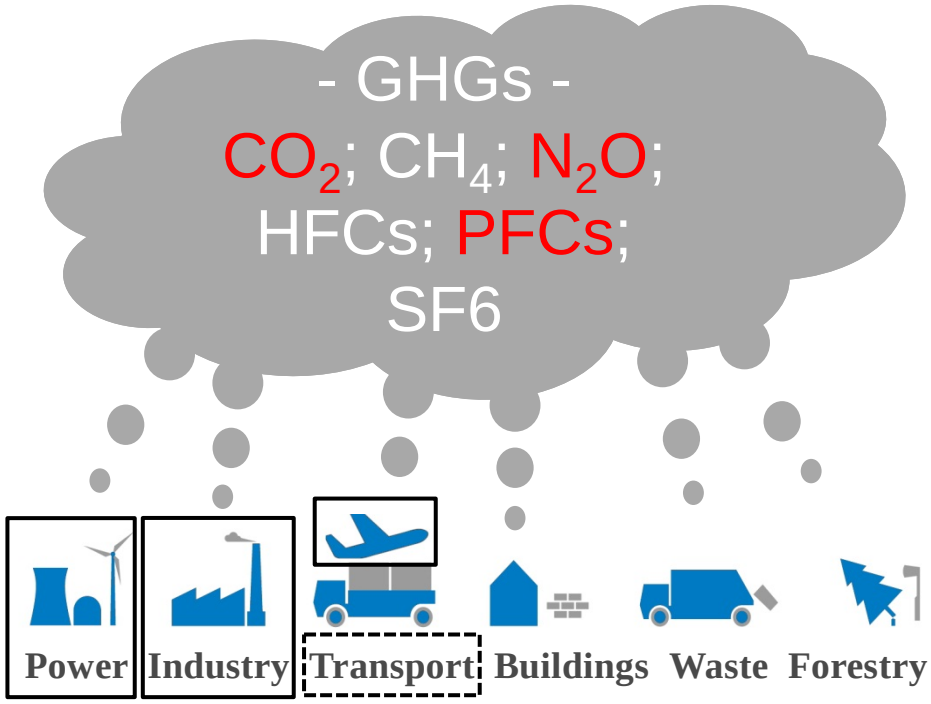
- Initially, the EU ETS focused on CO_2
- N_2O and PFCs were added in phase III.

Sectors

- **Energy**: Power and heat generation
- **Industry**: Energy-intensive sectors including oil refineries, iron and steel, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids, and bulk organic chemicals
- **Civil aviation**: intra-EU flights

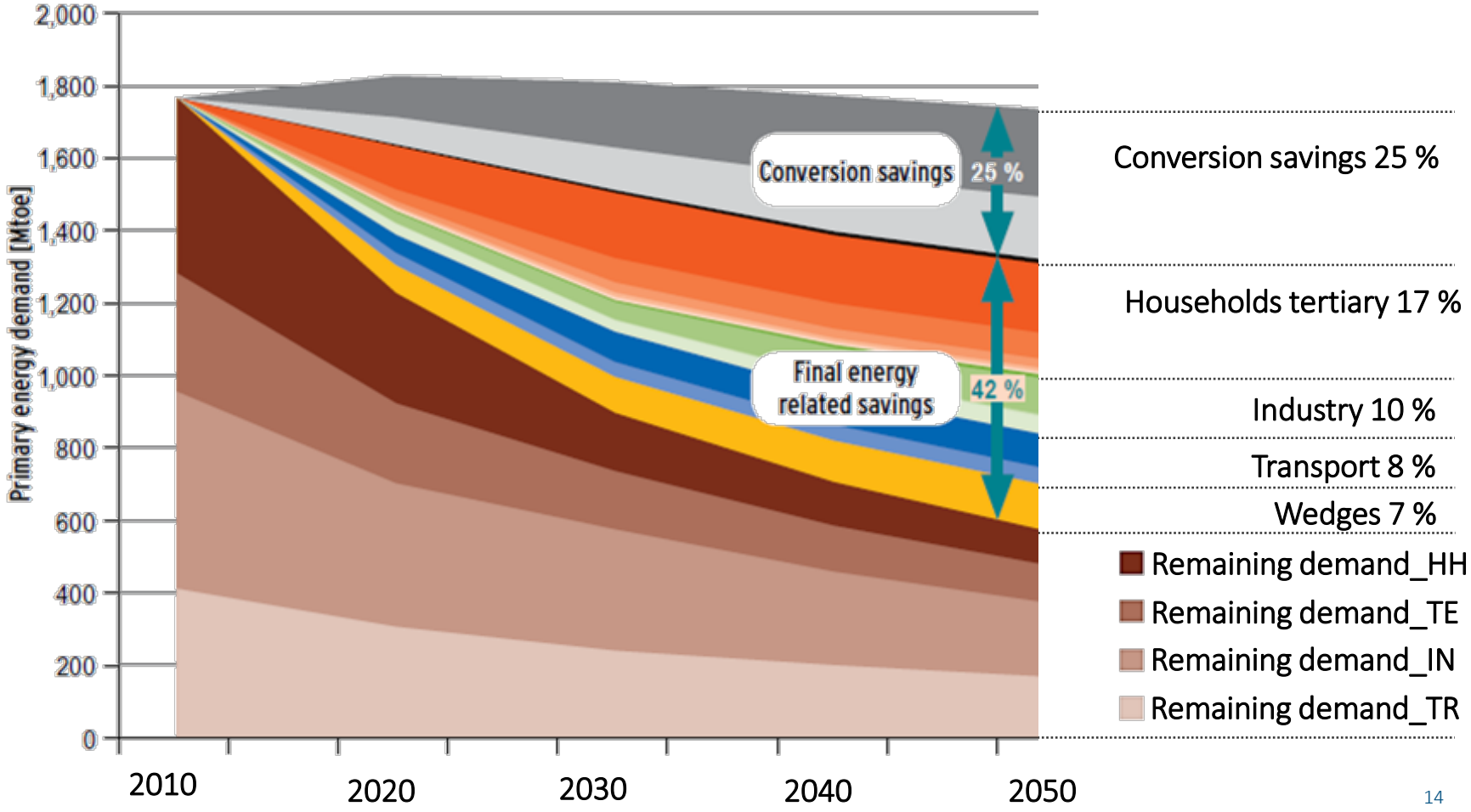
Thresholds

- Energy: 20 MW annual thermal capacity per installation
- Industry: Varying thresholds for different sectors; Small installations with < 25,000 tons of CO_2e may be excluded
- Aviation: 10,000t CO_2 /year



POTENTIAL ENERGY EFFICIENCY IN THE EU

- **Energy efficiency improvements need to be scaled up**
- **Primary energy demand in the EU could be more than halved**



Source: Fraunhofer ISI 2012

GERMANY‘S CHALLENGES

GERMANY IS SHIFTING ITS SOCIETY FROM THE USE OF FOSSIL FUELS AND NUCLEAR TOWARDS RENEWABLE ENERGY AND LOW CARBON SYSTEMS.

- Long tradition and **strong public support for Climate Policy** (National Climate plans, imlementation of Kyoto Protocol).
- 2007: **Integrated Energy and Climate Package** – 2020 climate target (minus 40% re 1990).
- 2010: **Energy concept -** Long-term climate and energy policy up to 2050 aimed at fundamentally restructuring the energy system, but also other sectors -> 2011: **Energiewende.**
- Transition towards a highly efficient **renewable energy** system also as an economic and social opportunity.
- Focus on **innovation and advanced technologies**, on effective and cost-efficient measures in line with market and competition principles.

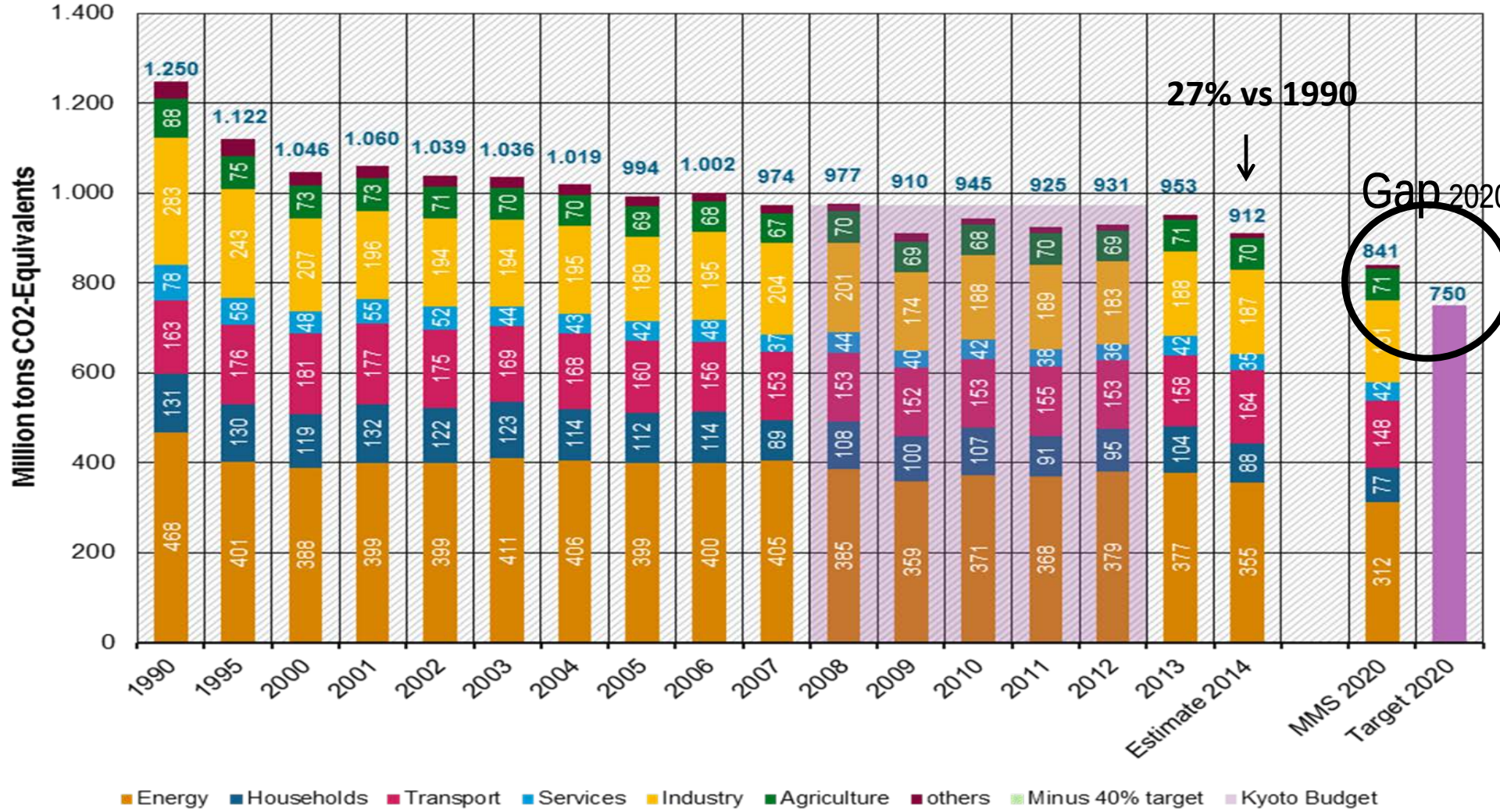
GERMANY HAS A 25 YEARS TRADITION IN BUILDING THE INSTITUTIONAL FRAMEWORK FOR SHIFTING THE SOCIETY TOWARDS LOW-CARBON PRODUCTION AND CLIMATE FRIENDLY LIVING.

- **Domestic climate targets** set out in government decisions, supported by legislation on individual climate and energy policies.
- Latest coalition agreement (Dec 2013) confirms 2020 and 2050 targets, interim targets for 2030 and 2040 confirmed through monitoring process for the **Energiewende**.
- **EU legislation** includes overall cap for emissions under emissions trading scheme (about 50% of GHG emissions in Germany).
- **Legally binding target for 2020** for non-trading sectors in Germany in EU effort sharing scheme.

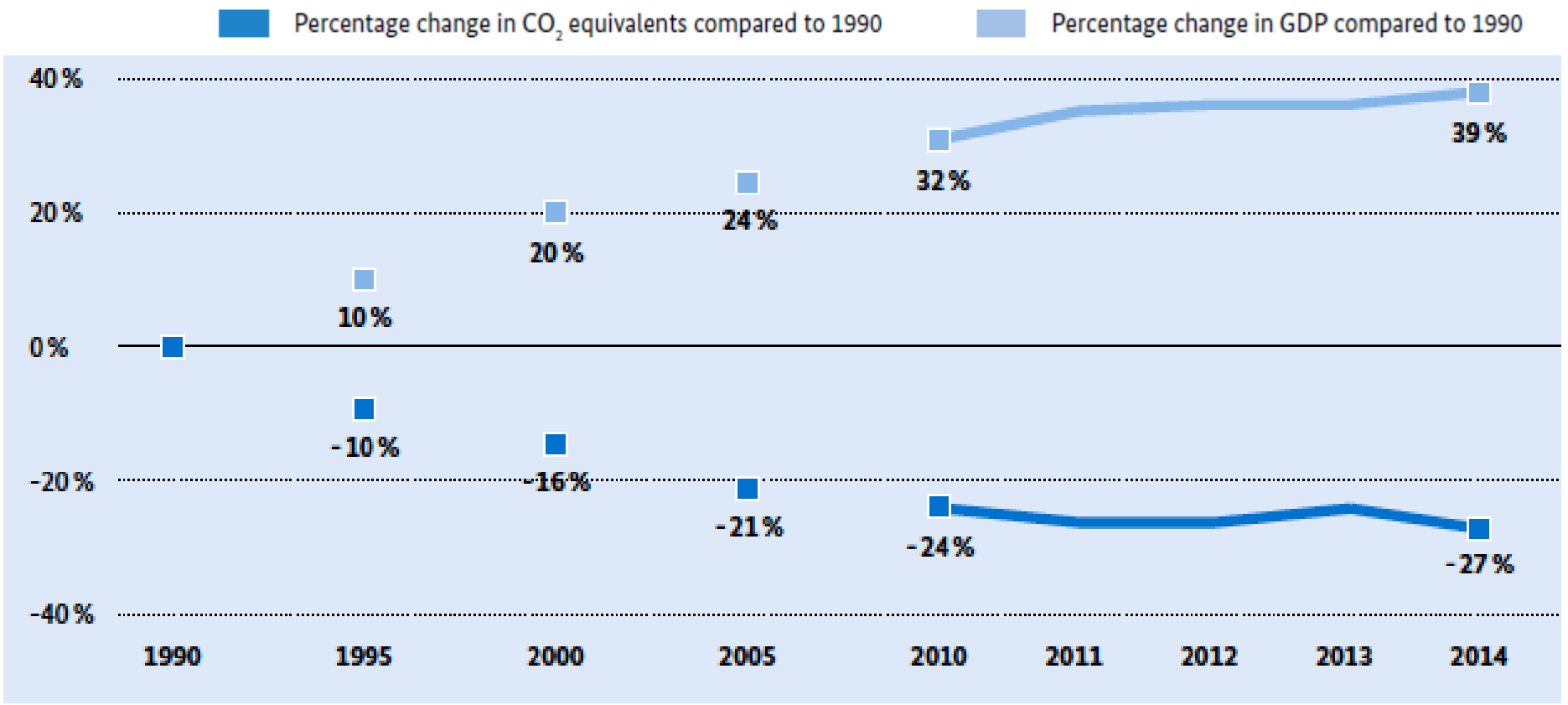
GERMANY IS DEDICATED TO PHASE OUT GHG EMISSIONS IN THE RANGE OF 80-95% UNTIL 2050 – DIFFERENT TARGETS

		2020	2030	2040	2050
Climate	Greenhouse gases (vs. 1990)	- 40%	- 55%	- 70%	- 80 to - 95%
Renewable energies	Share of electricity	35%	50%	65%	80%
	Overall share (Gross final energy consumption)	18%	30%	45%	60%
Efficiency	Primary energy consumption	- 20%	●●●●●●●●●●●●▶		- 50%
	Electricity consumption	- 10%			- 25%
	Energy consumption in buildings	20% heat demand			80% primary energy

IN FIVE YEARS GERMANY HAS TO REDUCE GHG EMISSION IN THE RANGE OF 162MIO. T/CO_{2EQ} WITH A GAP OF 91MIO. T/CO2EQ



GERMANY MANAGED TO DECOUPLE ITS INTERNATIONAL COMPETITIVE INDUSTRY PRODUCTION AND HIGH LIVING



Source: http://www.umweltbundesamt.de/presse/presseinformationen/treibhausgasausstoss-im-jahr-2013-erneut-um-12
and Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen): Selected efficiency indicators for Germany's energy balance

GERMANY HAS MANAGED TO BEAT ITS KYOTO TARGET BUT LACKS BEHIND ITS CURRENT AMBITIONS TOWARDS 40% REDUCTION IN 2020 VS. 1990 LEVELS.

- **Decoupling** growth from emissions
- **Kyoto target** during 1st commitment period was 21% for Germany, actual reduction was 23,6% (2008-2012 on average)
- Recent figures show **27% reduction vs 1990 levels** in 2014 (estimate)
- Projection shows about **33% reduction by 2020** based on existing measures (without Climate Action Programme 2020)

GERMANY HAS ADOPTED MEASURES TO CLOSE THE GAP OF AMBITIONS AND CURRENT TRENDS

Target

- 40% reduction in GHG emissions by 2020 (vs 1990)

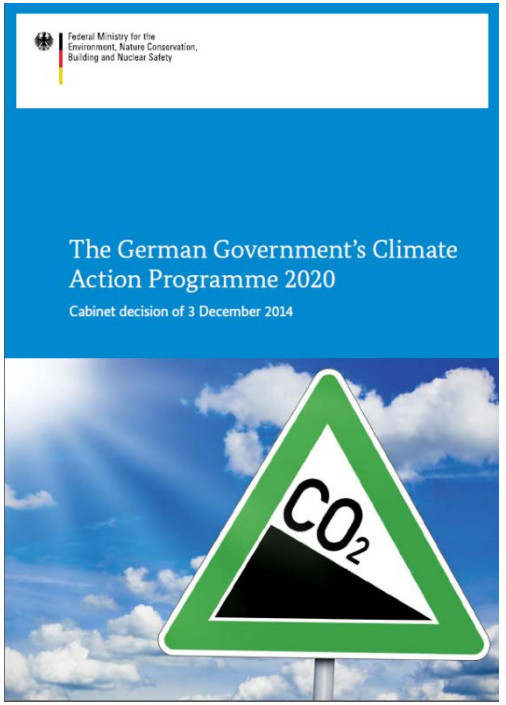
Gap

- With current policies: 33-34% GHG reduction 2020
- -> Gap: 6-7%, 75 – 87 Mt (+/- 1%: 62 – 100 Mt)

- Climate Action Programme 2020
- Adopted in December 2014 in Cabinet

GERMANY HAS TAKEN AMBITIOUS STEPS TO CLOSE THE GAP WHILE ENSURING GENERAL PUBLIC SUPPORT.

- Start April 2014: starting point, identification of gap
- Broad invitation: Identification of measures and suggestions
  - Federal Government / ministries, agencies
  - Länder and municipalities
  - Civil society
  - environmental and business NGOs
- over 500 external proposals
- sectoral grouping, Clustering
- quantification, if possible



WHILE GERMANY IS INCREASING AMBITIONS TO CLOSE THE GAP UNTIL 2020 THE 2050 TARGETS STAYS INSIGHT.

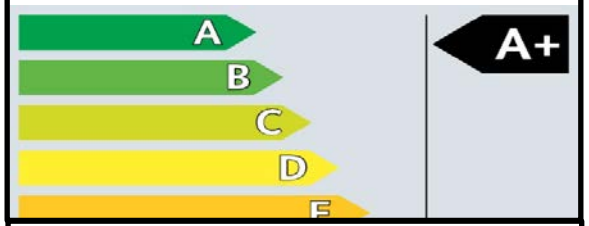
- **Climate Action Programme 2020 is an important milestone for reaching 2050 climate target**
- **Coalition agreement: describe next reduction steps up to 2050 and support them with measures developed in a broad-based dialogue process**
- **BMUB tasked to draw up Climate Protection Plan 2050**
- **To be adopted in 2016 by the federal cabinet**
- **Climate Protection Plan 2050 will be updated at regular intervals (to be defined)**
- **Participation also in implementation and review (Process started in June 2015 – second round in September and October 2016**

THE GERMAN ENERGY TRANSITION IS PART OF THE CLIMATE CHANGE POLICY

CENTRAL PILLARS OF THE GERMAN ENERGY TRANSITION

- **The energy transition's foundation are renewables and efficiency**

Energy Efficiency



Key legislation:

Energy Saving Ordinance
Heating Cost Ordinance

- Reduce energy consumption
- Cost-efficient

Supporting fields of action

Renewable Energy

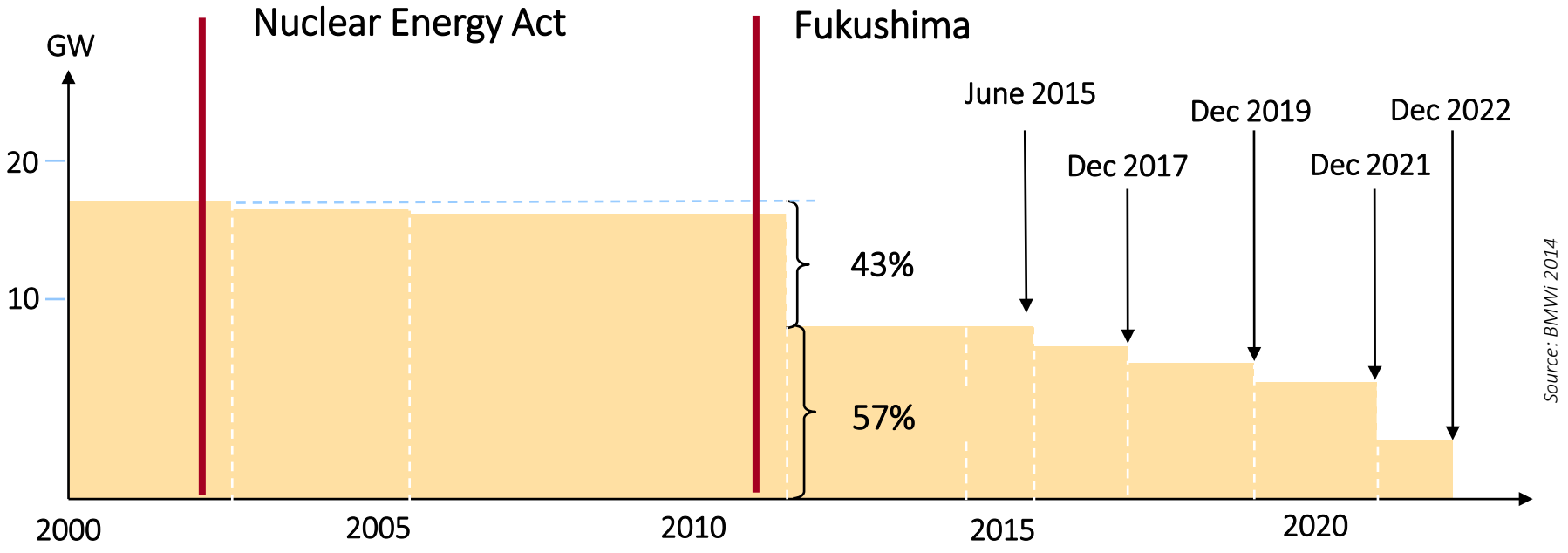
Key legislation:

Renewable Energy Sources Act
Renewable Energy Heat Act

- Steady growth
- Environmentally friendly

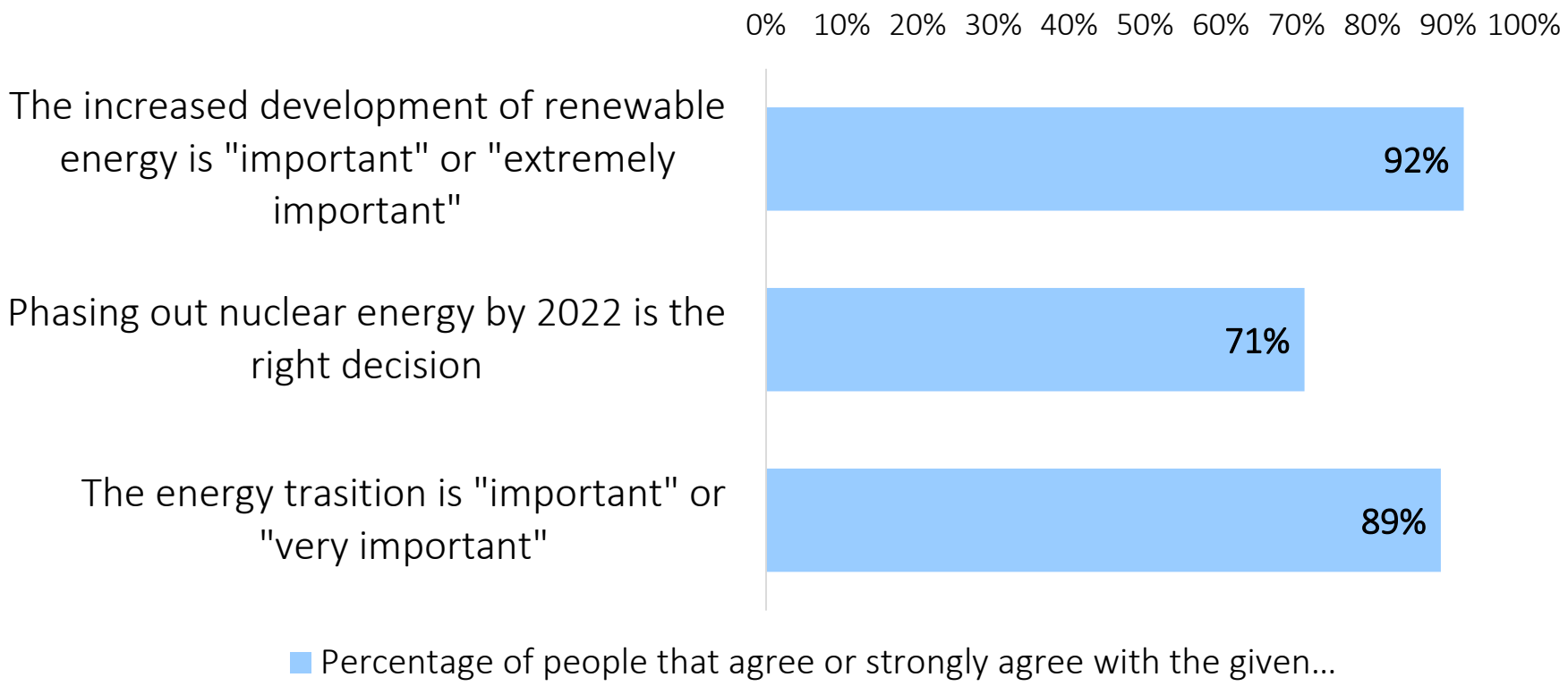
GERMAN NUCLEAR PHASE-OUT TIMELINE

- Nuclear phase out dates back to 2002 Nuclear Energy Act
- **Shut down of 9 nuclear power plants since 2011**
- **Still exporting electricity** – in 2014 net exports more than 34 TWh
- Remaining 8 nuclear power plants will be phased out by 2022



PUBLIC ACCEPTANCE OF THE „*ENERGIEWENDE*“

The energy transition enjoys a high level of approval among the German public and businesses.



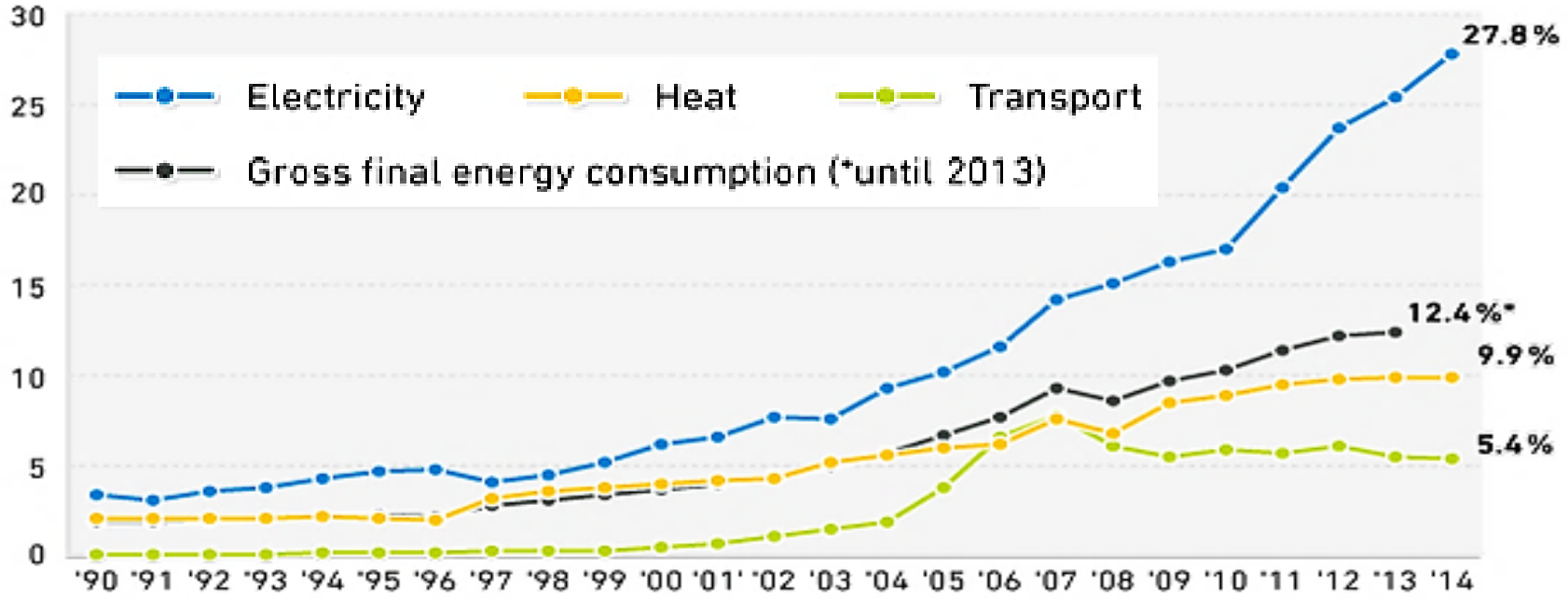
Sources: BMWi 2014, TNS Emnid 2014, Institut für Demoskopie 2014, BMUB 2014, BDEW 2014, Forsa 2013, BDI 2013

WHAT HAS BEEN ACHIEVED IN GERMANY…

SHARE OF RENEWABLE ENERGY IN GERMANY

- **Renewables have become the biggest electricity source in**
- **just ten years.**

Percentage of renewable energy

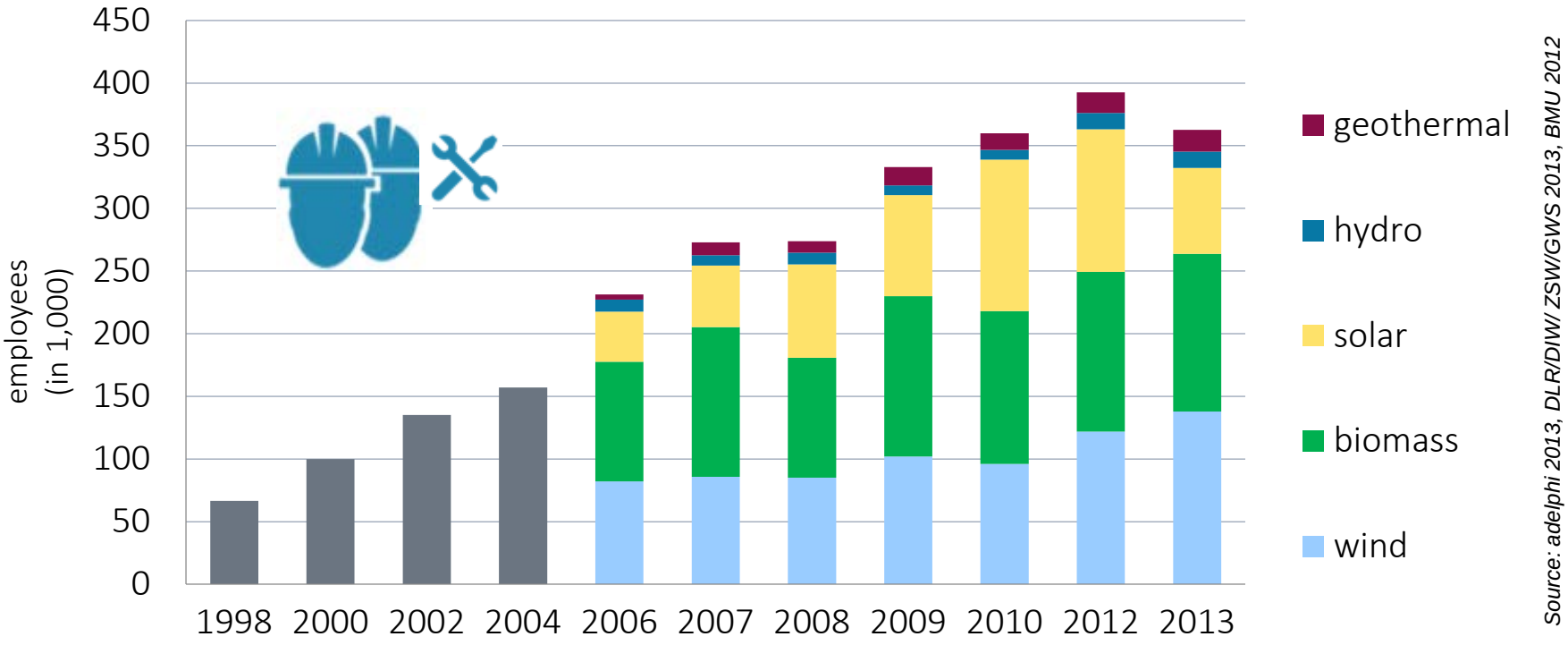


Source: BMWi
As of: 2/2015

RENEWABLE ENERGIES AGENCY
renewables-in-germany.com

GROSS JOB CREATION IN THE GERMAN RENEWABLES SECTOR

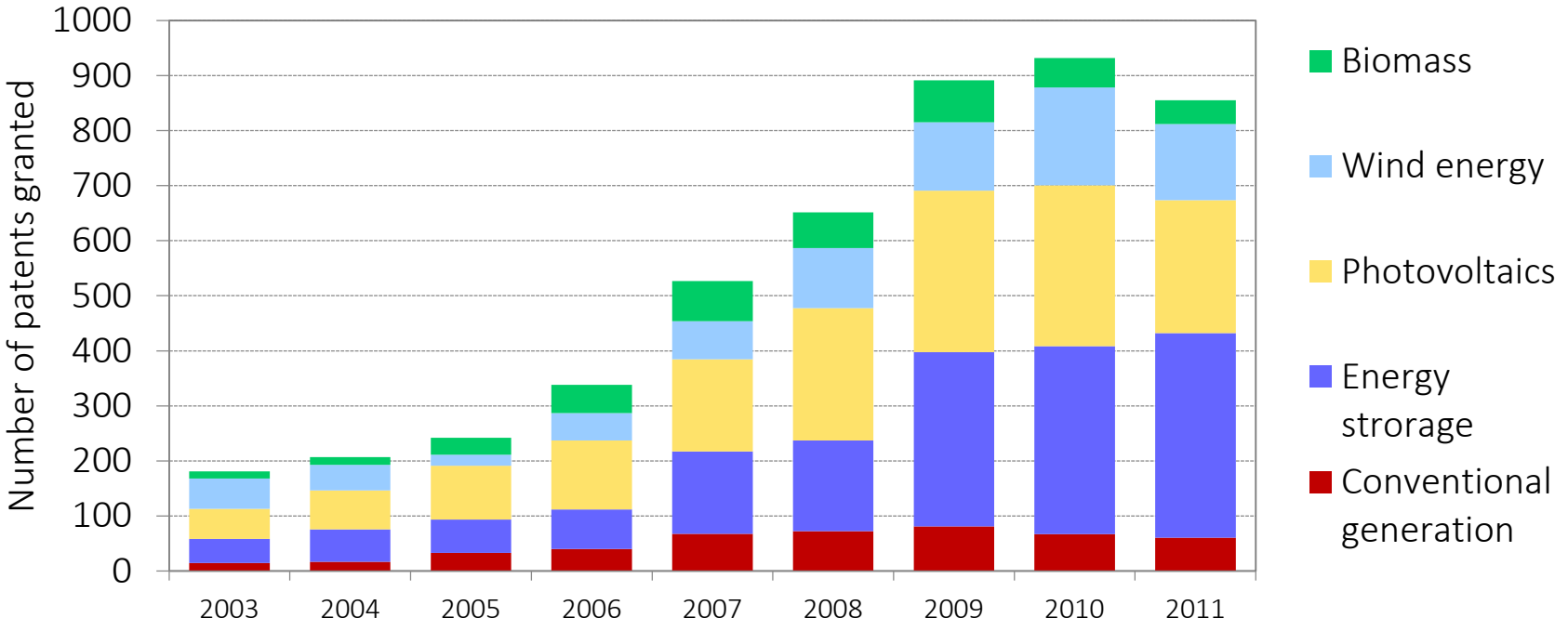
- **The renewables sector has created 360,000 jobs in Germany**



Source: adelphi 2013, DLR/DIW/ ZSW/GWS 2013, BMU 2012

INTERNATIONAL PATENTS GRANTED FOR ENERGY TECHNOLOGIES

- **The number of granted patents for renewable technolgies and energy storage exceeds that of conventional energy technologies**

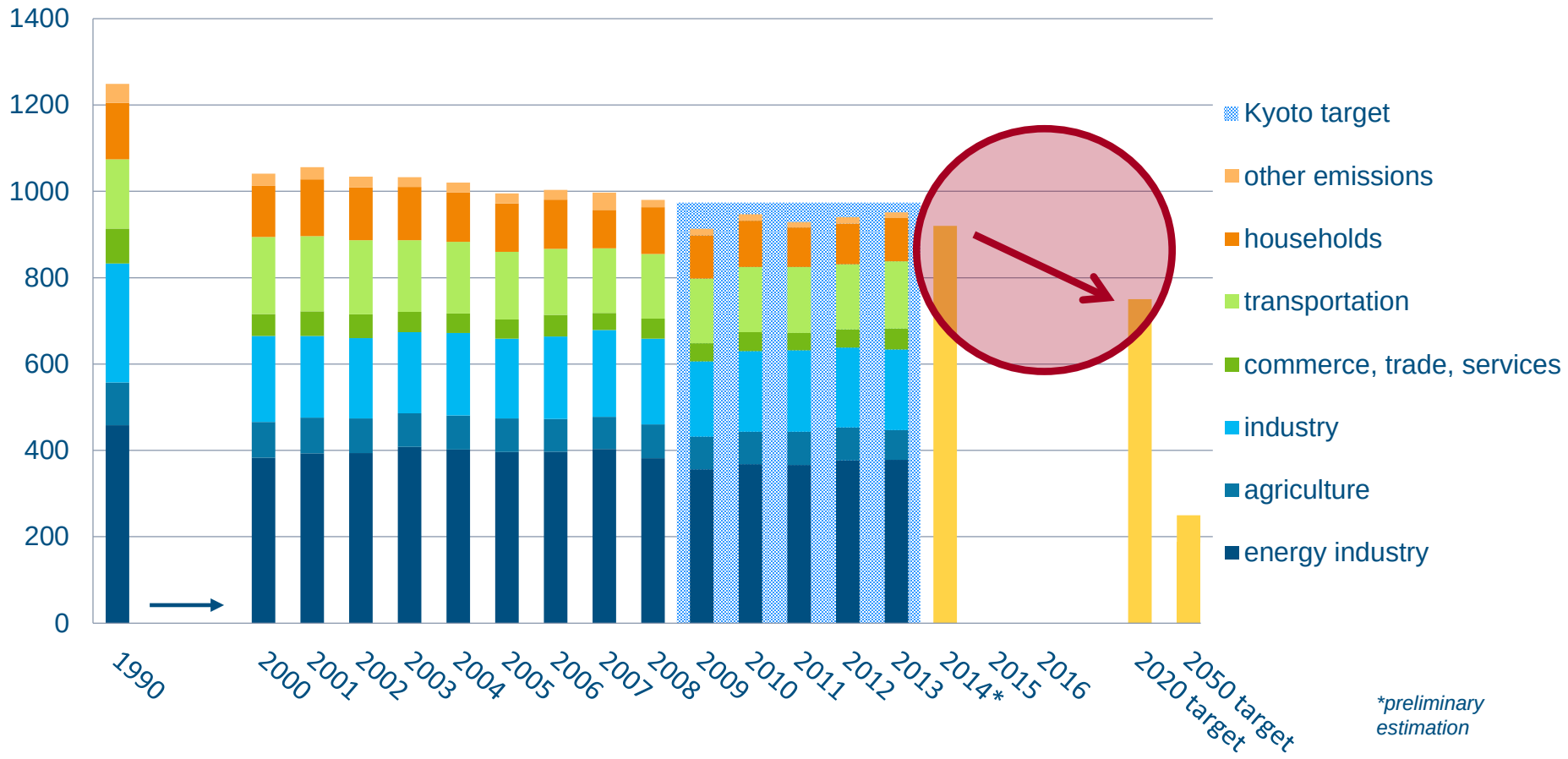


Source: GWS, Prognos, EWI 2014 nach OECD

WHAT STILL NEEDS TO BE DONE IN GERMANY…

CHALLENGE: REACHING THE -40% CLIMATE TARGET BY 2020

- Gap to reaching the greenhouse gas emissions reduction target 6-7% (±1% of uncertainty)



CLIMATE ACTION PROGRAMME 2020

Target

- **40% reduction in GHG emissions by 2020 (vs. 1990)**

Gap

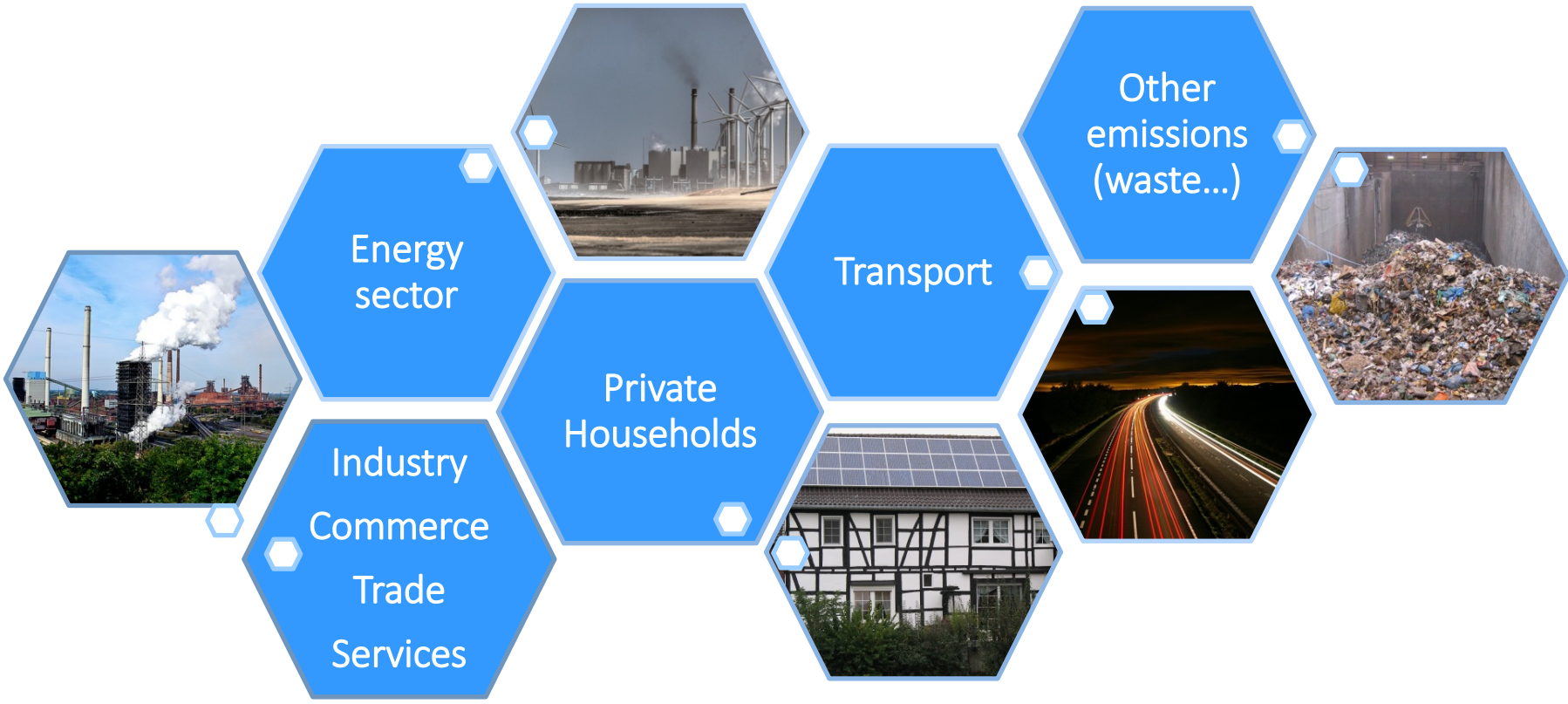
- With current policies: 33-34% GHG reduction by 2020 (uncertainty of +/- 1%)

CAP

- **Climate Action Programme 2020 adopted in Dec 2014 by Cabinet**

CLIMATE ACTION PROGRAMME 2020

- **All sectors contribute to emissions reduction**



CLIMATE ACTION PROGRAMME 2020
KEY POLICY MEASURES

Measures	**Greenhouse gas emission reduction (million tonnes of CO_2 equivalent)**
National Action Plan on Energy Efficiency (not adressing transport sector)	Approx. **25-30 mill. tonnes** (including energy efficiency in buildings)
Climate-friendly building and housing strategy	Approx. **5.7-10 mill. tonnes** (1.5 - 4.7 mill. tonnes of which are in addition to NAPE)
Measures in the transport sector	Approx. **7-10 mill. tonnes**
Reduction in non-energy-related emissions : industry, the commerce/trade/services sector and waste management agriculture	**3-7.7 mill. tonnes** **3.6 mill. tonnes**
Reform of the emissions trading scheme	Dependent on decisions at EU level on structure
Further measures, especially in the power sector	**22 mill. tonnes**
TOTAL	**62-78 mill. tonnes**

FIVE GOOD REASONS FOR THE ENERGY TRANSITION

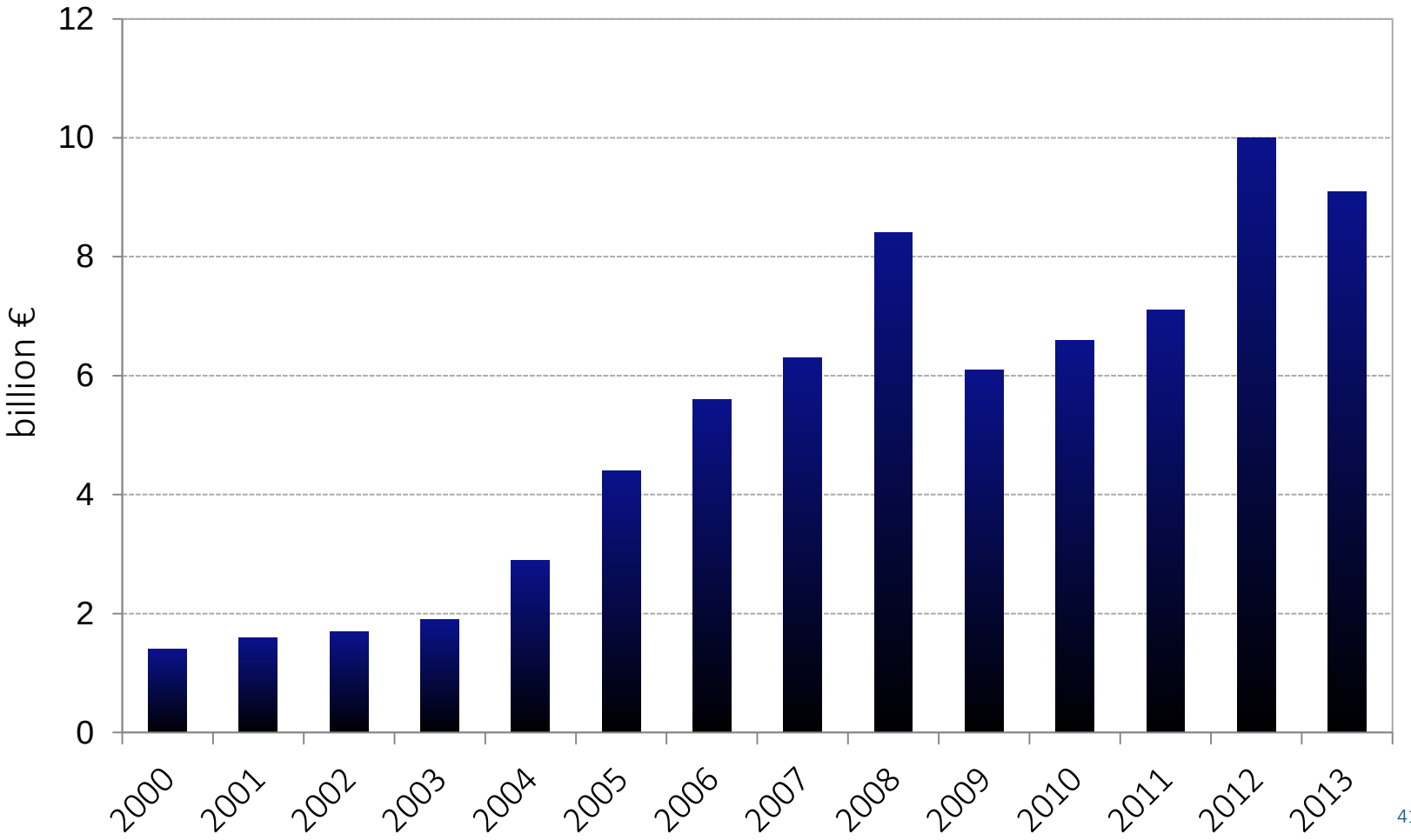
- **Reduce carbon emissions and comply with the climate protection targets**
- **Phase-out nuclear power generation**
- **Reduce dependency on energy imports**
- **Development of new technologies as new sources of growth and employment**
- **Show that energy policy can be both sustainable and economically successful**

THANK YOU FOR YOU ATTENTION

BACK-UP SLIDES:
RENEWABLE ENERGY

GROSS AVOIDED FUEL COSTS DUE TO THE USE OF RENEWABLES

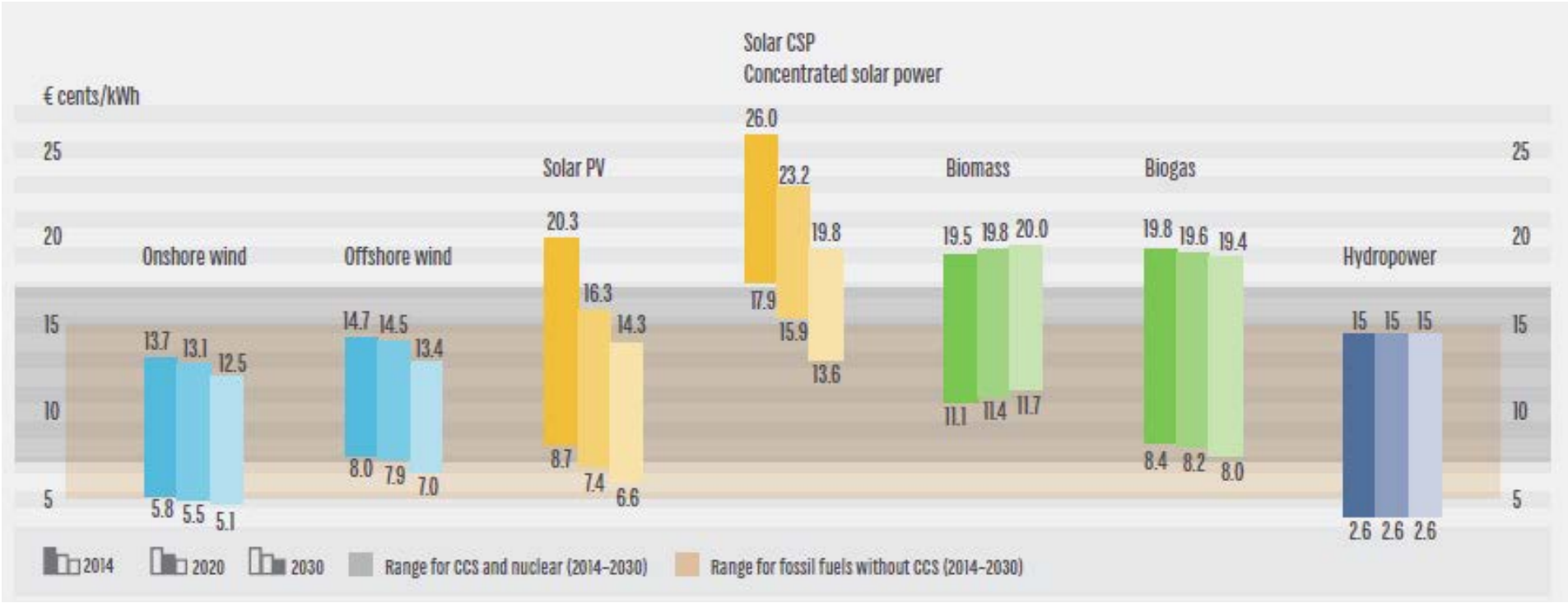
Renewable energy reduces the demand for fossil fuel imports.



Source: ISI, DIW, GWS, IZES 2014

RENEWABLE ENERGY HAS BECOME THE MOST COST-EFFICIENT LOW-CARBON OPTION

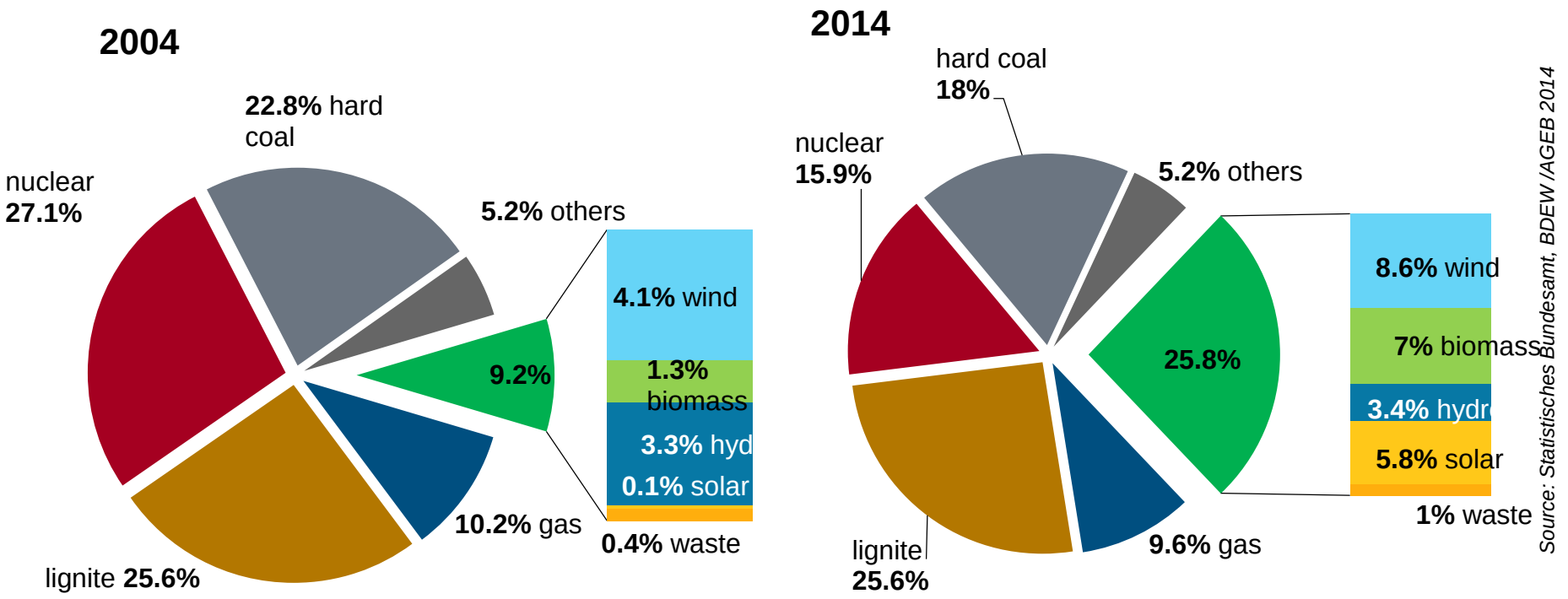
Levelised cost of electricity in Europe 2014, 2020, 2030 (ct/kWh)



Source: Fraunhofer ISI 2014

GERMAN GROSS ELECTRICITY PRODUCTION

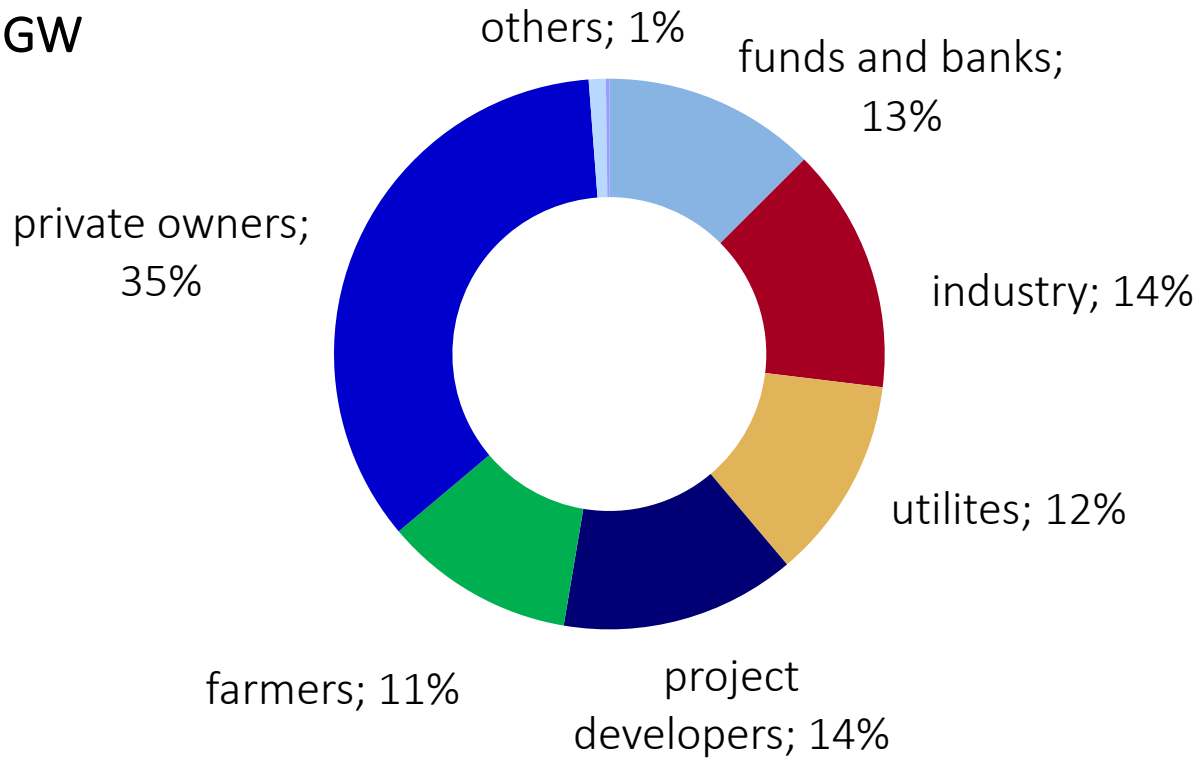
Renewables have become the biggest electricity source in just ten years.



OWNERSHIP STRUCTURE OF GERMAN RES FACILITIES IN 2012

Renewable installations create multiple opportunities for entrepreneurship.

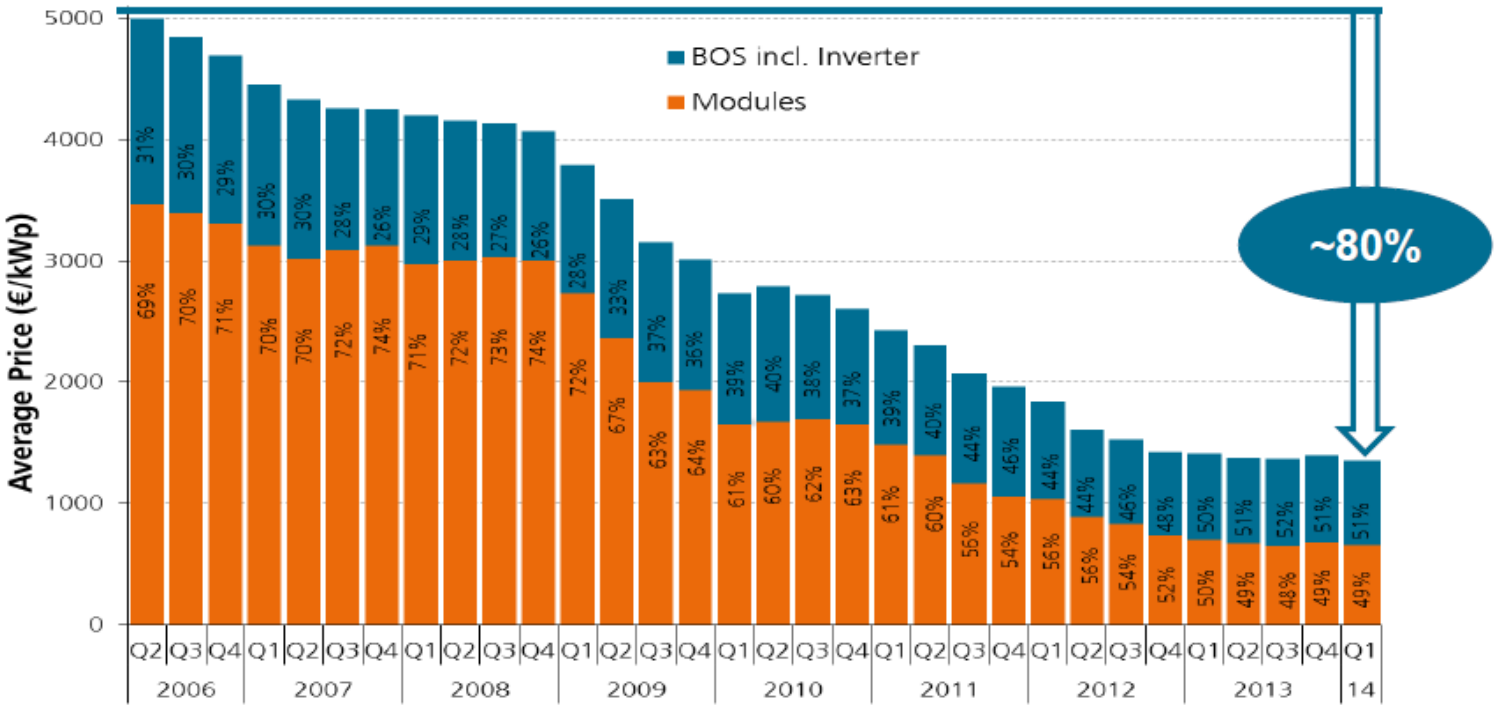
Total ~ 73 GW



Source: trend:research 2013

AVERAGE PRICE OF ROOFTOP PV SYSTEMS IN GERMANY

Declining module costs in particular have driven down PV system.

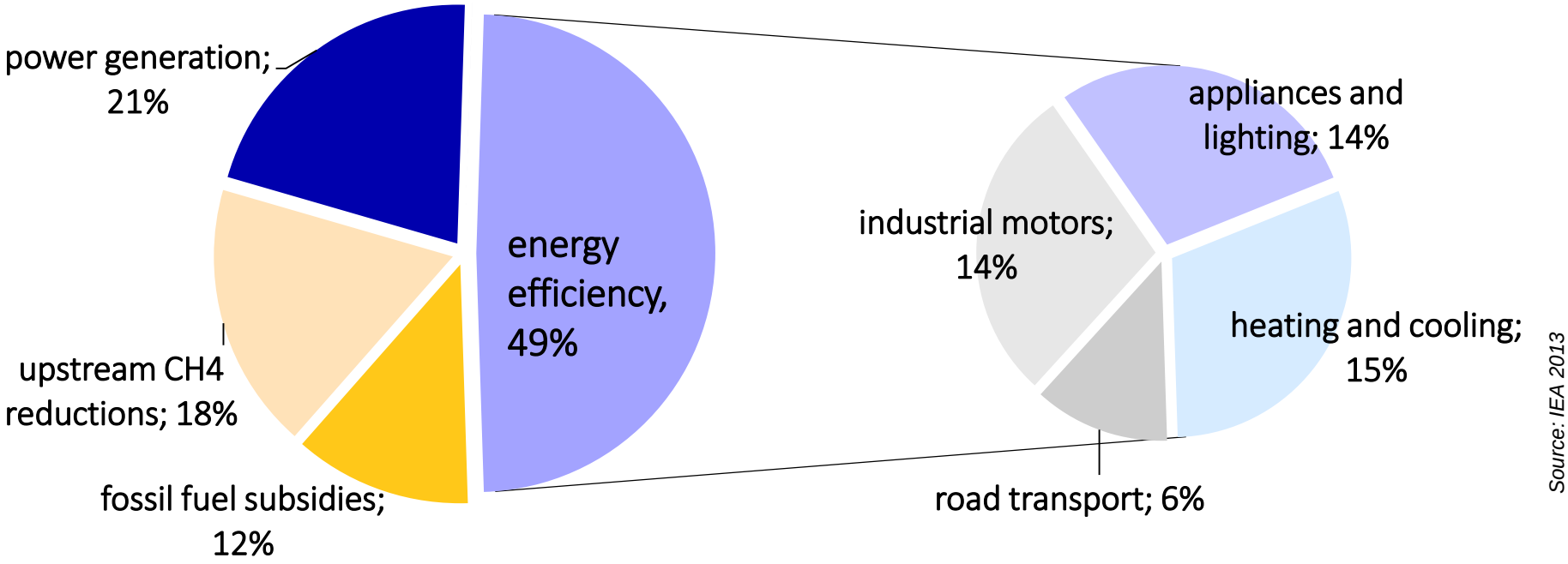


Source: Fraunhofer ISE 2014 based on data from BSW

BACK-UP SLIDES:
ENERGY EFFICIENCY

WORLDWIDE GHG REDUCTION POTENTIAL BY 2050

Efficiency is the most important means of reducing CO_2 emissions.



Source: IEA 2013

MAIN FEDERAL-LEVEL ENERGY EFFICIENCY MEASURES

Buildings

- Energy consulting
- KfW progammes for construction and renovation
- MAP (Market Incentive Programme)
- Energy saving legislation

Products and appliances

- Energy consulting (Energy Efficiency Campaign)
- NTRI: National Top Runner Initiative
- Energy Efficiency Labelling Ordinance
- Ecodesign Directive (eff. classification)

Industry and business

- Energy consulting services
- KfW credits and loans (Effizienzprogramm, BAFA)
- Obligatory energy audits
- European emissions trading (ETS)

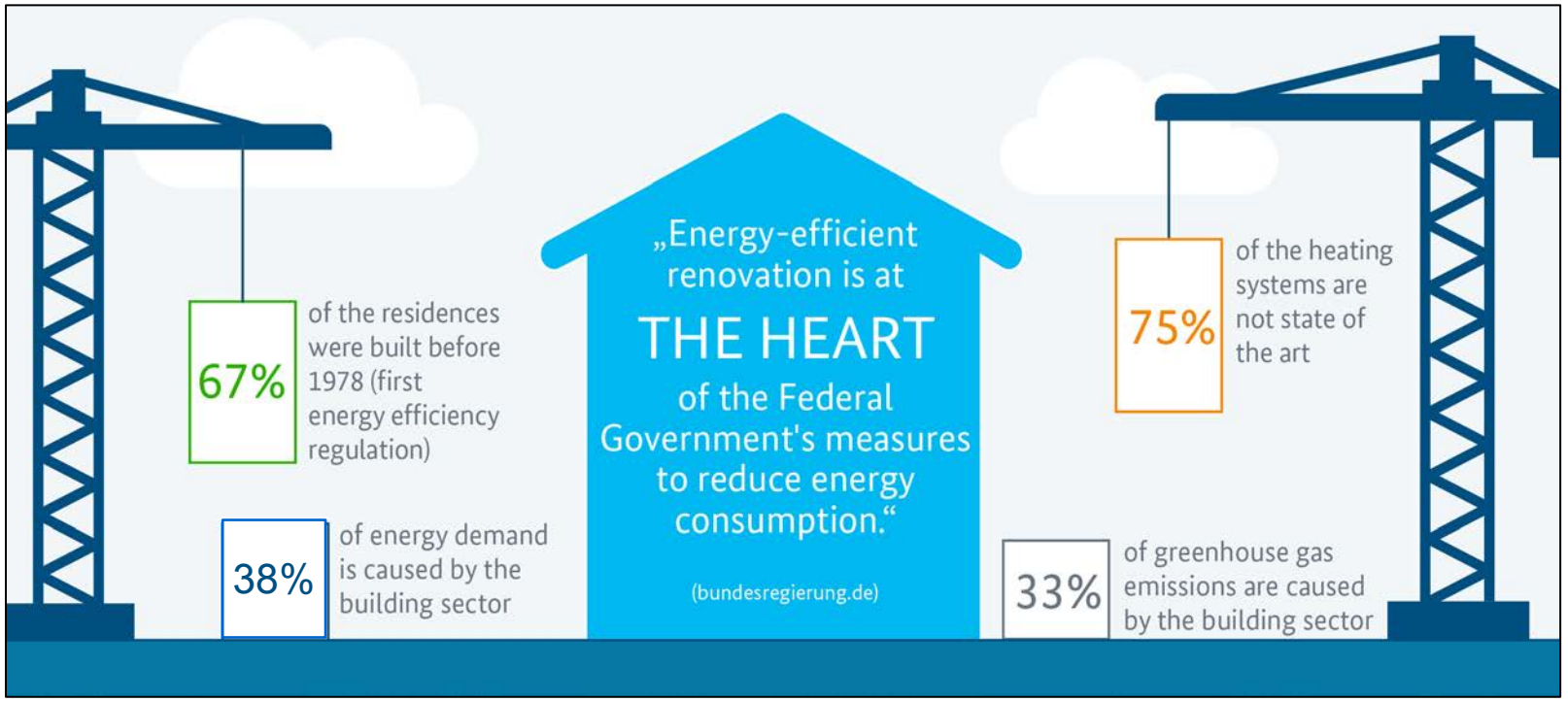
Transport

- Labelling (EU Directive Fuel Economy)
- Regulation of consumption
- Motor vehicle taxation
- E-mobility strategy
- Mobility and fuel strategy

Source: Ecofys 2015

A balance of consultation and information, incentives and regulations.

SAVING POTENTIAL OF BUILDINGS

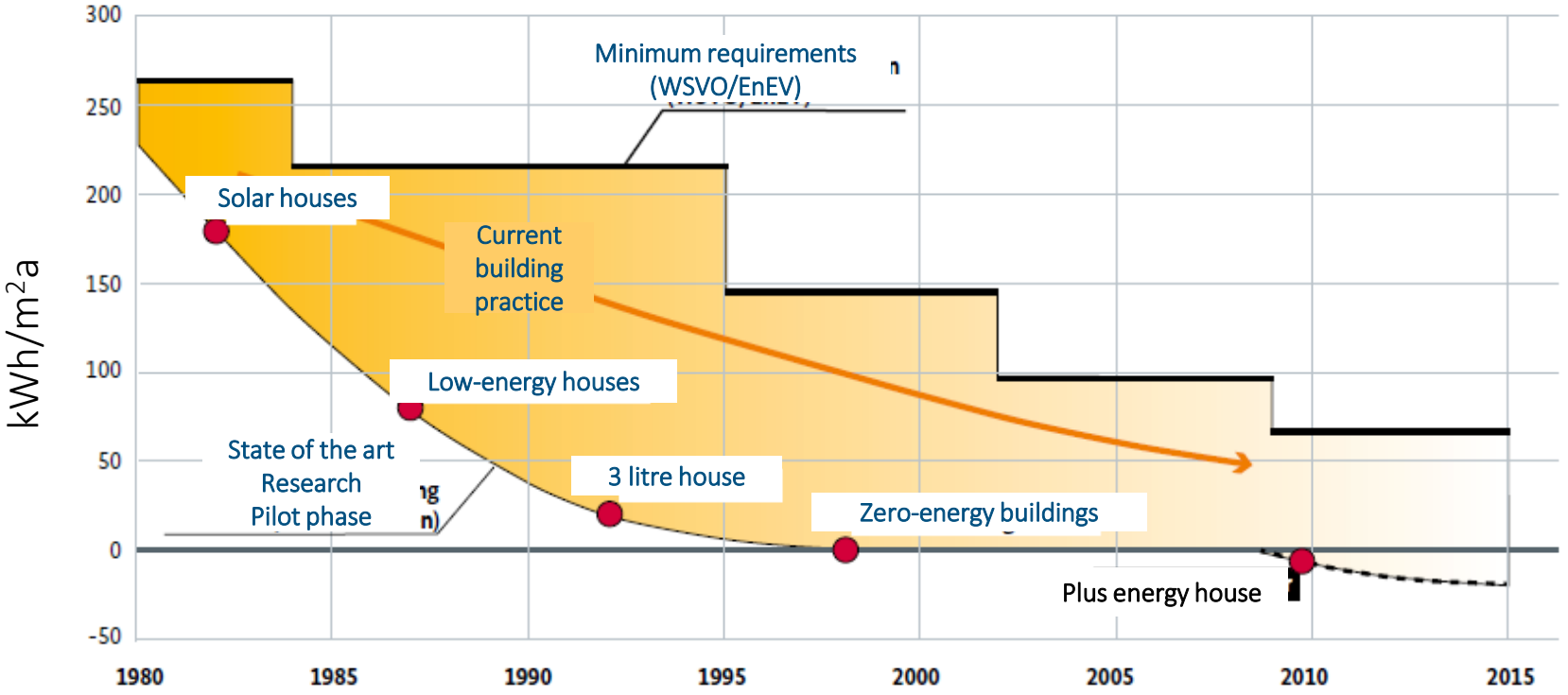


Source: BDH

The "Energiewende" can only be successful if existing buildings are included.

LEARNING CURVES IN ENERGY EFFICIENT BUILDINGS

Regulation follows the technical learning curve to make new buildings increasingly efficient.

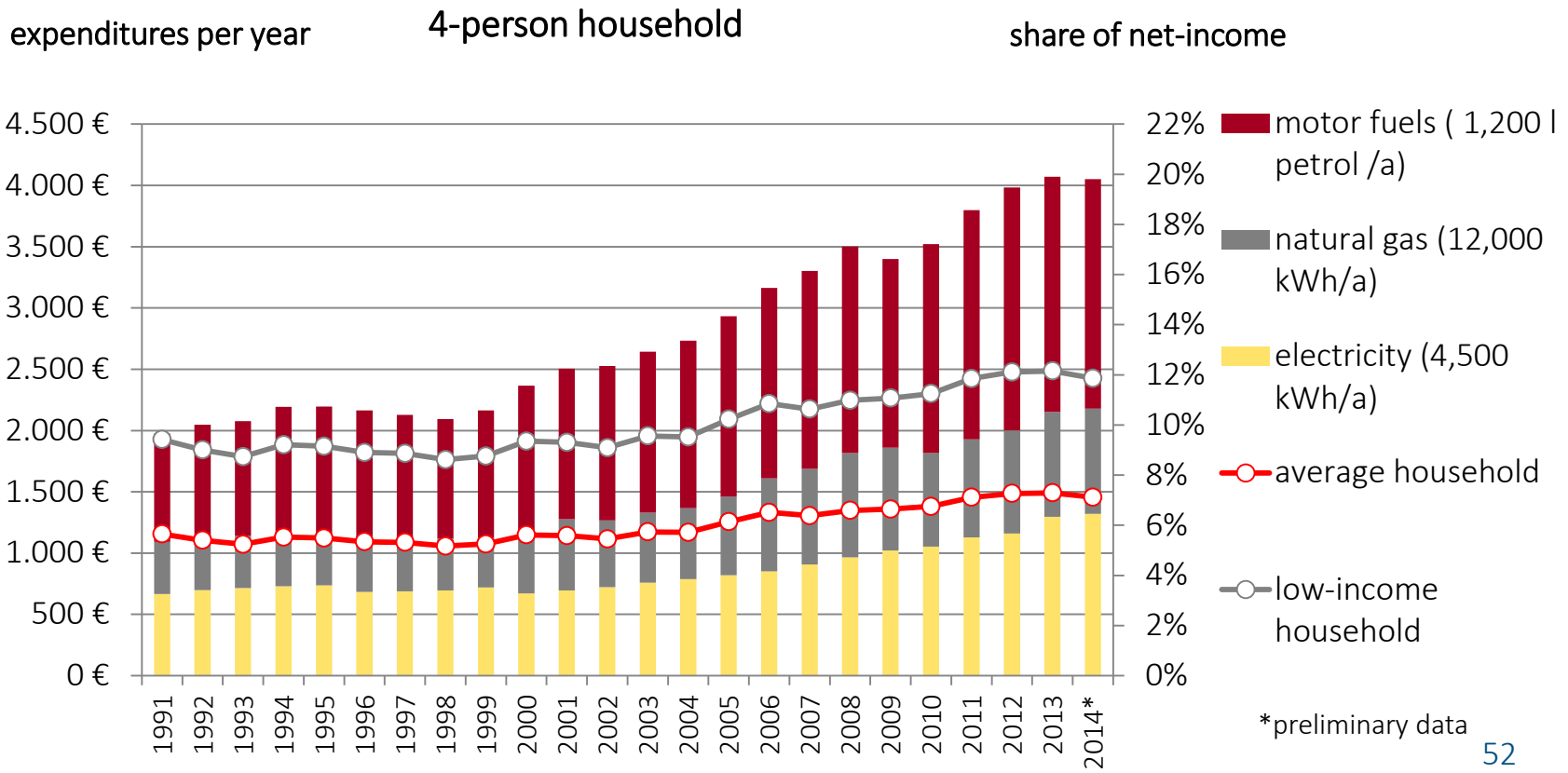


Source: Fraunhofer IBP, BMWi 2014

BACK-UP SLIDES: CHALLENGES

GERMAN ENERGY EXPENDITURES AND SHARES

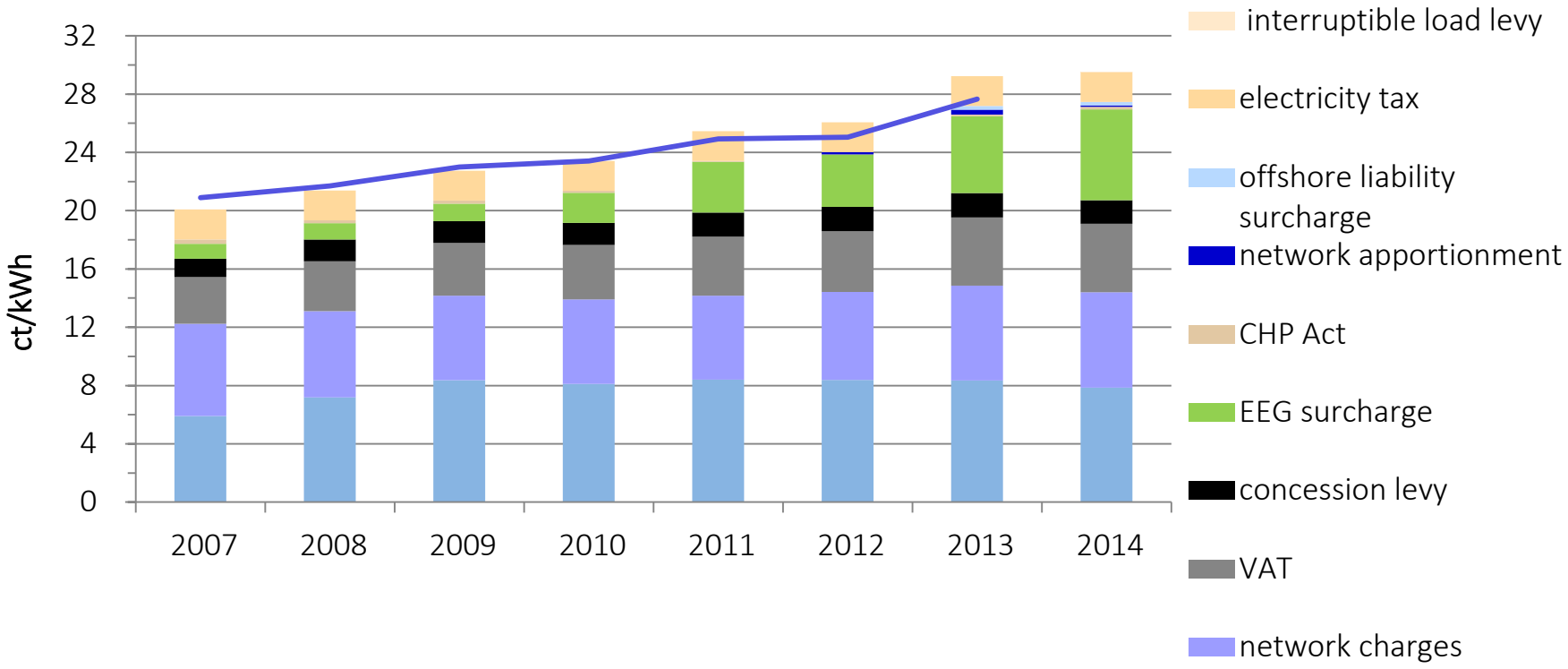
An average 4-person household spends roughly 7% of it‘s income on energy. Petrol accounts for the the largest share.



Source: Ecofys 2015 based on BMWi 2014

GERMAN HOUSEHOLD ELECTRICITY PRICES

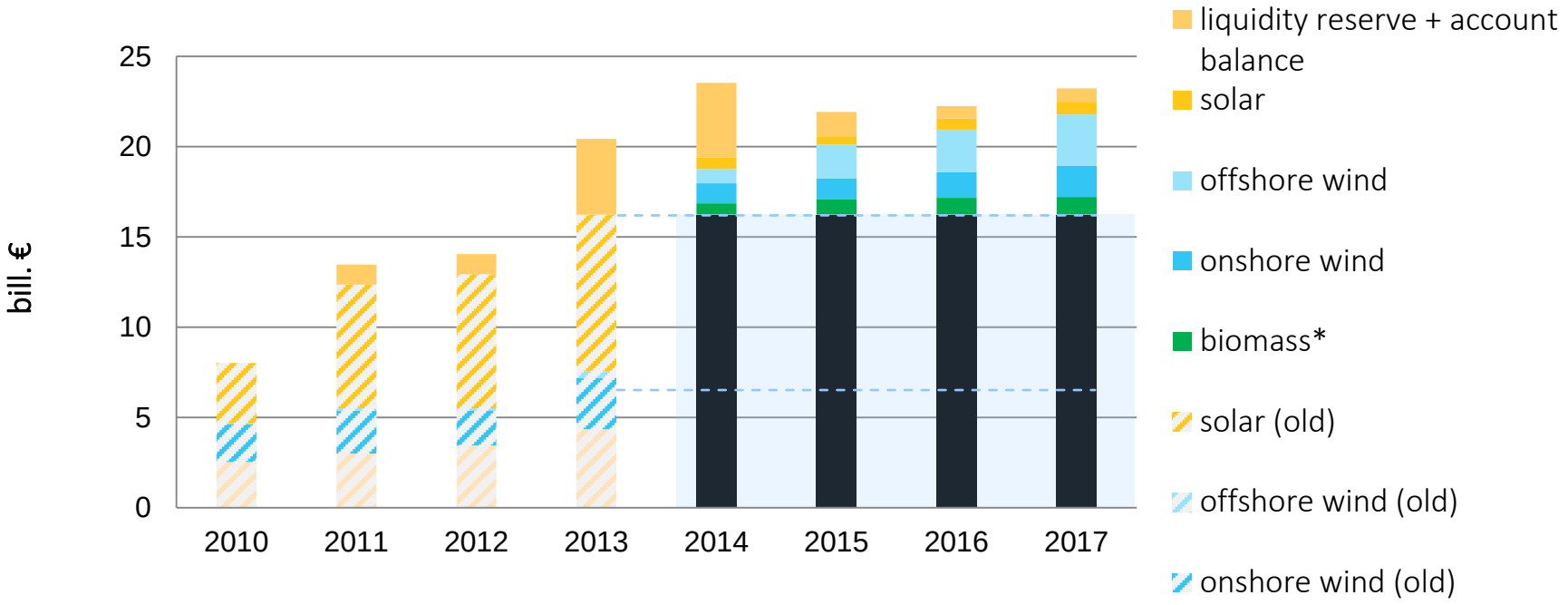
The EEG surcharge is only one reason for electricity price increases.



Source: BNetzA 2014

NET FEED-IN PAYMENT TRENDS IN GERMANY

Main share of payments for renewable electricity goes to existing plants. New installations account for a much smaller share.



Source: Agora Energiewende / Öko Institut, 2014
** Biomass development "low" scenario*

AVERAGE HOUSEHOLD ELECTRICITY SPENDING: AN INTERNATIONAL COMPARISON

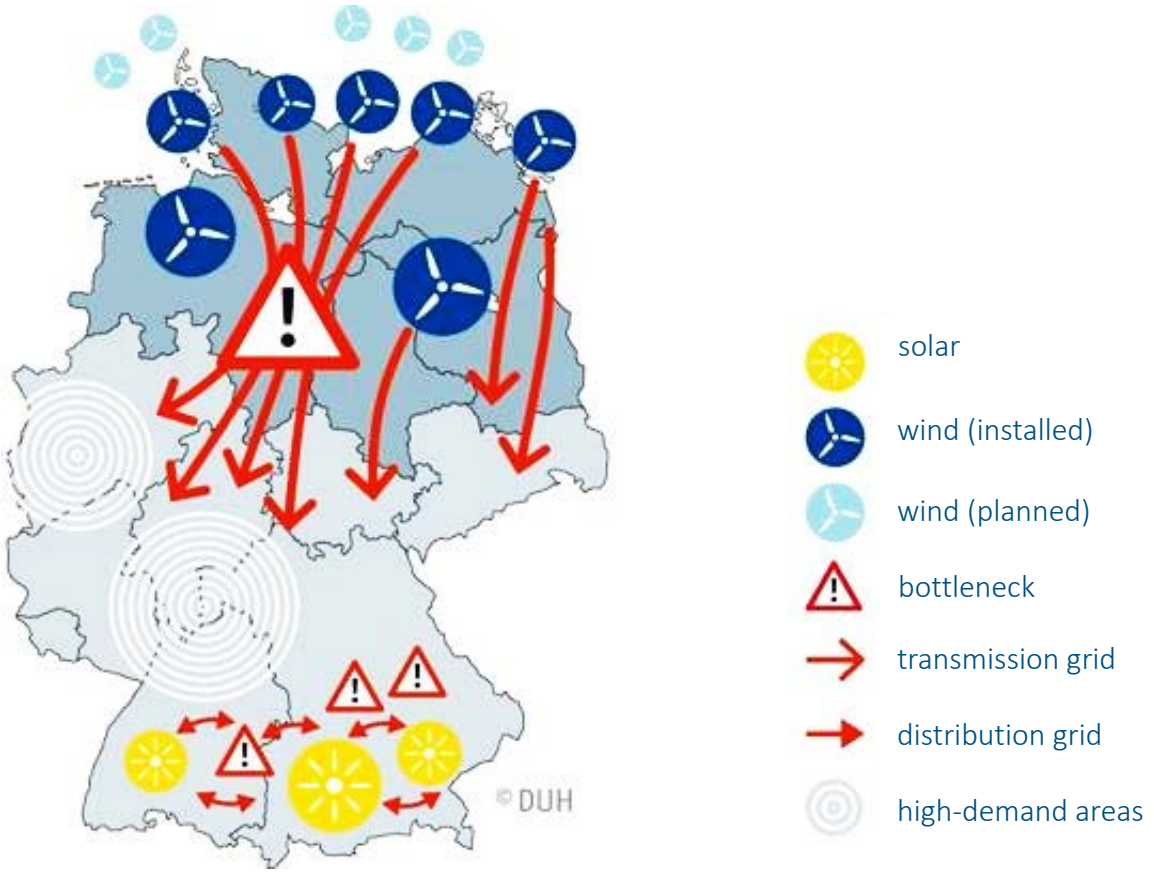
Efficiency in Germany largely outweighs higher electricity prices.

Country	Consumption (kWh)	Price (€ ct/kWh)	Bill (€)
Denmark	4,000	30	1,200
US	11,800	9	1,060
Germany	3,500	30	1,050
Japan	5,600	18	1,010
Spain	4,400	23	1,010
Canada	10,800	8	850
UK	4,200	19	800
France	5,000	16	800
Italy	2,700	25	680

Source: Ecofys 2015 based on Agora 2014

THE CHALLENGE: CONNECTING SUPPLY AND DEMAND

New power lines need to transport excess supply in northern Germany to southern Germany in order to prevent shortages.



Source: DUH 2011