Strategies of Germany for Mitigating Climate Change

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- 5th Monitoring Report of the Federal Ministry of Economics "Energy of the Future"
- Published in December 2016
- Topics:
  - Targets and indicators
  - Renewables
  - Energy demand and efficiency
  - Buildings
  - Transportation
  - Greenhouse gases and environmental impacts
  - Power plants and supply security
  - Affordable energy and competition
  - Grid infrastructure
  - Integration of the energy system
  - International context

- Comment of the 5th Federal Monitoring Report
- Published in December 2016
- Topics:
  - Credibility of the energy transformation
  - Organizing climate protection
  - Improving energy efficiency
  - Broad approach to transportation
  - Strategic REN development
  - Securing electricity infrastructure
  - Affordability of energy
  - Using digitalization

"Price" for more nuclear

Energy Concept 2050 [September 2010]

Germany: Targets and reality 2015	**2015**	**2020**	**2050**
Greenhouse gas emissions (base year 1990)	-27.2%	- 40%	-80-95%
Primary energy consumption (base 2008)	-7.6%	- 20%	-50%
REN share	14.9%	18%	60%
Gross electricity consumption (base 2008)	-4.0%	-10%	-25%
REN share	31.6%	35%	≥80%
Heat demand of building stock (base 2008)	-11.1%	-20%	
Primary energy in buildings (base 2008)	-15.9%		-80%
REN share	13.2%	14%	
Final energy in transportation (base 2005)	+1.3%	-10%	-40%
REN share	5.2%	10%	

Phase-out of Nuclear Power in Germany

	Phase-out until end of the year	**Gross capacity (MW)**
Gundremmingen B	2017	1.344
Philippsburg 2	2019	1.468
Grohnde	2021	1.430
Gundremmingen C		1.344
Brokdorf		1.480
Isar 2	2022	1.485
Emsland		1.406
Neckarwestheim 2		1.400
		11.357

Since March 2011 (Fukushima event), 50 percent of the nuclear capacities in Germany have already been shut down

Will the 2020 Targets be reached?

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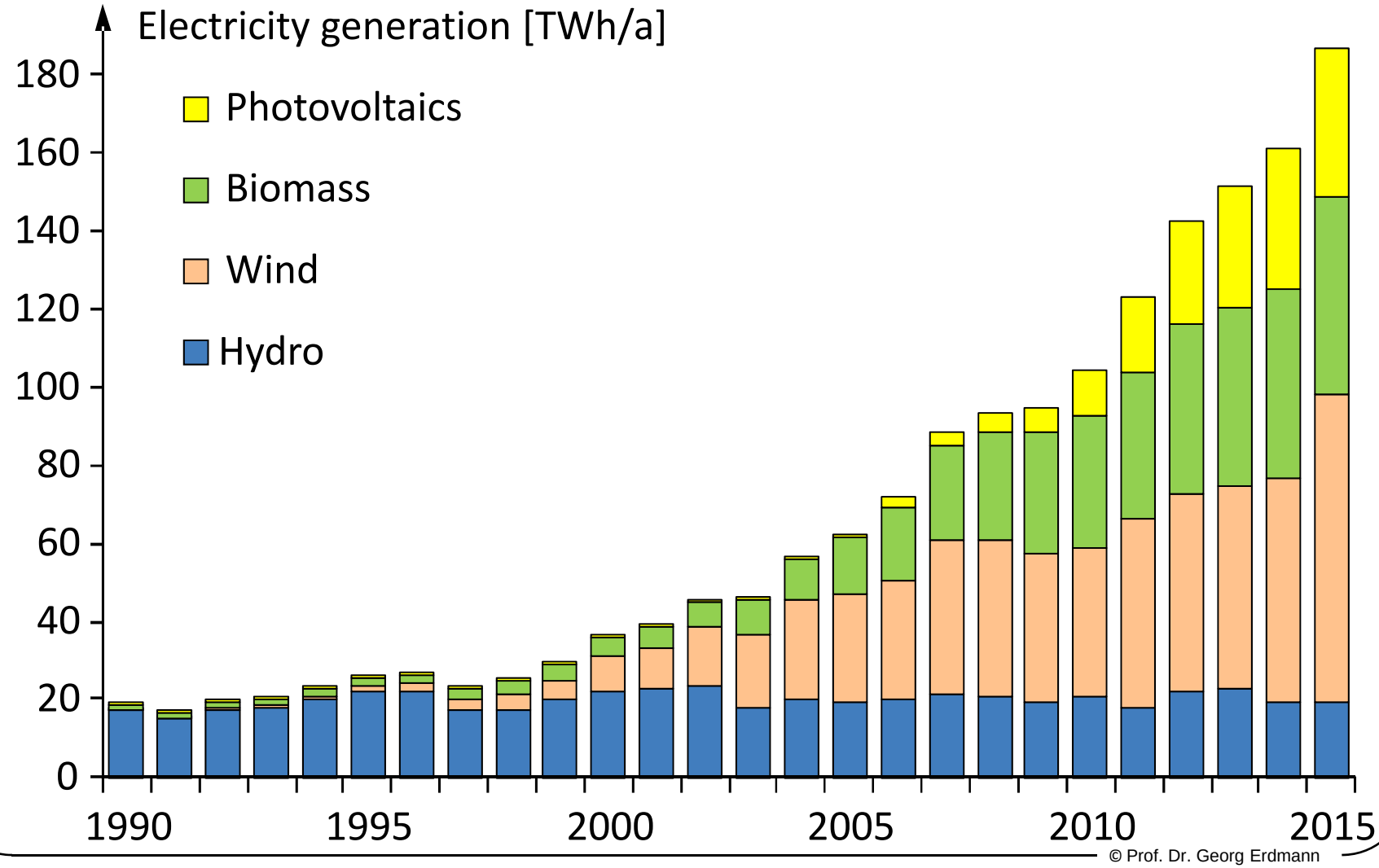
Agenda: Mixed Performance in GHG Reduction

- Success: Power generation from renewables
- Ambivalent: Energy efficiency
- Failure: Transportation fuels
- European Emission Trade System ETS and national actions

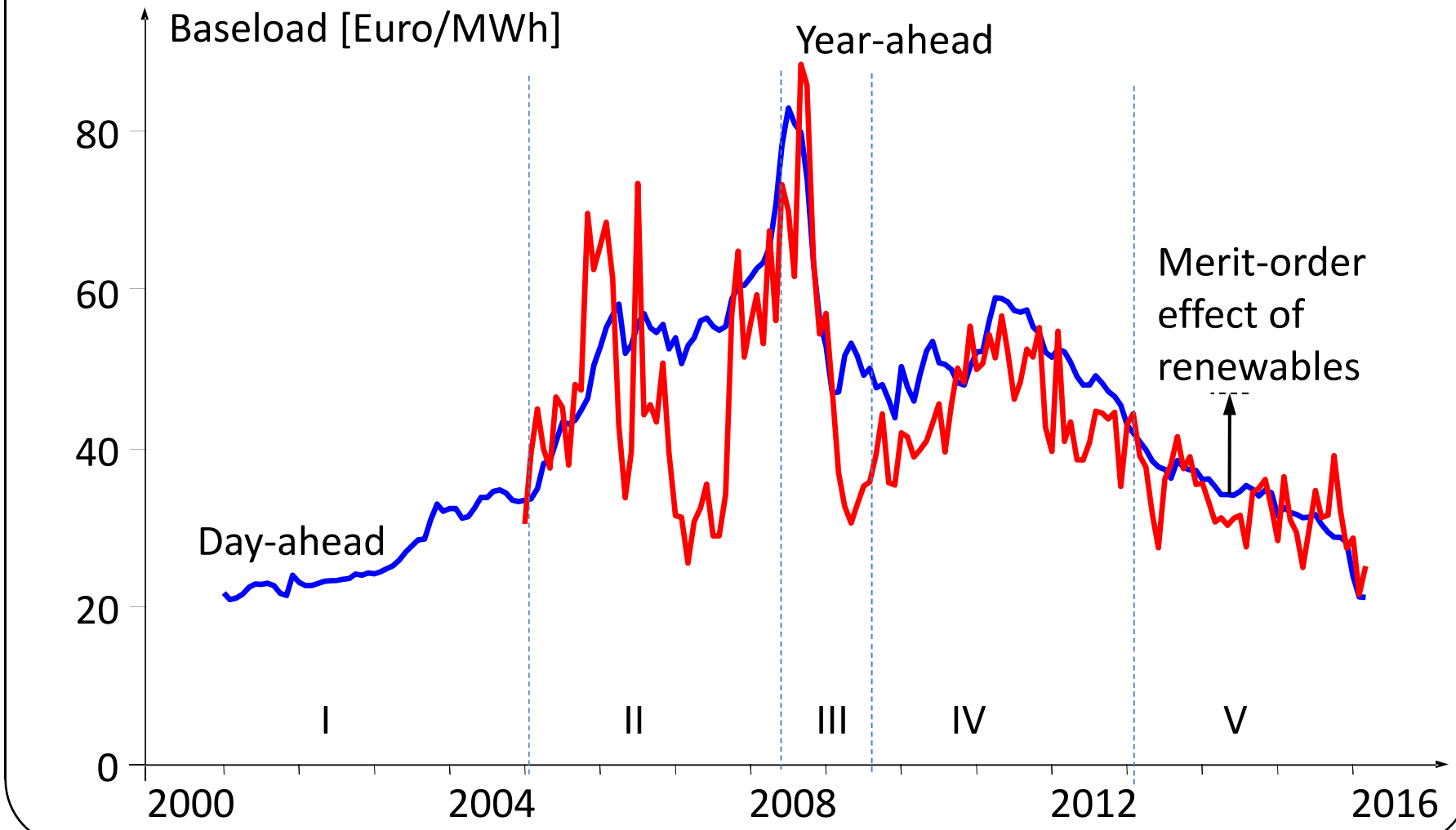
Renewable Electricity in Germany *[Source AGEB]*



Expenditures for Electricity Consumption

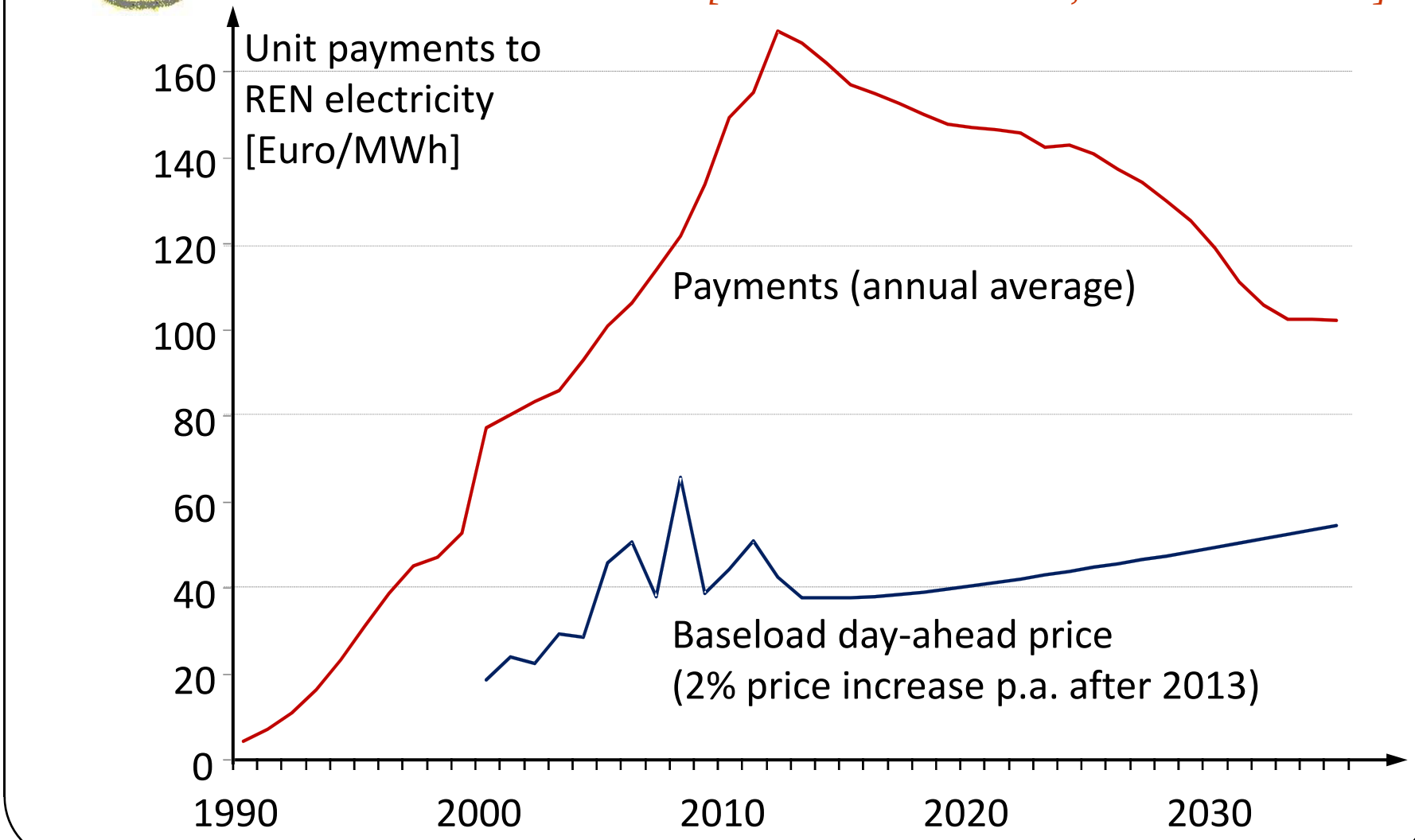
Billion Euros p.a.	2010	2011	2012	2013	2014	2015
Total annual expenditures	**60.9**	**63.6**	**64.3**	**71.0**	**70.3**	**69.4**
Expenditures induced by governmt	**17.2**	**23.0**	**23.3**	**30.0**	**32.3**	**31.3**
Electricity taxes	6.4	7.2	7.0	7.0	6.6	6.6
Concession fees	2.1	2.2	2.1	2.1	2.0	2.0
Renewable electricity levy	8.3	13.4	14.0	19.8	22.3	22.0
Combined heat and power Levy	0.4	0.2	0.3	0.4	0.5	0.6
Offshore grid levy (§ 17F ENWG)	-	-	-	0.7	0.8	0.0
Expenditures regulated by the government	**16.9**	**17.6**	**19.0**	**21.2**	**21.4**	**21.4**
Fees for the transmission grid	2.2	2.2	2.6	3.0	3.1	3.5
Fees for the distribution grid	14.7	15.4	16.4	18.2	18.3	17.9
Expenditures driven by the market	**26.8**	**23.1**	**22.0**	**19.8**	**16.6**	**16.8**
Market value of REN electricity	3.5	4.4	4.8	4.2	4.1	4.7
Generation, marketing and sales	23.3	18.6	17.2	15.6	12.6	12.0

Wholesale Power Prices [Sources: EEX, EPEX]



Unit Payments to REN Electricity

[Sources: own scenario, calculated in 2014]



REN Integration into Power Markets

- First step: Feed-in tariff (FIT) aiming to create markets for renewable technologies. Grid operators become owners of the electricity against paying the regulated feed-in premium

- Second step (experimental since 2012, mandatory since 2015): Market premiums (difference between the FIT and the wholesale market price) forcing renewable electricity generators to sell power

- Third step (experimental since 2015, mandatory after 2018): Capacity auctions that let the market and not the government determine the FIT

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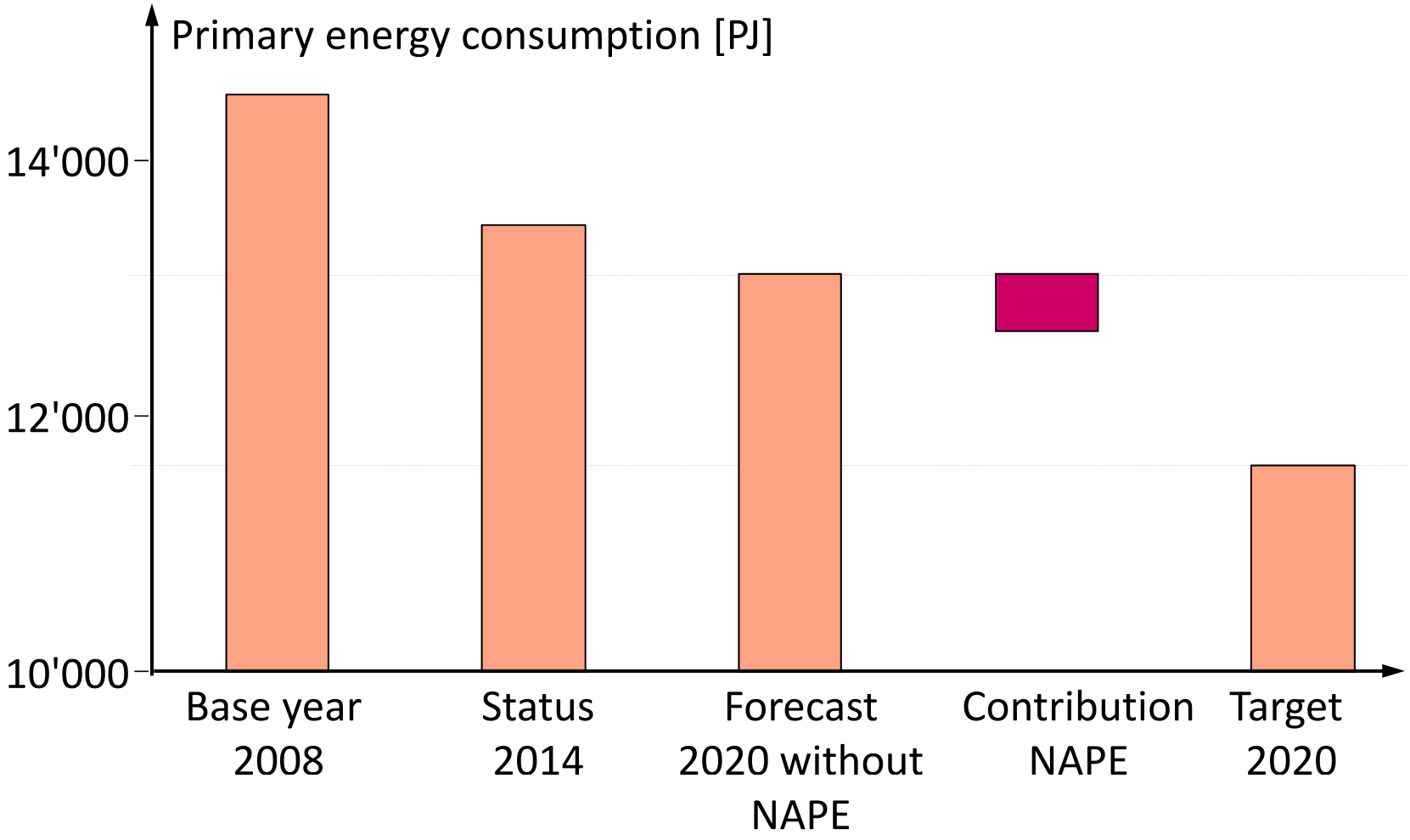
National Action Plan Energy Efficiency NAPE

[>20 individual measures proposed by the government in 2014]



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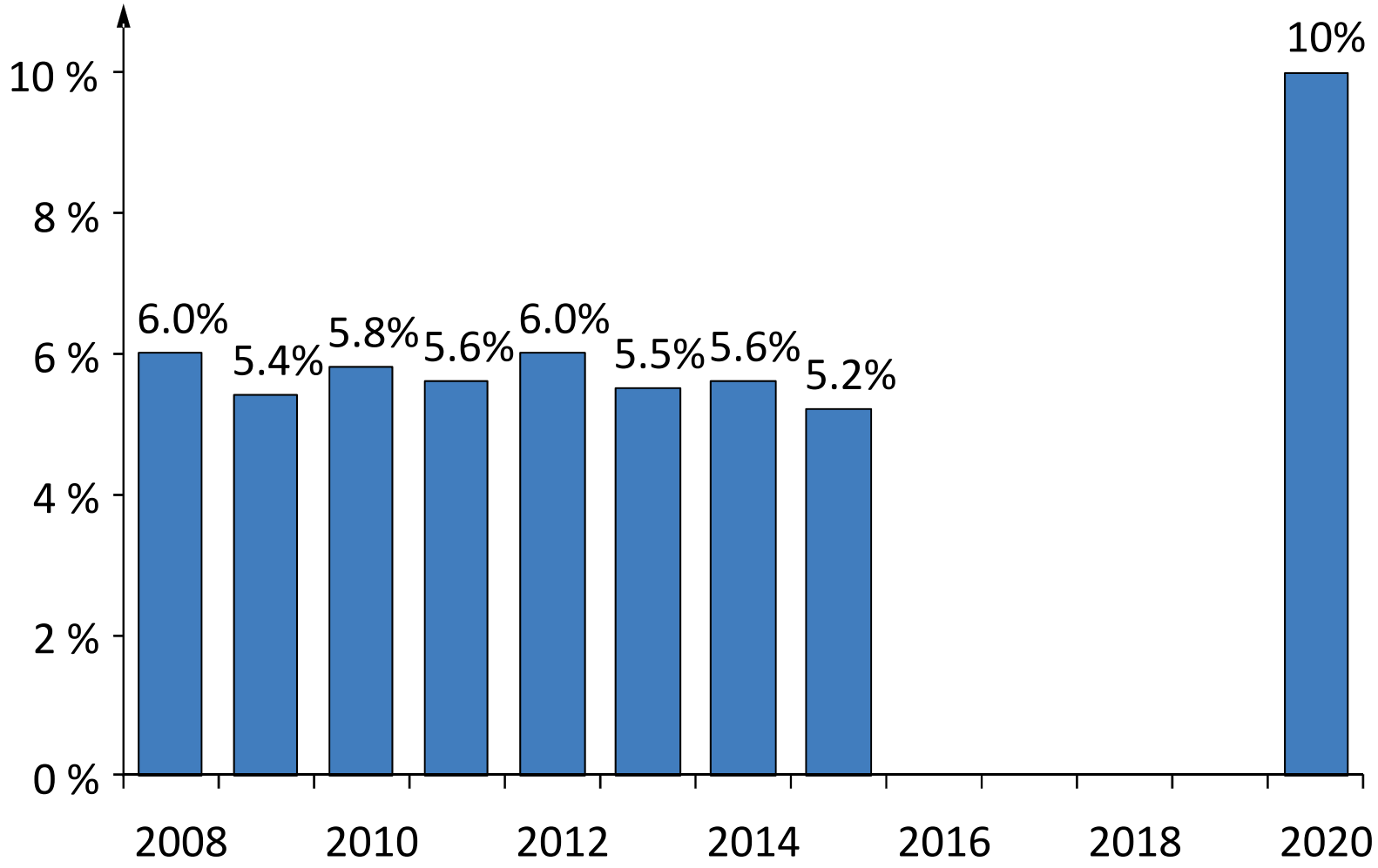
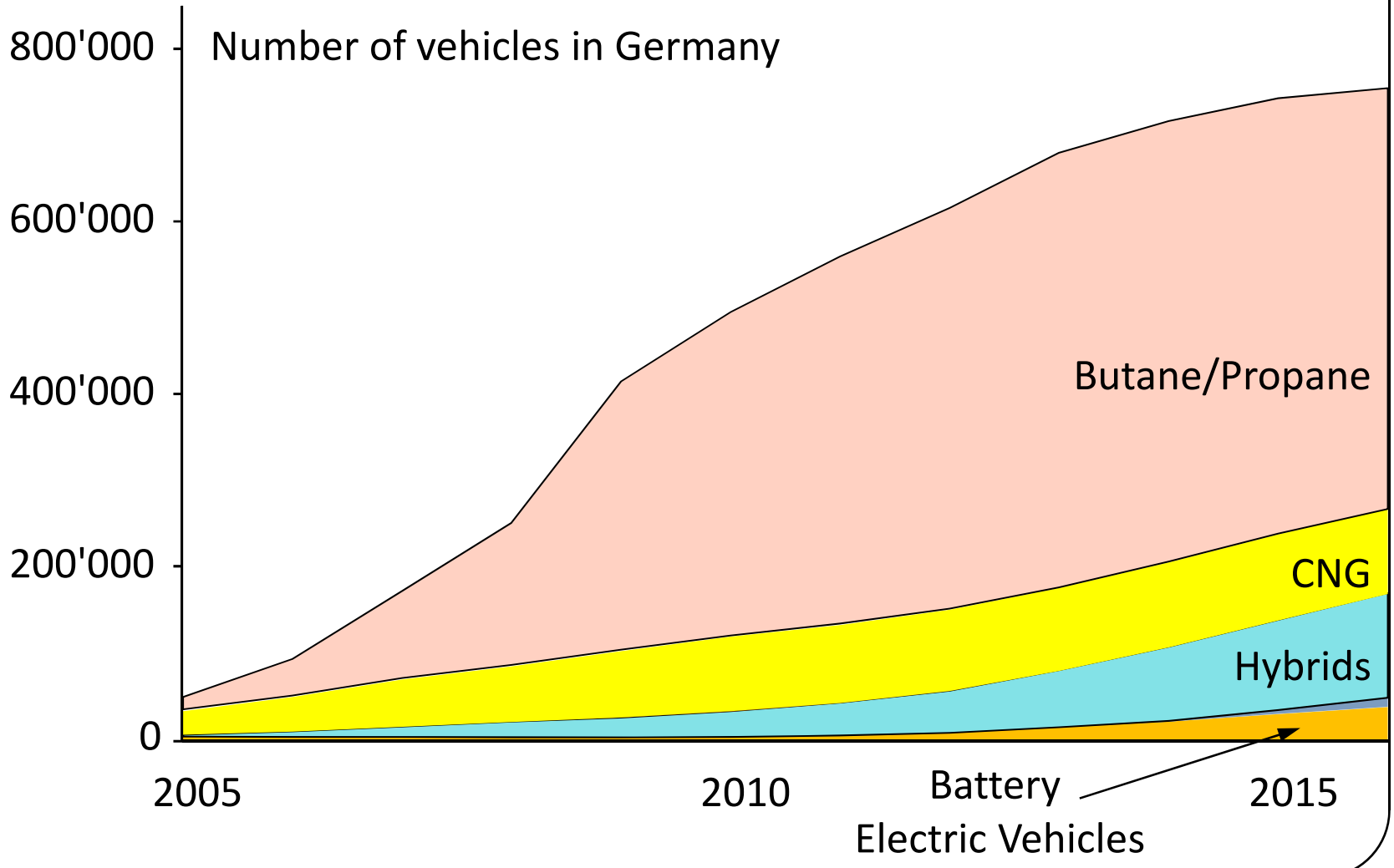
REN Share in Transportation



Stock of Vehicles with Alternative Fuels



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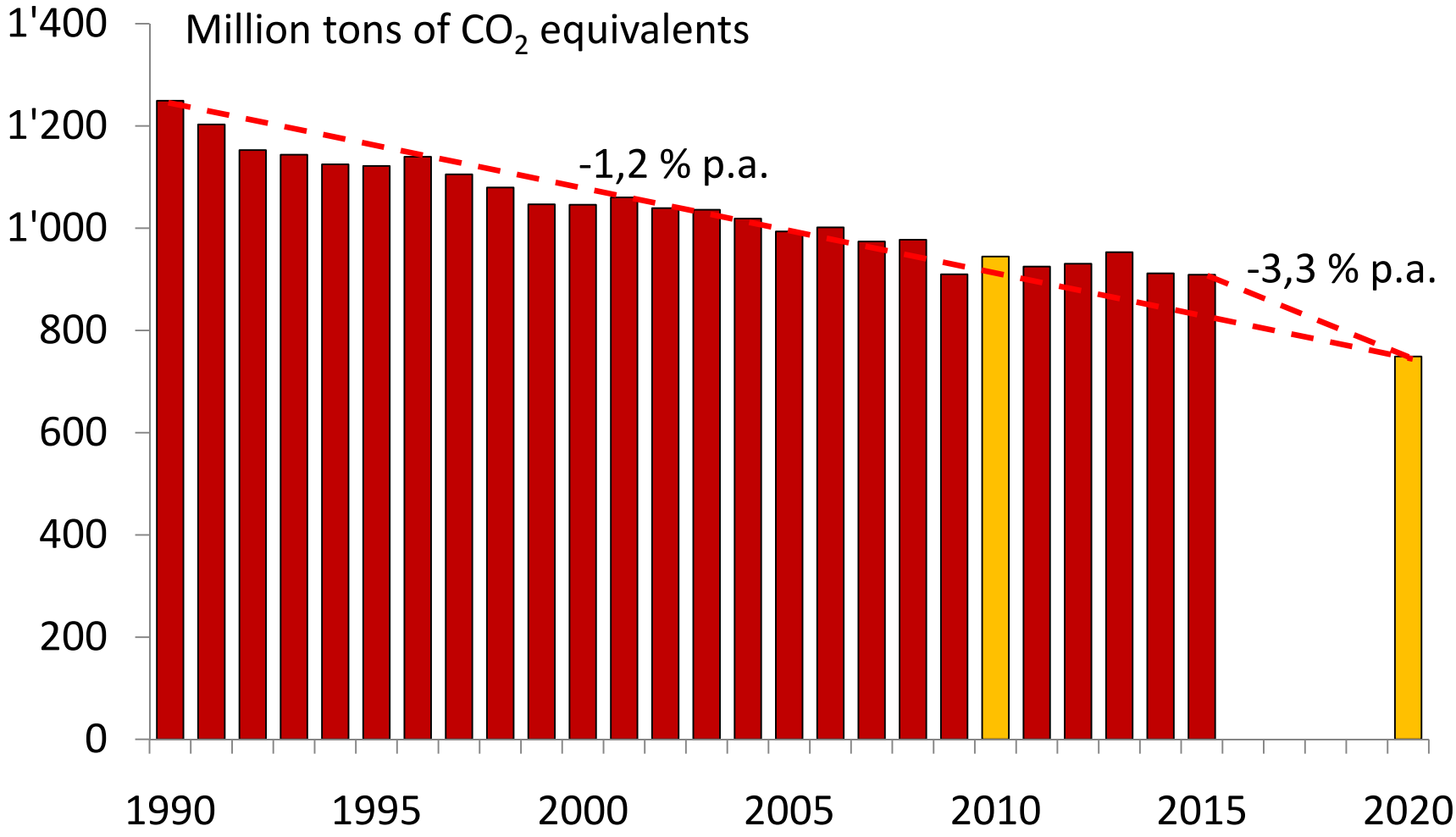
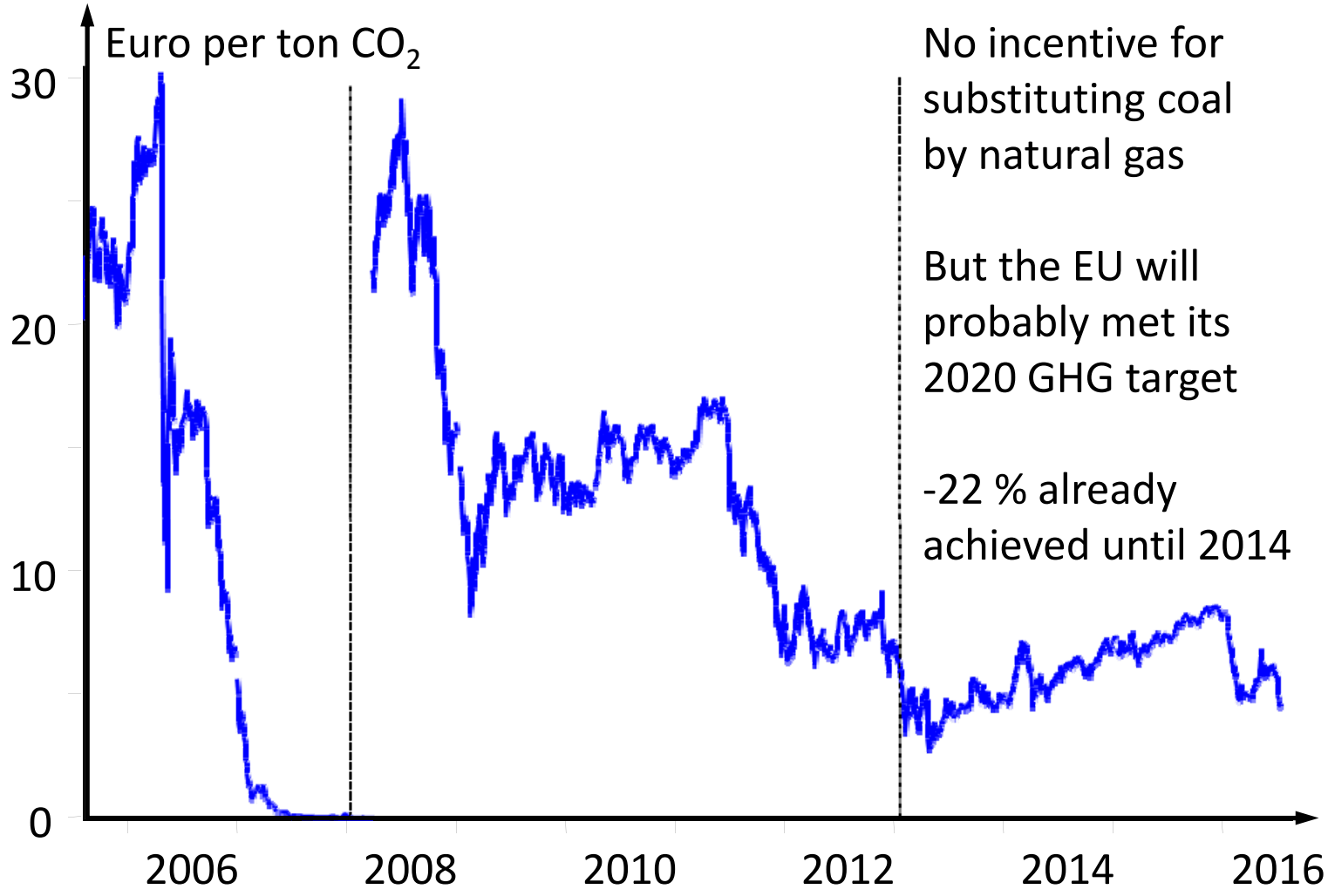
Greenhouse Gas Emissions in Germany



Exogenous: CO_2 Price of the European ETS



Endogenous Reasons for the Weak Progress

- Missing instruments that could compensate for the nuclear phase-out until 2022
- Unexpected growth of German net electricity exports (52 billion kWh in 2015 or 8% of gross generation)
- Insufficient intensity and performance of instruments for stimulating energy efficiency or renewable fuels
- Insufficient performance of subsidies in favor of electric vehicles (400 Euro per vehicle)
- Interest group opposition against strong measures such as banning coal fired power generation

German GHG Perspectives Towards 2030

	GHG emissions according to EU proposal (tons)	Thereof: EU-ETS Sectors	Non-ETS sectors
1990	1248		
2005	992	521	471
2030	589 (-53% against 1990)	297	292

Federal Climate Protection Plan 2050

[Proposal according to a Cabinet Paper of 07.11.2016]

Action field [Mio. t CO_2 equiv.]	1990	2014	2030 (absolute)	2030 (reduction against 1990)
Energy sector	466	358	170 – 180	64 – 61 %
Buildings	209	119	70 – 80	67 – 62 %
Transportation	163	160	95 – 98	42 – 40 %
Industry	283	181	130 – 133	54 – 53 %
Agriculture	88	72	58 – 61	34 – 31 %
Total	1248	902	533 – 562	57 – 55 %

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