

**ENERGIE-  
WENDE**

**THE GERMAN  
ENERGY  
TRANSITION**

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Ökostrom ↑

~~Atomenergie~~

**30/06**

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# CONTENT OUTLINE

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The German energy market

The Energiewende and its drivers

Recent developments

Consequences of the Energiewende &

Insights for New Zealand



# THE GERMAN ENERGY MARKET



# NUMBERS TODAY

## GERMANY VS NEW ZEALAND

Area: 357,168 km<sup>2</sup> vs 269,652 km<sup>2</sup>

Population: 81,4 m vs 4,8 m

TSO: 4 vs 1

DSO: 883 vs 29

Generators: about 1000 vs 5

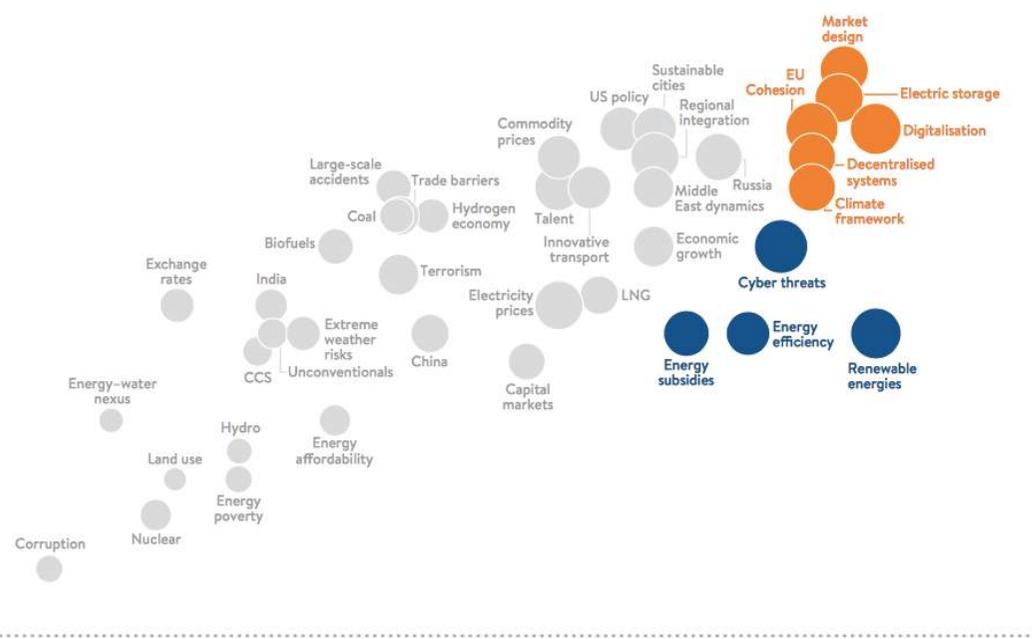
Retailers: 900 vs 22

Renewable Electricity: **30%** vs **80%**

Renewable Energy: **13%** vs **40%**

Electric Mobility: **75,000** vs **3,500**

Uncertainty ▲

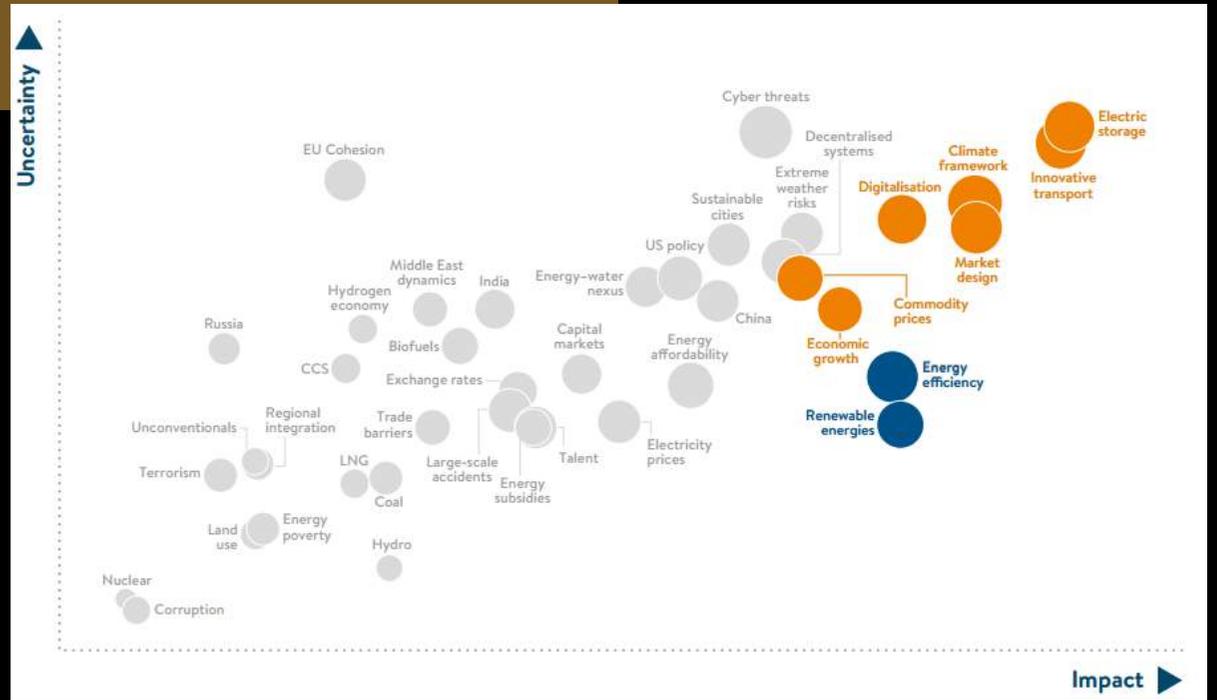


Impact ►

05

# ENERGY ISSUES MAPS 2017

## GERMANY



Impact ►

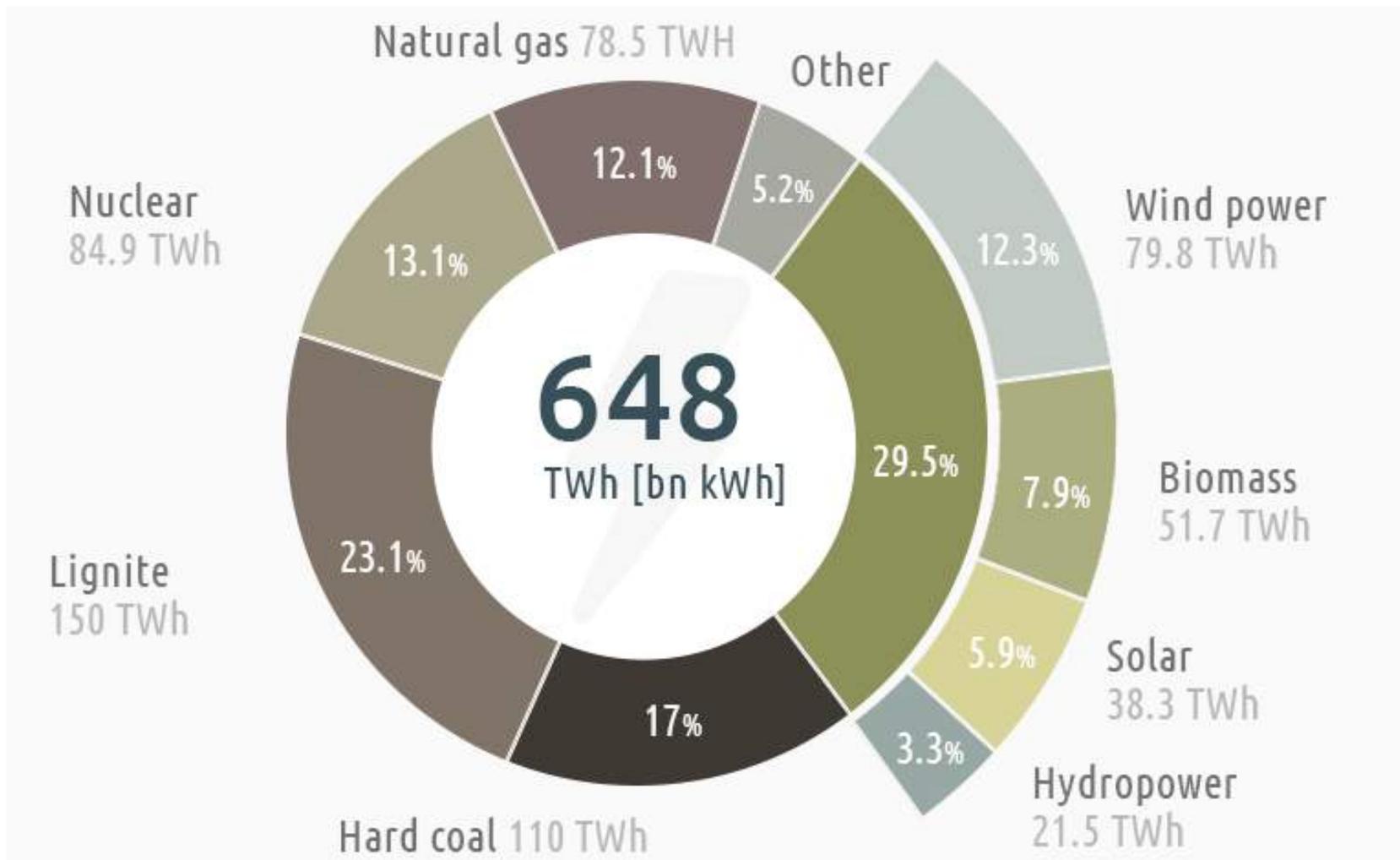
## NEW ZEALAND

Source: WEC 2017

# ELECTRICITY GENERATION IN GERMANY 2016

06

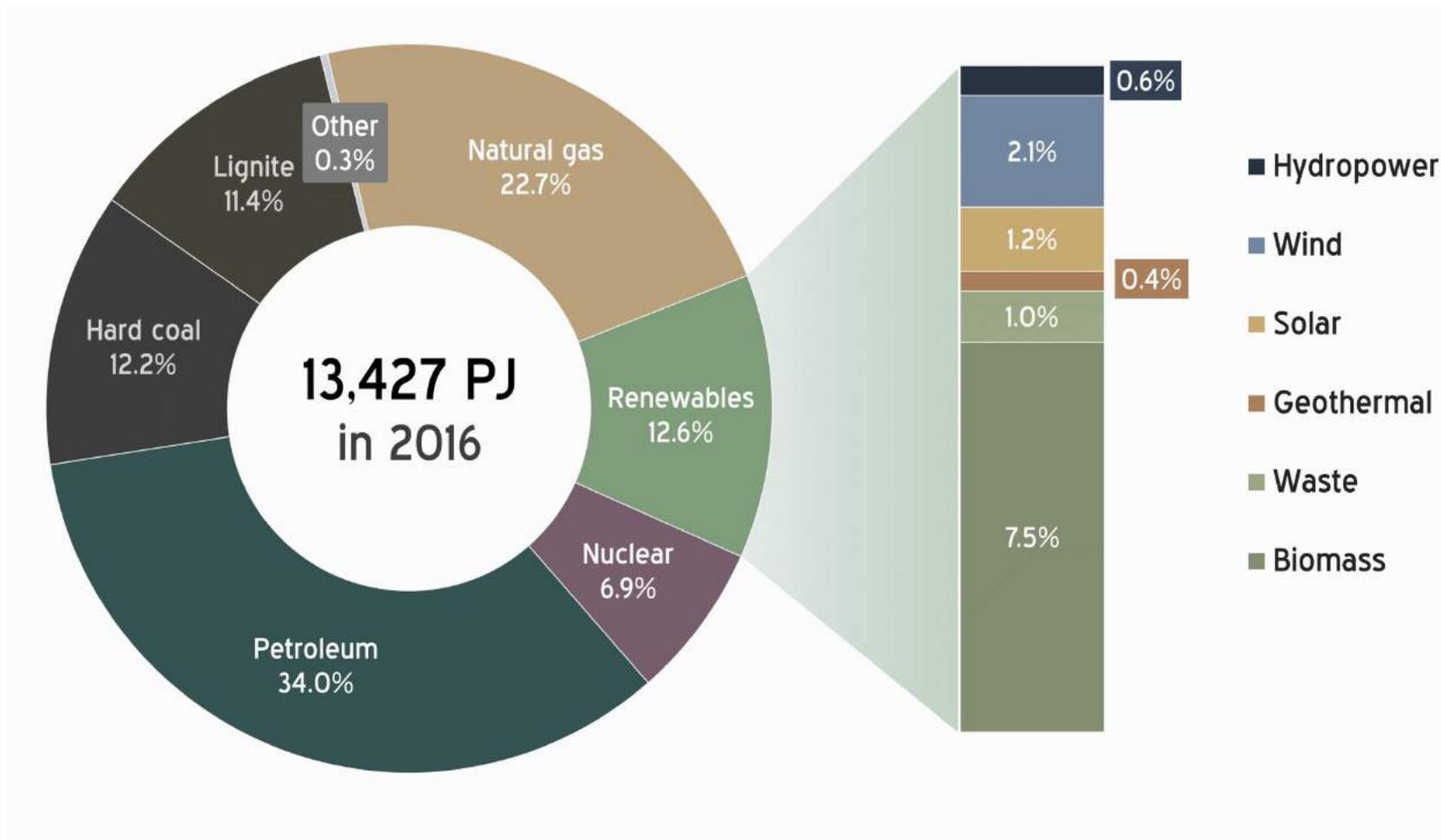
Source: AGEB 2016



# ENERGY CONSUMPTION IN GERMANY 2016

07

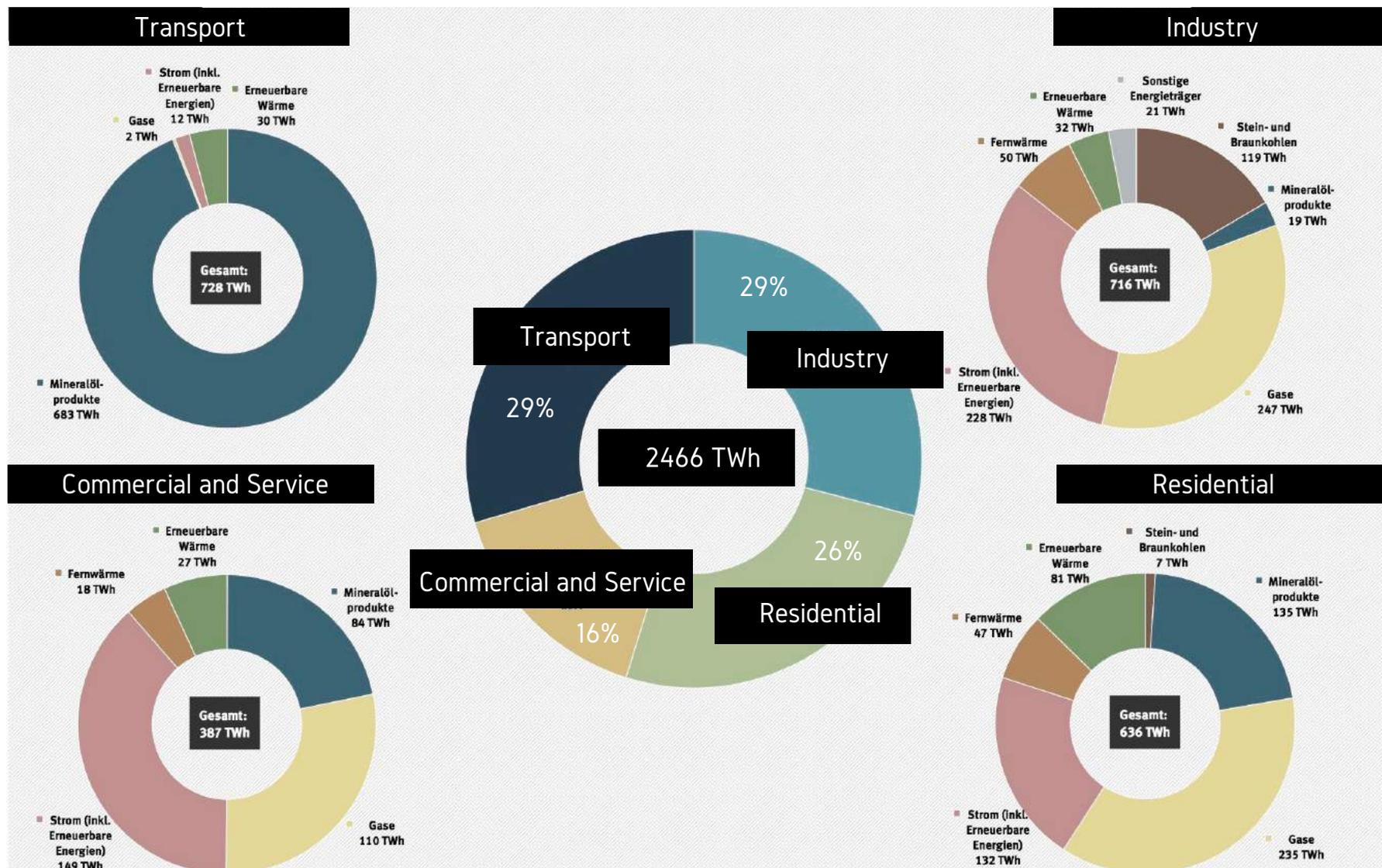
Source: AGEB 2016



# 2016 ENERGY CONSUMPTION BY SECTOR

08

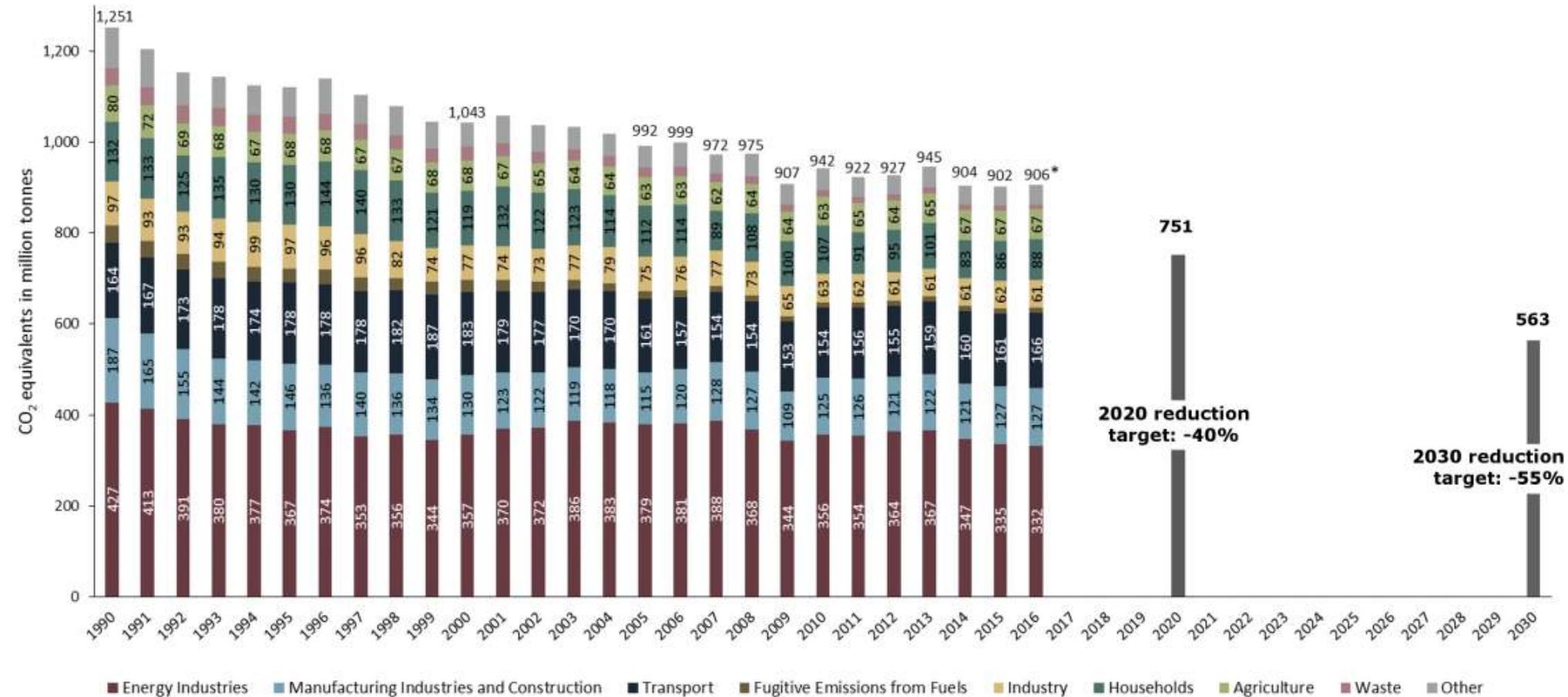
Source: German Environment Agency 2017



# GHG EMISSIONS BY SECTOR IN GERMANY 1990-2016

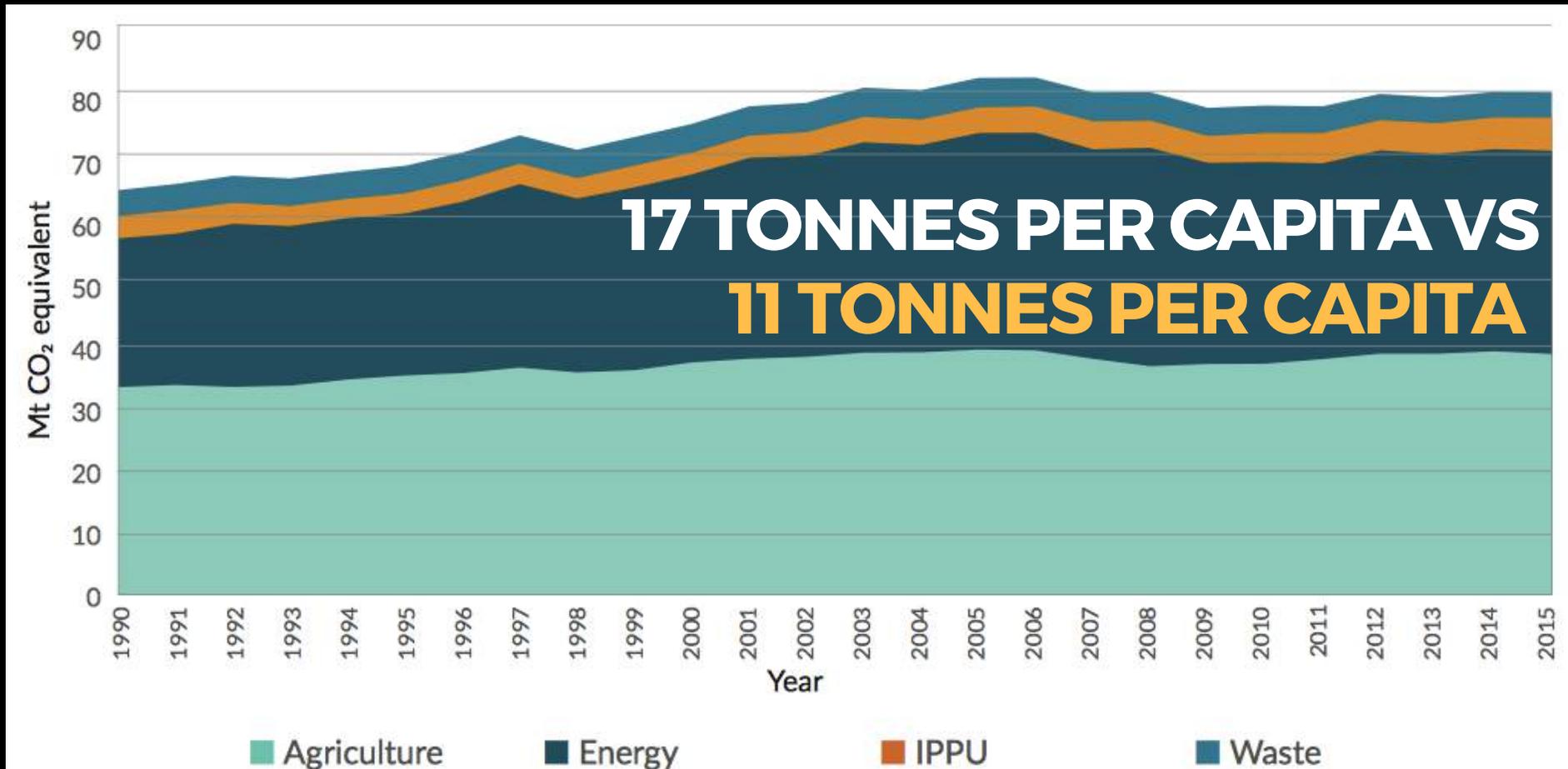
09

Source: Clean Energy Wire, Data: UBA 2017

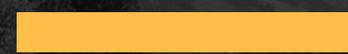


# GHG EMISSIONS IN COMPARISON

New Zealand GHG Emissions by sector 1990-2015



# THE ENERGIEWENDE & ITS DRIVERS



# THE GERMAN ENERGIEWENDE

- = integrated German policy that addresses all sectors of the economy
- = long-term energy and climate strategy,
  - based on developing renewable energy and improving energy efficiency
- = fundamental transformation of Germany's power system
- = shift from coal and nuclear to renewable energy

**DRIVERS** TODAY  
**THE ENERGIEWENDE IS DRIVEN BY  
FOUR MAIN POLITICAL OBJECTIVES:**

- combating climate change
- phasing-out nuclear power
- improving energy security
- industrial competitiveness and growth

# ROOTS

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Germans never really liked the idea of nuclear power

In 1970s and 80s Germans protesting nuclear reactors

Greens, founded in 1980, supporting anti-nuclear movement

1983 first Green representatives in parliament

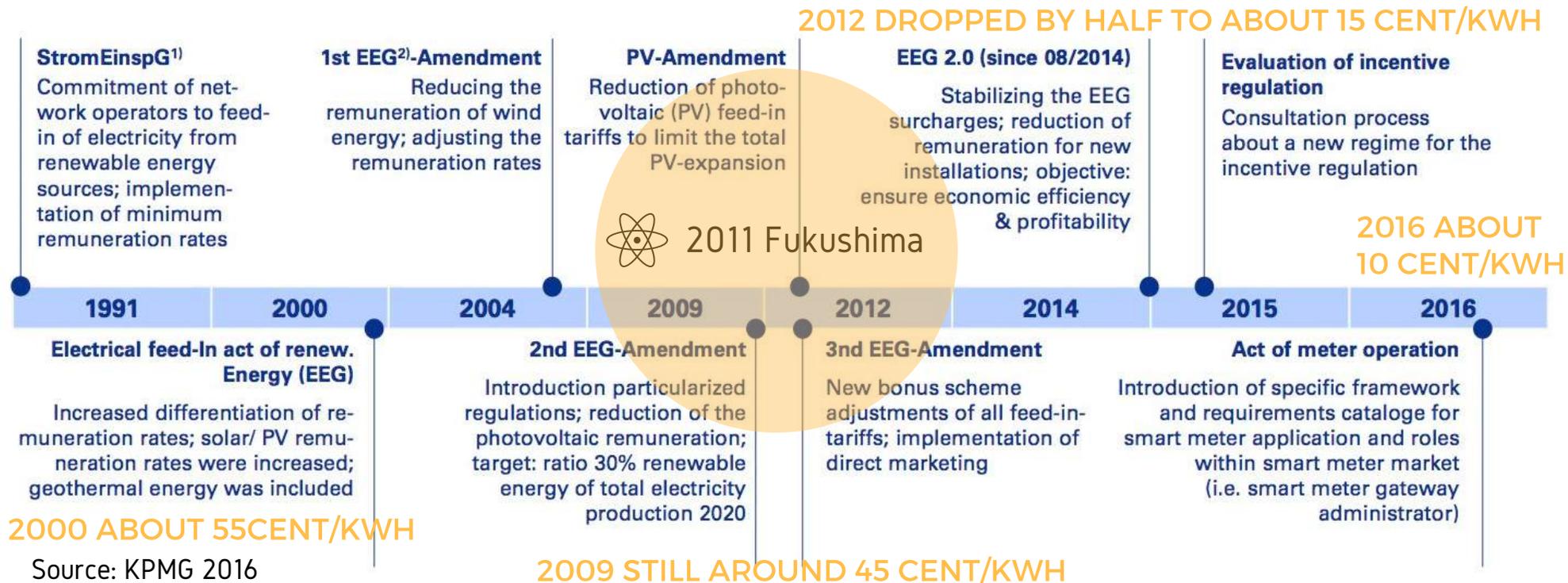
Chernobyl convinced SPD (social democrats) to support the anti-nuclear movement

1986 reactor explosion in Chernobyl, Ukraine

German reunification, not the only thing that happened in 1990

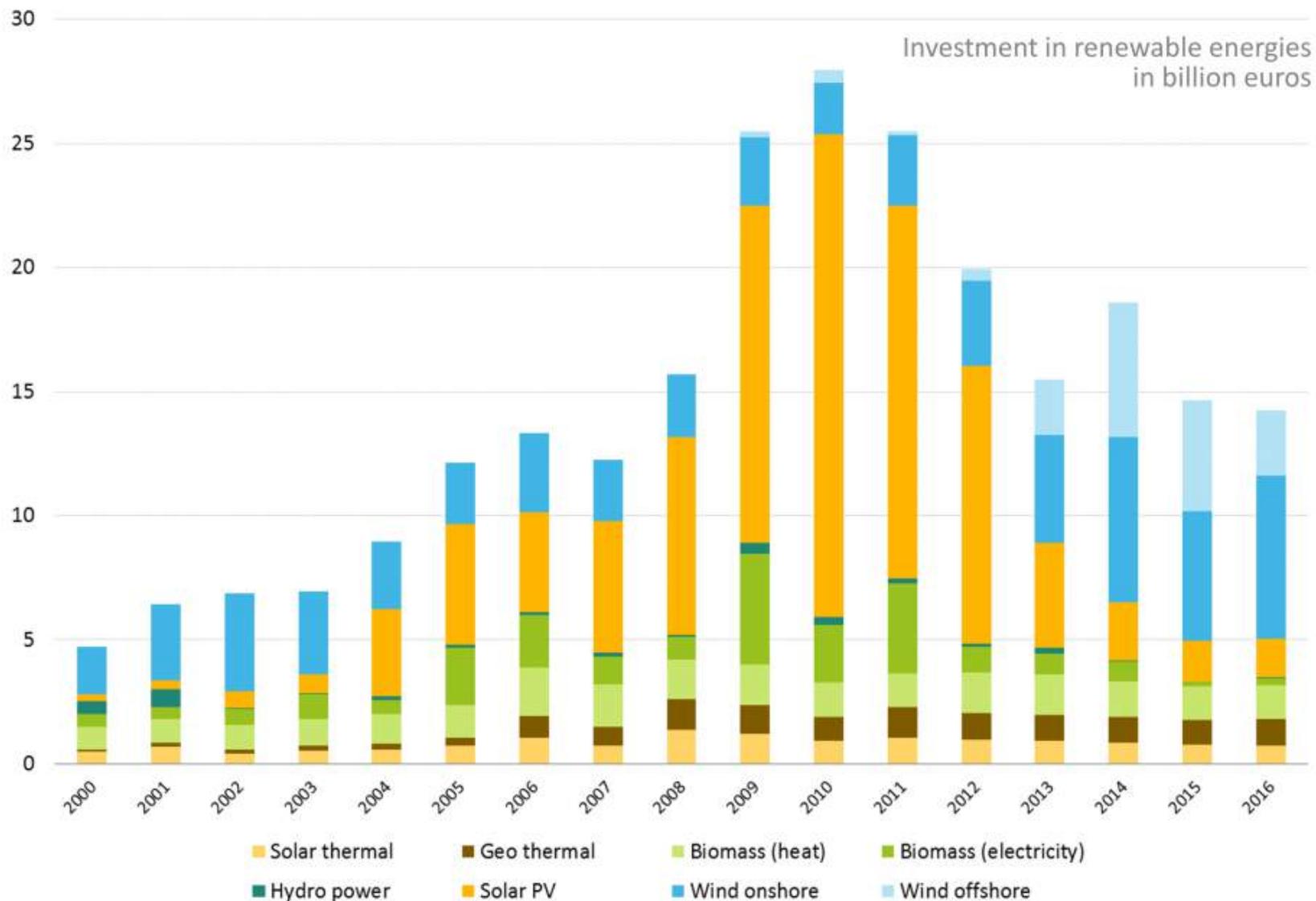
1990 the StromEinsG bill made its way through the parliament

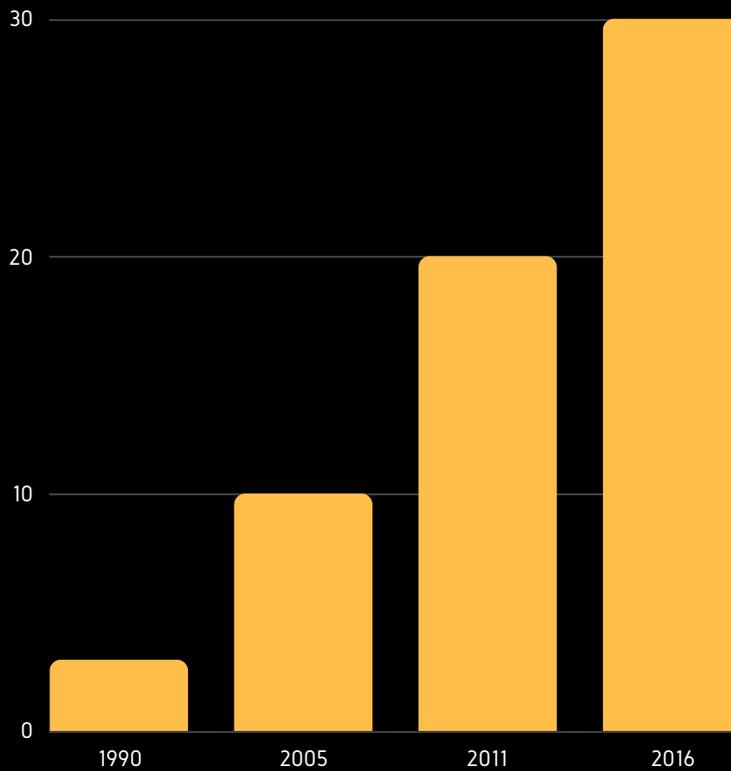
## THE ENERGIEWENDE WAS BORN



# INVESTMENT IN <sup>14</sup> RENEWABLE ENERGY 2000-2016

Source: Clean Energy Wire, Data: BMWi 2017

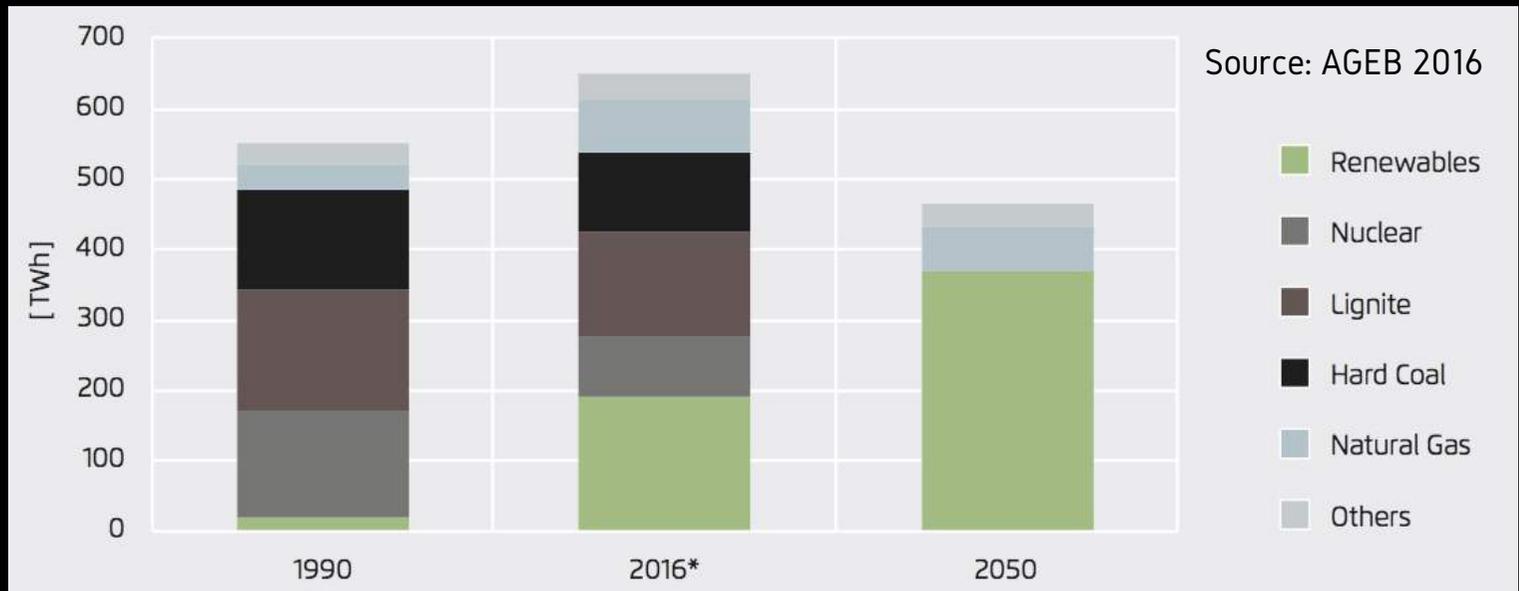




# RENEWABLE ELECTRICITY

## change over time

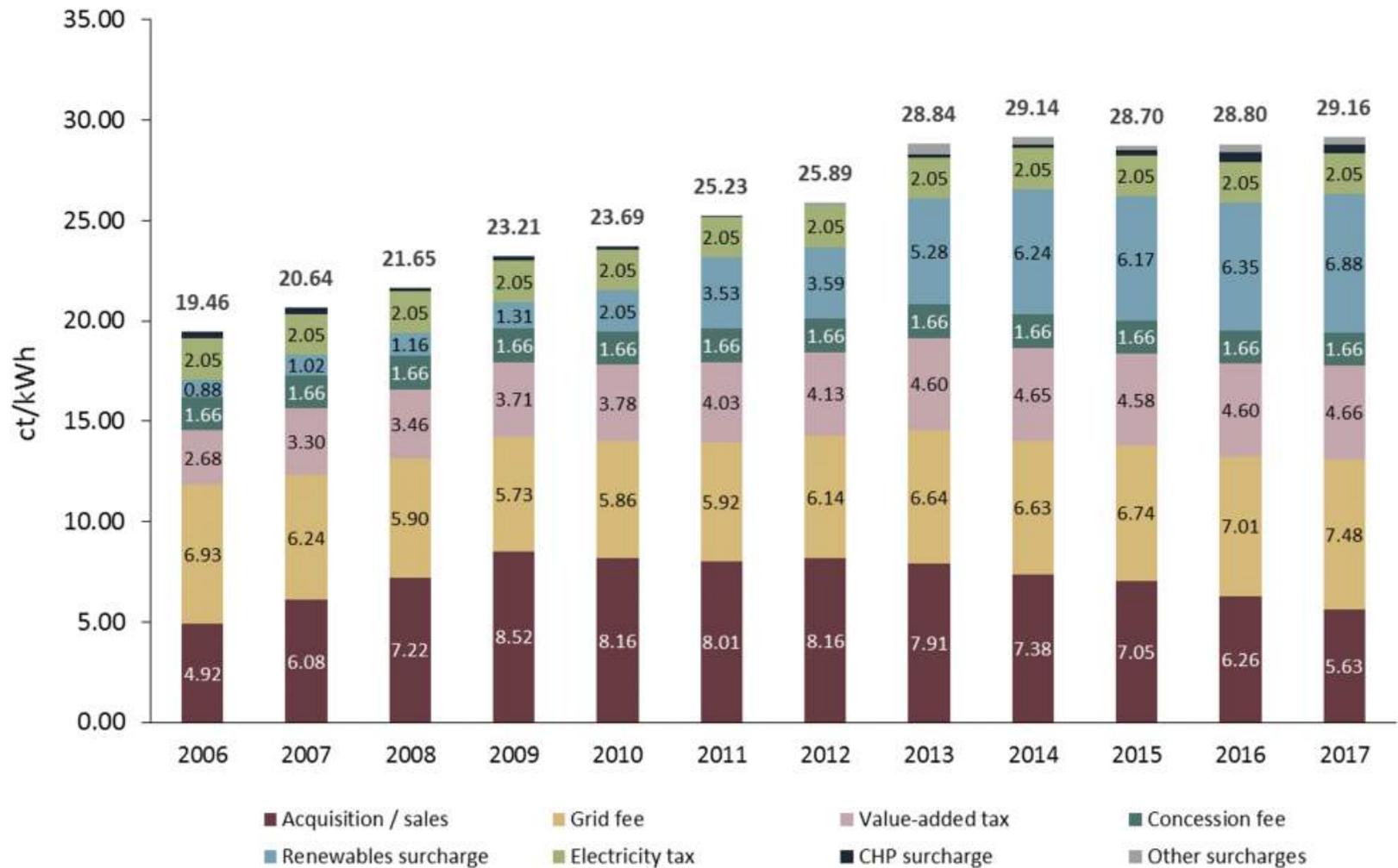
from 3.6 % of renewable electricity in 1990 to 29.5 % in 2016, representing about 100GW, 50% of the installed capacities



# AVERAGE ELECTRICITY PRICE PER HOUSEHOLD IN GERMANY 2016

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Source: Clean Energy Wire, Data: BDEW 2017



# THE GERMAN ELECTRICITY PRICE INTERNATIONAL

## CONTEXT

Data: Agora Energiewende,  
WEC, MBIE NZ 2017

	Renewables-based electricity generation in %	Annual household consumption in kWh	Electricity price in EURct/kWh	Annual electricity bill in EUR
Denmark	52	3,820	29.4	1,121
US	13	12,294	9.0	1,110
<b>Germany</b>	<b>30</b>	<b>3,362</b>	<b>29.1</b>	<b>978</b>
Japan	10	5,373	18.1	971
Spain	40	4,038	22.6	912
Canada	66	11,303	7.5	851
France	19	5,830	14.3	834
UK	18	4,143	17.3	717
Italy	37	2,485	23.3	580
Poland	12	1,935	15.1	291
<b>New Zealand</b>	<b>80</b>	<b>7,265</b>	<b>17.6</b>	<b>1,279</b>



# RECENT DEVELOPMENTS

# THE 2017 REFORM OF THE RENEWABLE ENERGY SOURCES ACT (EEG 2017)

- Four main elements:
- introduction of a tendering system
  - deployment corridors for renewable energies
  - simplified terms for "citizens' energy company"
  - revised energy targets

## OTHER SUPPORTS

### Transport sector

Purchase grants for EVs and Hybrids until 2019, budget of €600 m

Project grants: "Batterie 2020" battery research project since 2007, budget of €400 m, and the NIP - National Innovation Program on hydrogen infrastructure, budget of €1.4 b from 2016 through to 2020

### Heating sector

Investment grants (smaller installation) and repayment grants (larger solutions, commercial)

### Renewable energy research and development

Funding for energy innovations to expand renewable energy & reduce the cost of heat and electricity and enhance international competitiveness

# KEY TARGETS 20

Source: Agora Energiewende Data: AGEB 2016

		Status quo	2020	2025	2030	2035	2040	2050
<b>Green-house gas emissions</b>	Reduction of GHG emissions in all sectors compared to 1990 levels	-27% (2016)*	-40 %		-55 %		-70 %	-80 – 95 %
<b>Nuclear phase-out</b>	Gradual shut down of all nuclear power plants by 2022	11 units shut down (2015)	Gradual shut down of remaining 8 reactors					
<b>Renewable energies</b>	Share in final energy consumption	14.9 % (2015)	18 %		30 %		45 %	min. 60 %
	Share in gross electricity consumption	32.3 % (2016)*		40 – 45 %		55 – 60 %		min. 80 %
<b>Energy efficiency</b>	Reduction of primary energy consumption compared to 2008 levels	-7.6 % (2015)*	-20 %					-50 %
	Reduction of gross electricity consumption compared to 2008 levels	-4 % (2015)*	-10 %					-25 %

# SECTOR TARGETS

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Source: Clean Energy Wire, Data: Federal German Agency 2017

<i>Sector</i>	<i>1990*</i>	<i>2014*</i>	<i>2030*</i>	<i>2030 (reduct., comp. to 1990)</i>
<i>Energy</i>	466	358	175-183	61-62%
<i>Buildings</i>	209	119	70-72	66-67%
<i>Transport</i>	163	160	95-98	40-42%
<i>Industry</i>	283	181	140-143	49-51%
<i>Agriculture</i>	88	72	58-61	31-34%
<i>Other</i>	39	12	5	87%
<b>Total</b>	<b>1248</b>	<b>902</b>	<b>543-562</b>	<b>55-56%</b>

\*In million tonnes of CO<sub>2</sub> equivalents.

# NEW ELECTRICITY MARKET DESIGN

Source: BMWi 2016

In July 2016 the Government enacted a new law on energy market design  
- the Electricity Market Act 2.0

- free price information
- tougher rules for power suppliers/traders
- competition for flexibility
- cost reduction of grid expansion
- digitalisation - smart meter roll out
- introduction of a capacity reserve



# INTERNAL AND EXTERNAL CONSEQUENCES

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## INSIGHTS FOR NEW ZEALAND

# INTERNAL

Significant transition affecting the whole value chain:

- constant regulation changes
- contradictory effects
- margin reductions in conventional generation
- new business models
- Energiewende creates jobs

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ENERGIENCES  
CONSEQUENCES

# EXTERNAL

The transition and its global impacts:

- Green-Paradox
- geopolitical implications
- cut down R&D Costs
- motivational & learning effects

# LEARNINGS

Learning from Germany yes, but not simply adapting as each country is unique!

- technology adoption
- timely and flexible policy
- be careful with the use of subsidies
- investment in a green economy can boost the job market but there are also job losses

## 60%

Sixty percent of 42 Countries (24 in Europe and 18 others) in a recent WEC Survey believe the German energy policy is not a blueprint for the world.

## 70%

Though 70 of these surveyed countries expect a beneficial impact for Germany's economy in the long run.

# THANK YOU!

If you have further questions or wish to receive more details,  
please do not hesitate to get in direct contact with me.

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