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13 January 2021 |EU - Korea Climate Action Initiative
Youth Frontier for Energy Transition and Green Deal

2050 Net Zero Emissions Targets and Strategies of Germany

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The Wuppertal Institute

- Founded 1991
- Think tank dedicated to applied research and sustainability
- 250 staff members

Transition Research:

from problem assessment to real world experiments

Agenda

1. **Introduction: *Germany's emissions reduction targets***
2. **A closer look at the energy sector: *Measures and challenges***
3. **The path towards climate neutrality**
   a. *Climate ambitions have been rising*
   b. *A scenario for climate neutrality by 2050*
   c. *Outlook: Is climate neutrality by 2050 in line with the Paris agreement?*

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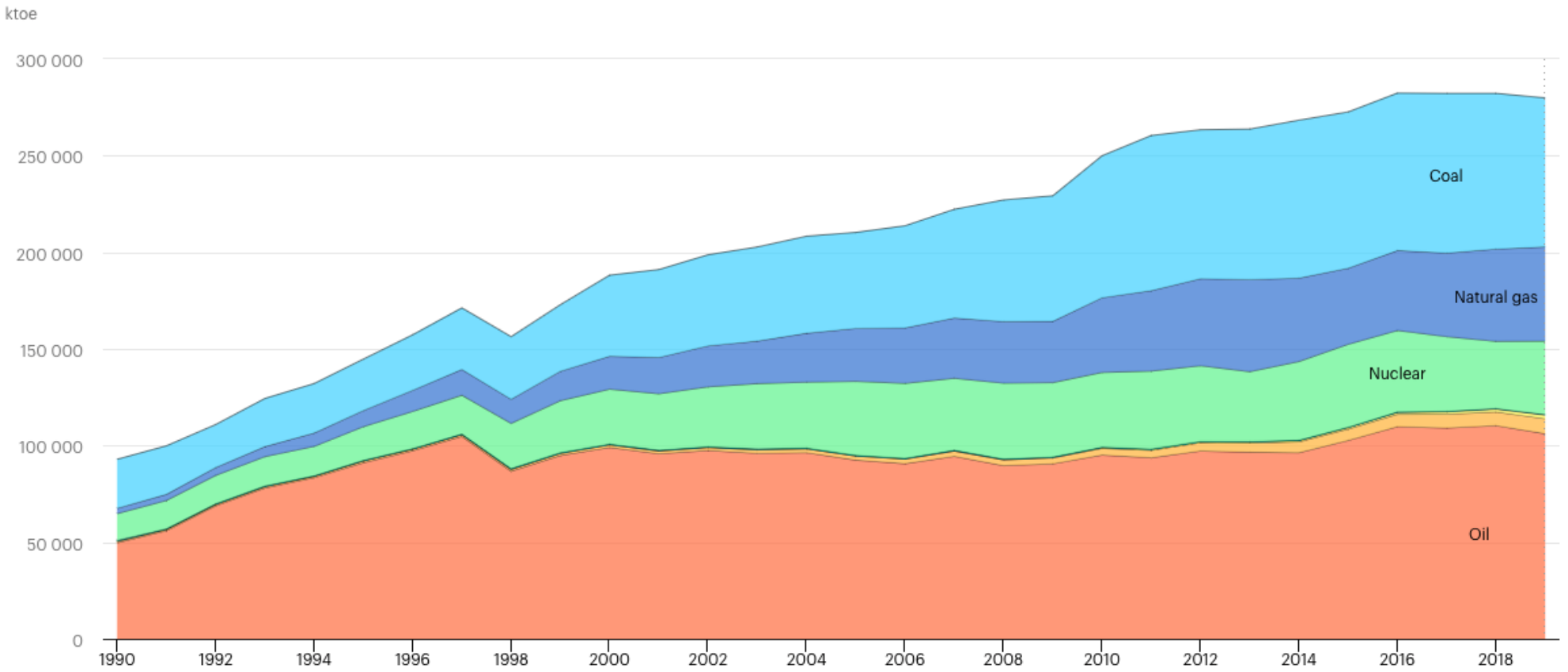
Warm-up

Which country is this?

Total energy supply (TES) by source, 1990-2019



Source: https://www.iea.org/data-and-statistics

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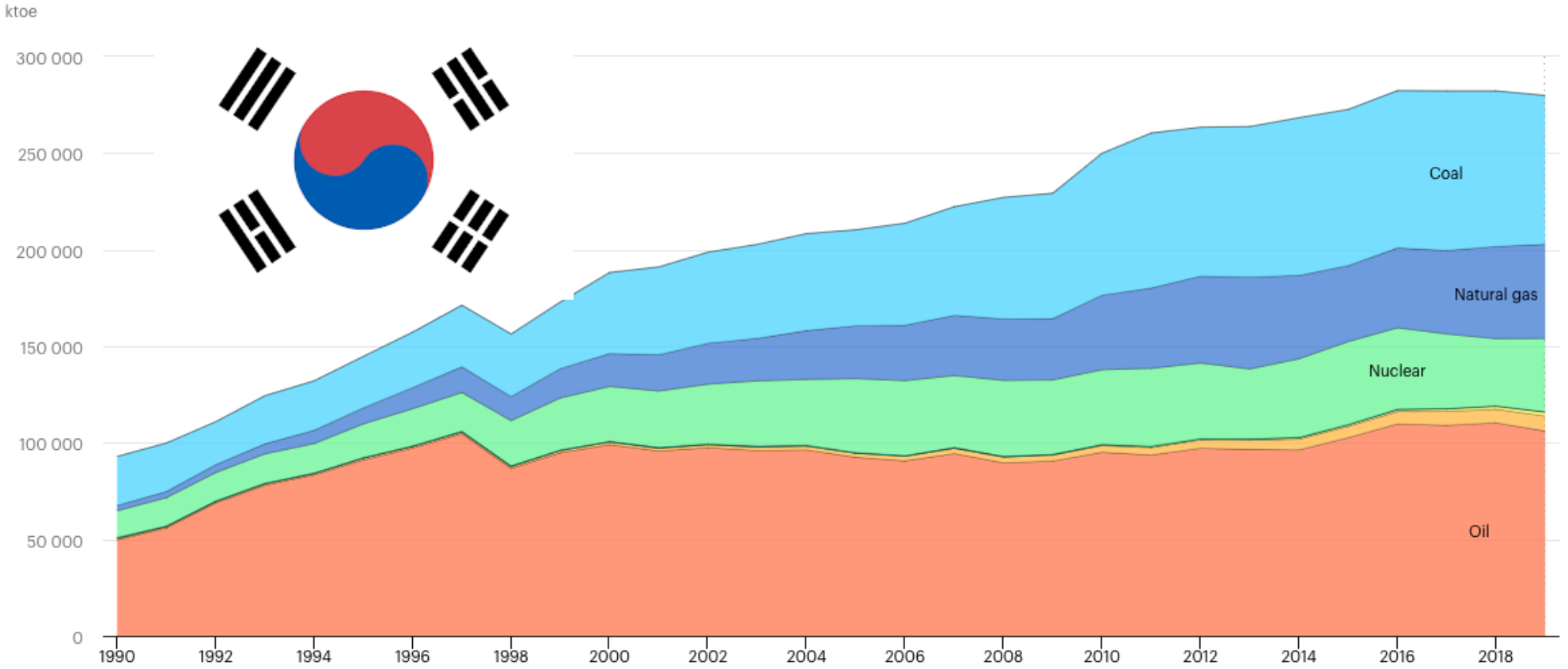

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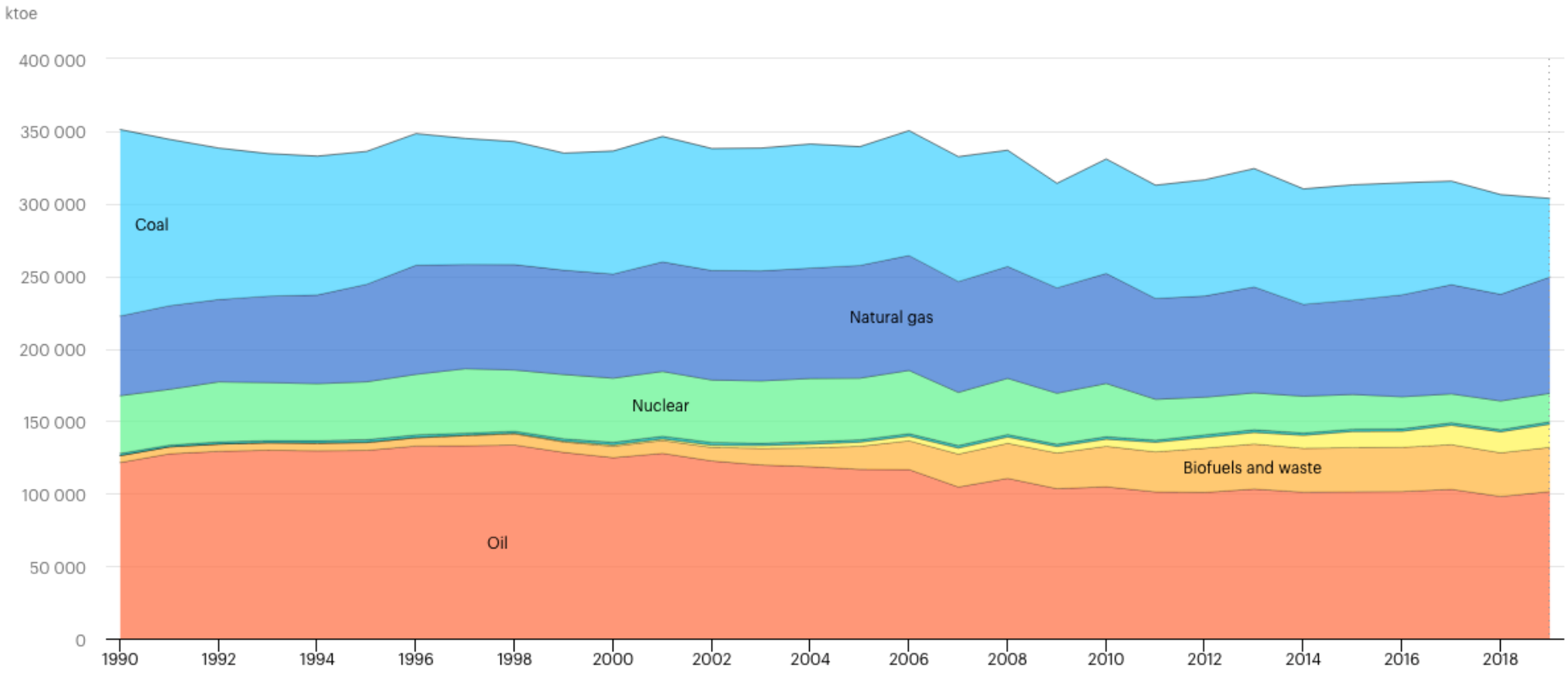

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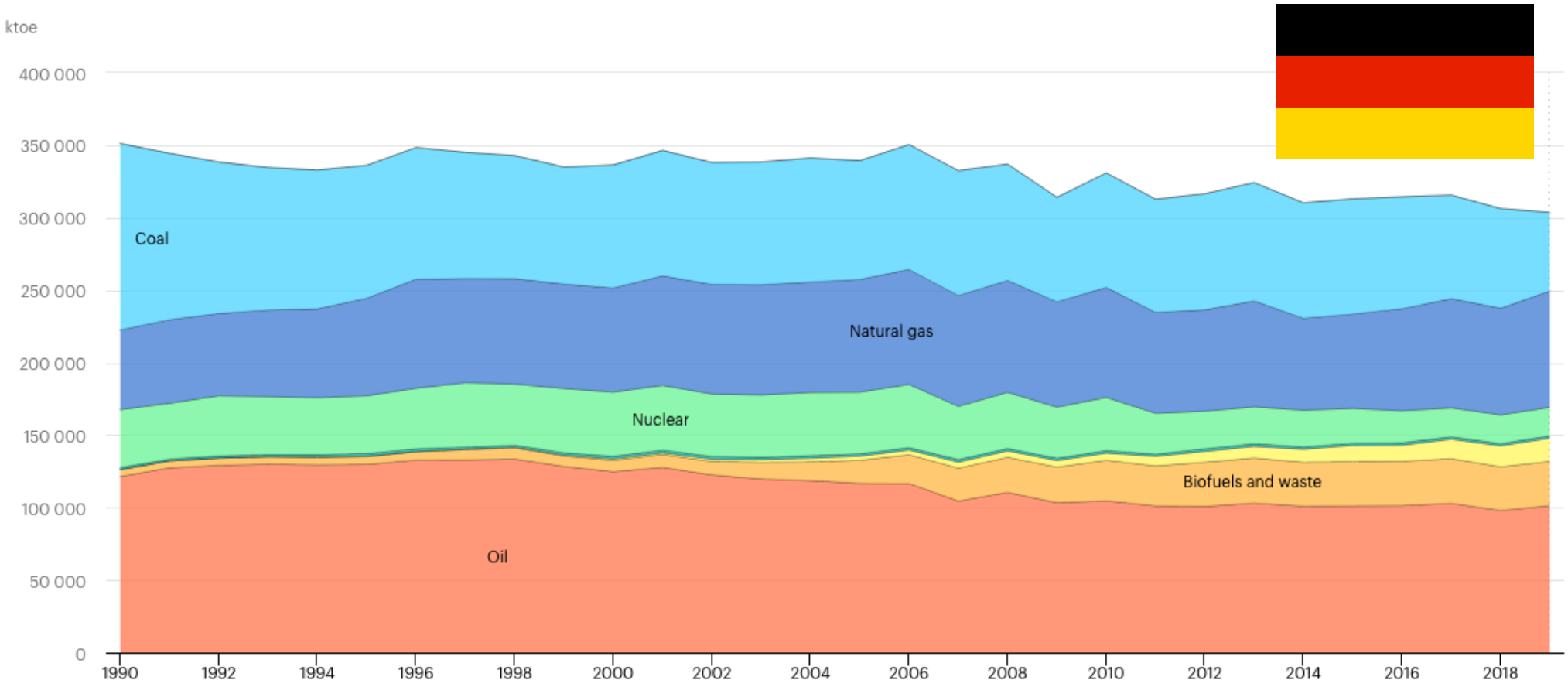
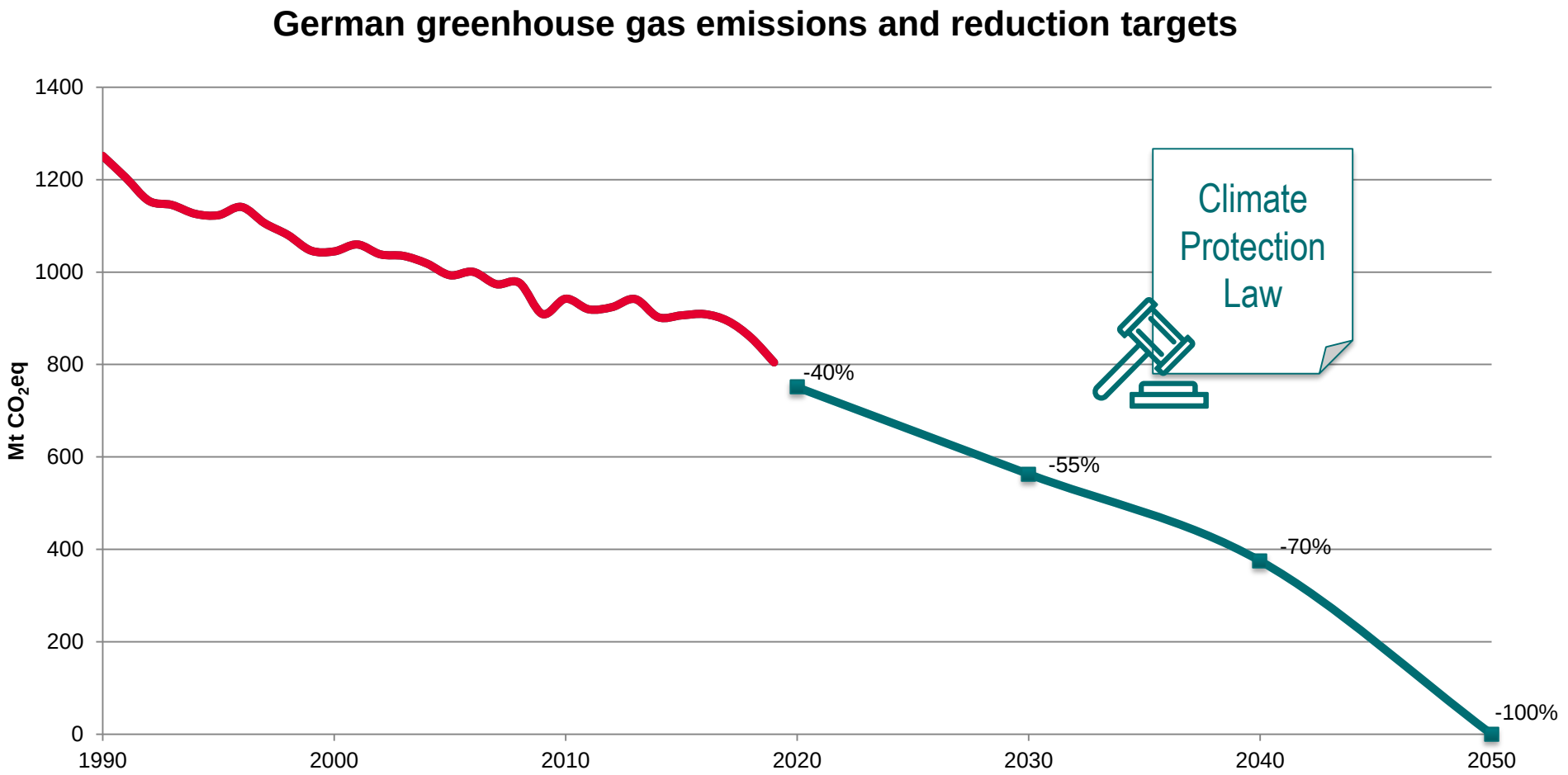


Source: https://www.iea.org/data-and-statistics

Introduction

Germany’s emissions reduction targets

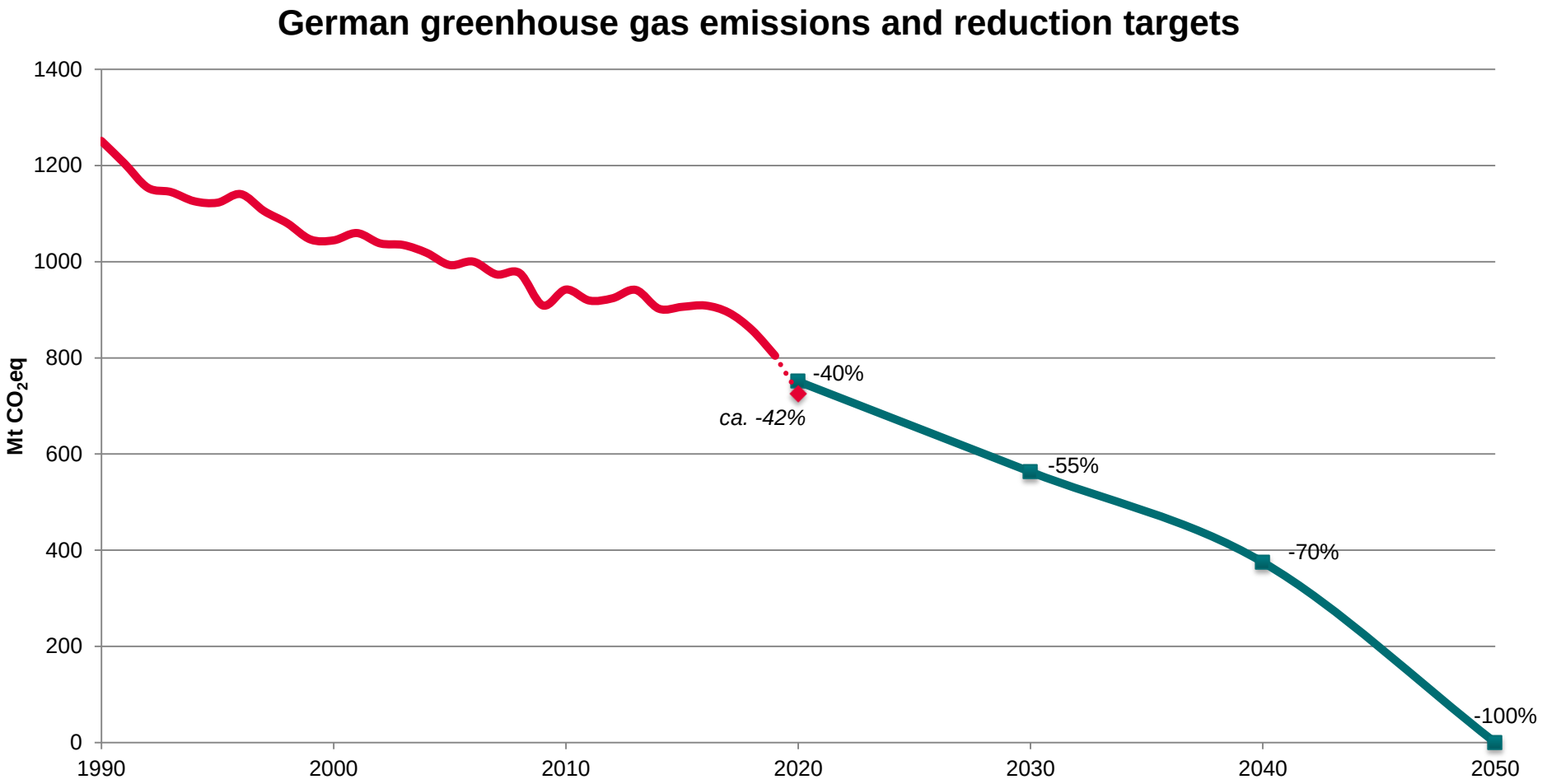
Germany's GHG emissions and reduction targets



- **In 2019, the German government signed the 2050 goal of climate neutrality, as well as its interim targets, into law. The law includes concrete interim goals for each emitting sector.**

Source: own graphic, based on UBA (2020)

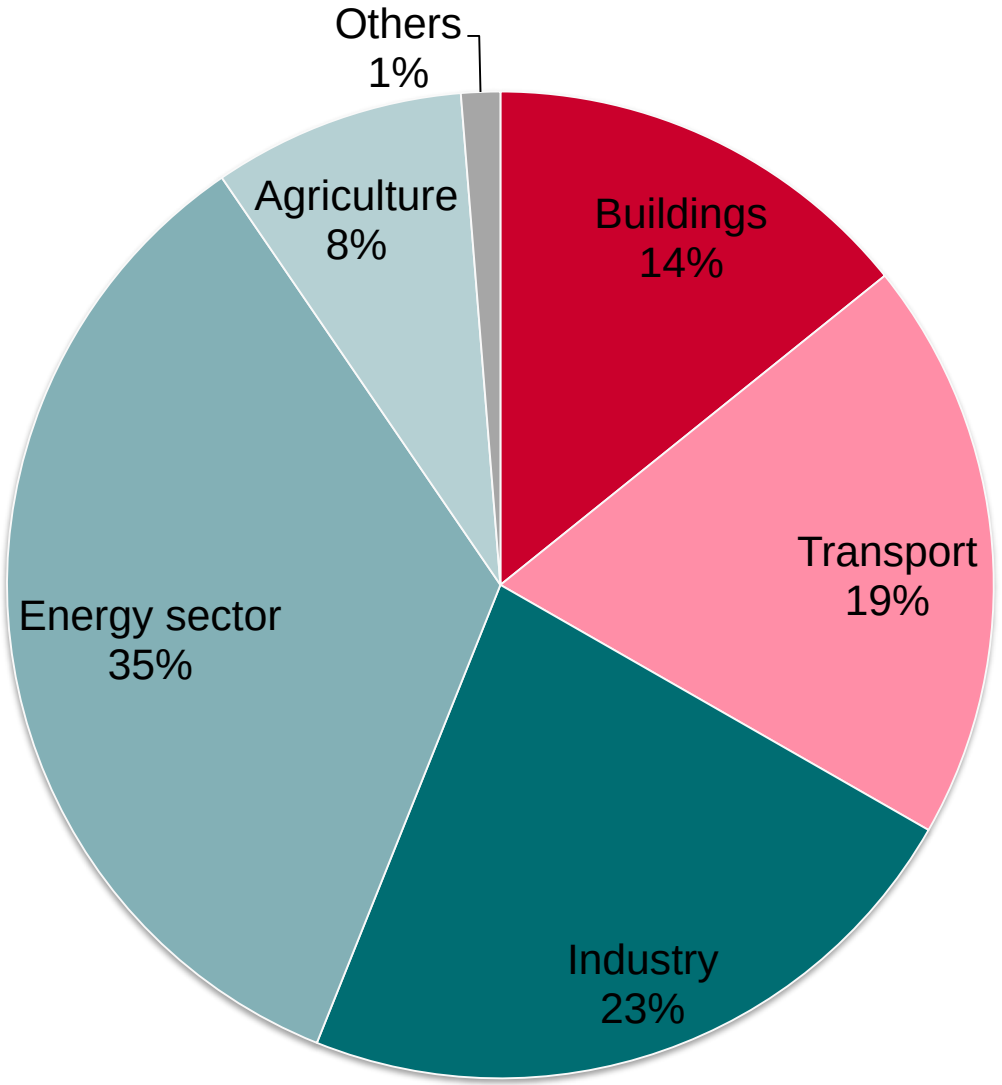
Germany's GHG emissions and reduction targets



- **Germany achieves its 2020 target in large part due to the Covid-19 pandemic.**

Source: own graphic, based on UBA (2020), Agora Energiewende (2020)

Current German GHG emissions by sector



2019 (preliminary)

Source: own graph, based on UBA 2020

Development of German GHG emissions by sector

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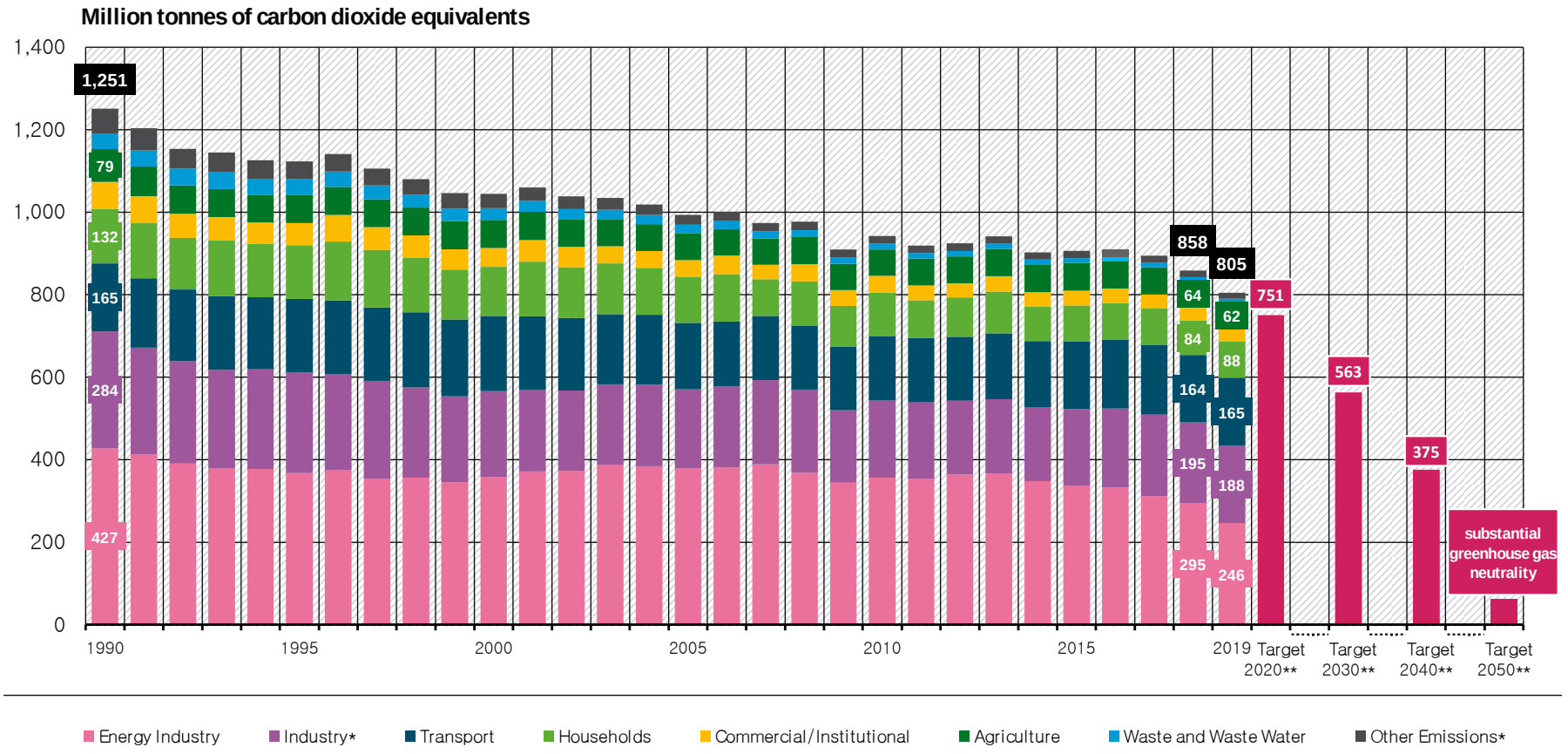
Emission of greenhouse gases covered by the UN Framework Convention on Climate

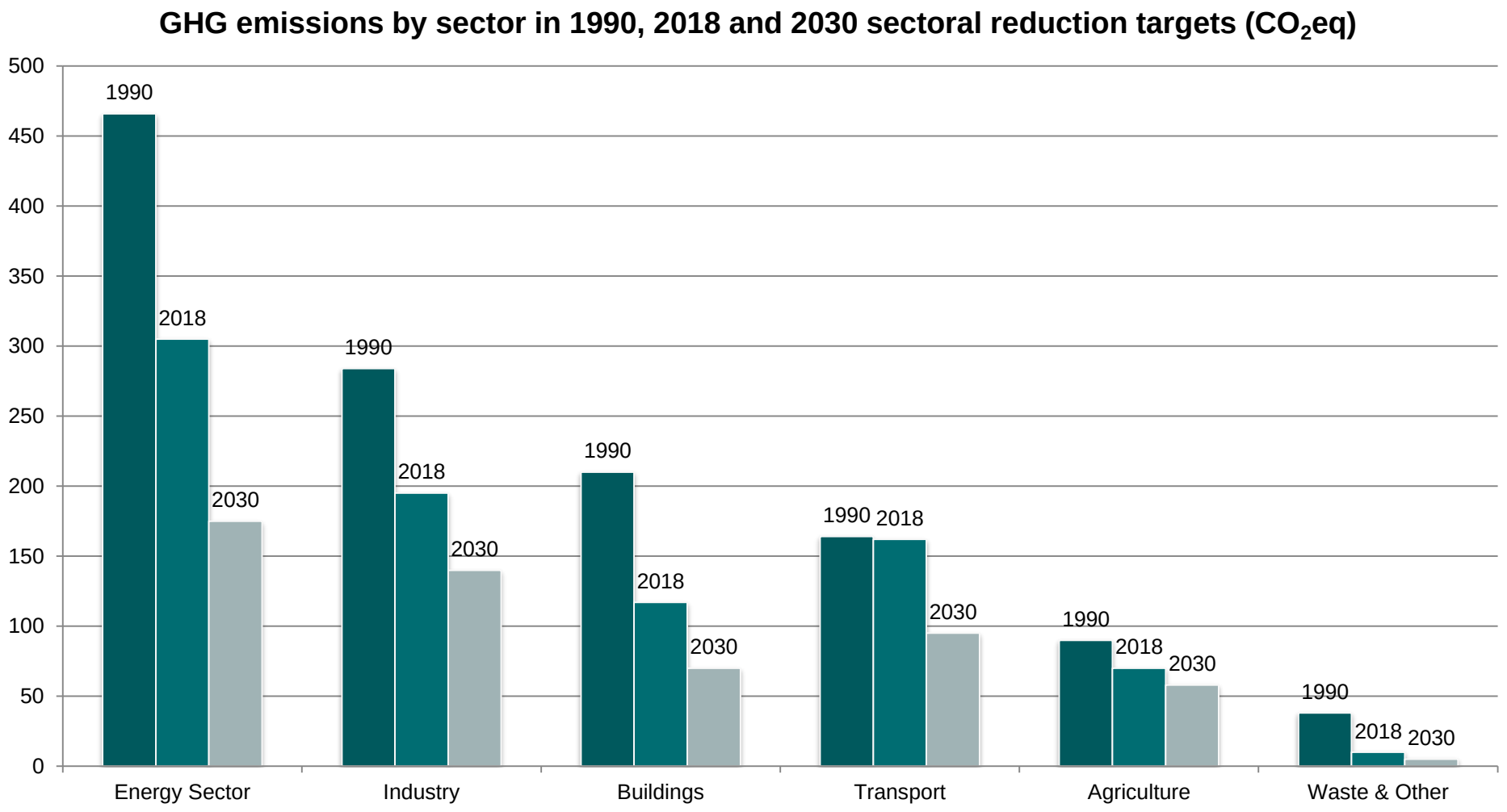


Emissions by UN reporting category, without land use, land use change and forestry
* Industry: Energy and process-related emissions from industry (1.A.2 & 2);
Other Emissions: Other combustion (rest of CRF 1.A.4, 1.A.5 military) & fugitive emissions from fuels (1.B)
** Targets 2020 to 2050: Energy Concept of the German Federal Government (2010)
2019: Short-term forecast, emissions from commerce, trade & services contained in Other Emissions

Source: German Environment Agency, National Inventory Reports for the German Greenhouse Gas Inventory 1990 to 2018 (as of 12/2019) and estimate for 2019 from UBA Press Release 15th of march 2020

Source: UBA (2020)

Historical GHG reductions and 2030 targets by sector



Source: own graphic, based on UBA (2020)

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A closer look at the energy sector

Measures and challenges to reduce CO2 emissions

A closer look at the energy sector

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Key challenges:

- Shift from fossil to renewable electricity
- Increased electricity demand (electrification / sector coupling)
- Shift from fossil to renewable liquid & gaseous energy carriers

	Current policy
	9.7 GW new solar & wind capacity per year
	Coal phase-out by 2038
	≤ 10 GW by 2035 installed electrolyser capacity

Legal basis for achieving the targets in the energy sector:

- Renewable Energy Sources Act
- Coal Phase-out Act
- National Hydrogen Strategy

Challenges of the Energy Transition:
Regional Job Losses

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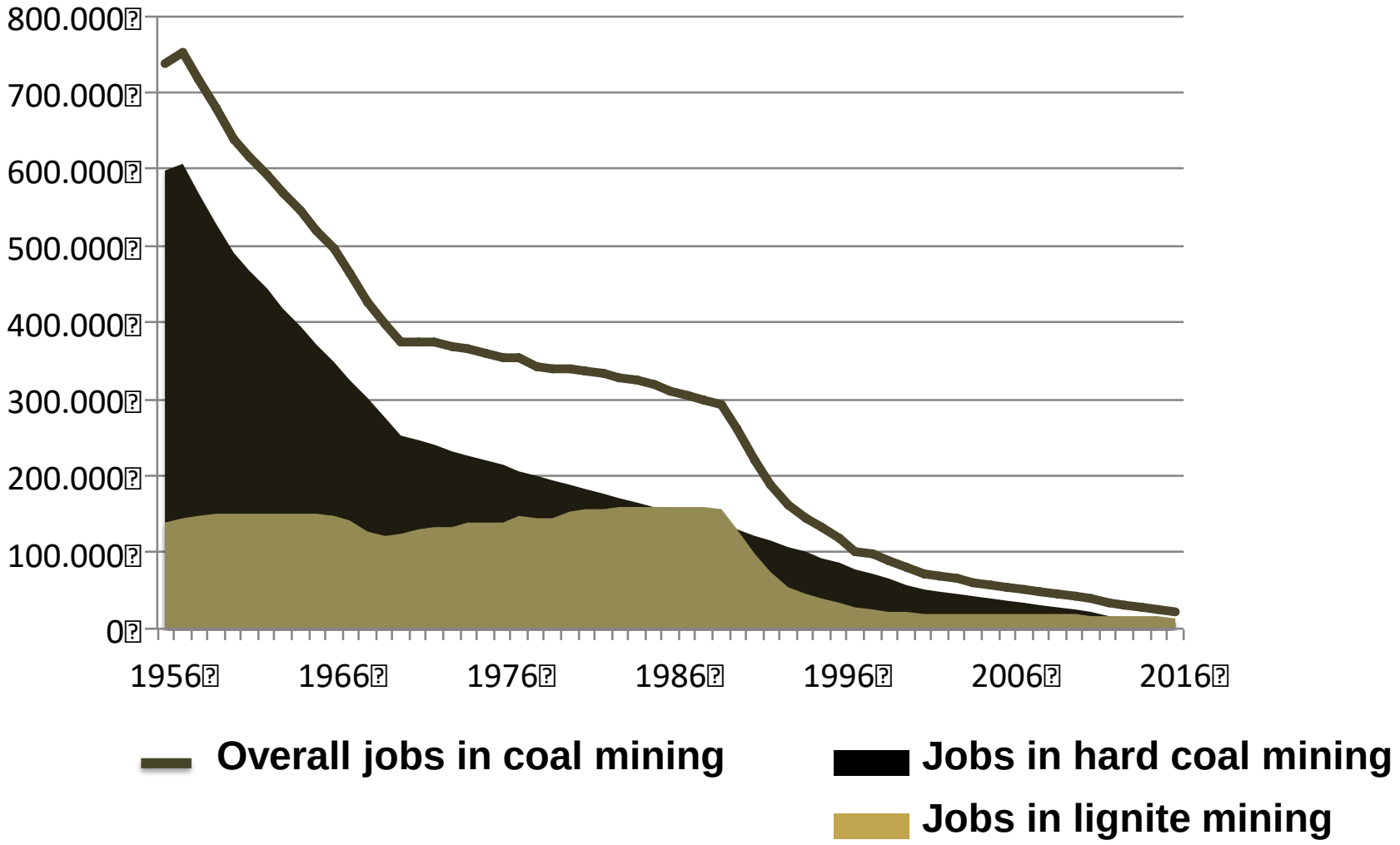
We resist! – Against the social black-out of whole regions!

The fear of job losses in coal regions were a strong barrier to more ambitious climate targets / early coal phase-out

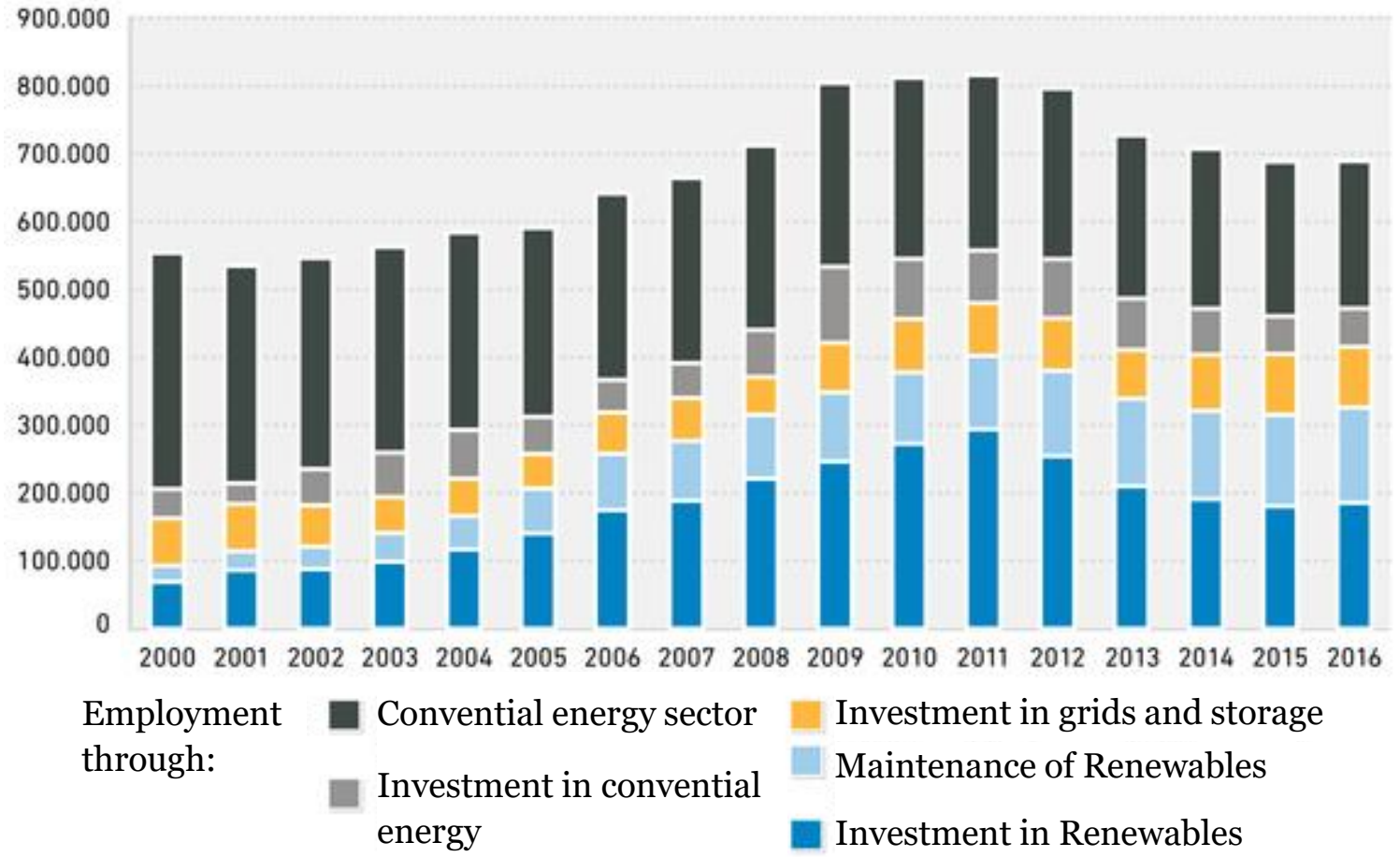
Coal jobs over the time in Germany



Coal mining jobs decreased from over 750,000 to less than 21,000 in 2016. This was driven by purely economic reasons.

Source: own calculations based on Statistik der Kohlenwirtschaft e.V. (2016a, 2016b, 2017)

Employment in the energy sector

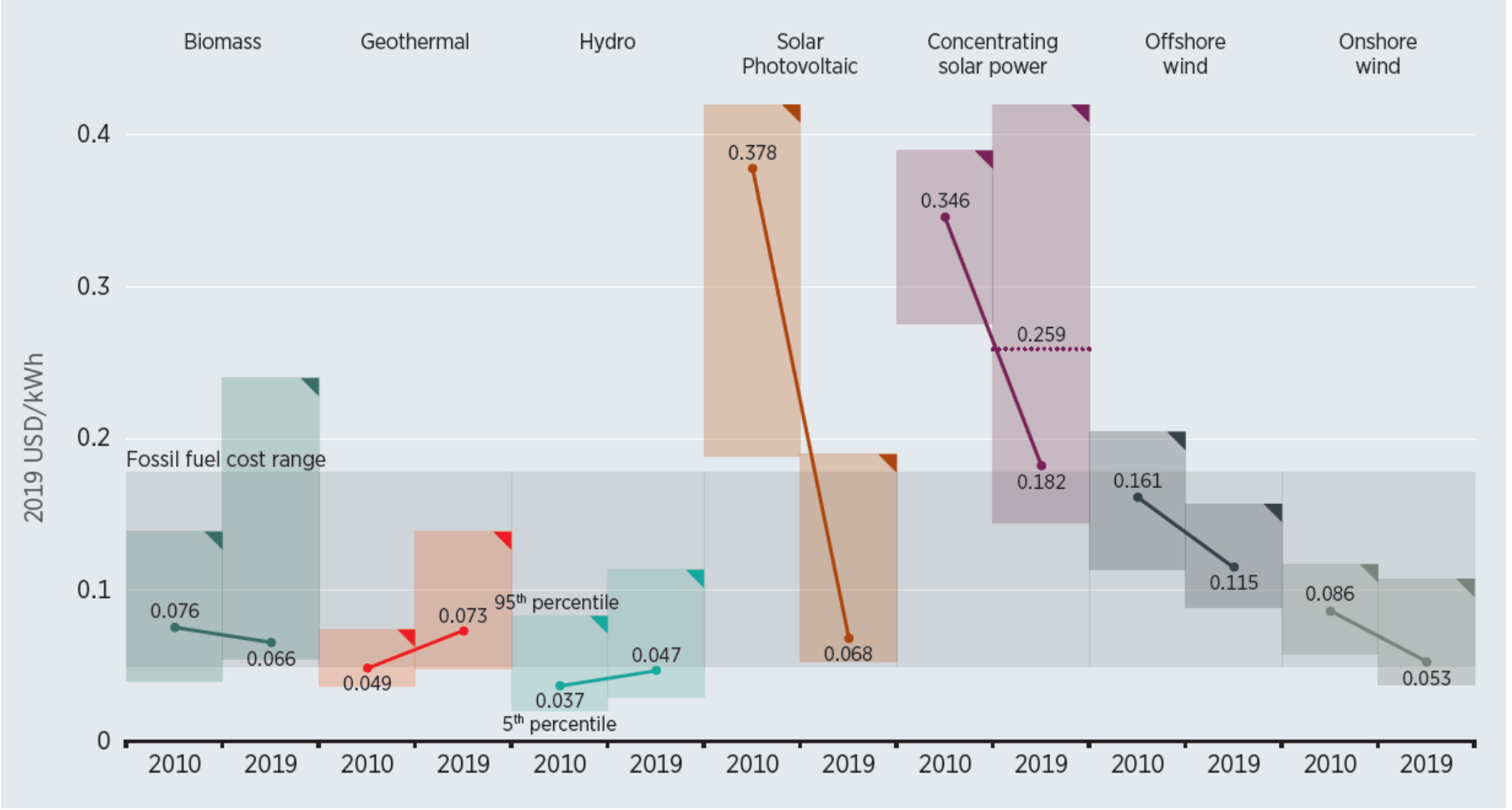


New jobs in renewables outnumber job losses in fossil energy

.... on national level – but with winners and loosers on regional level

https://www.unendlich-viel-energie.de/mediathek/grafiken/entwicklung-der-beschaeftigung-in-der-energiewirtschaft-2000-2016

Renewables
Are costs a barrier?

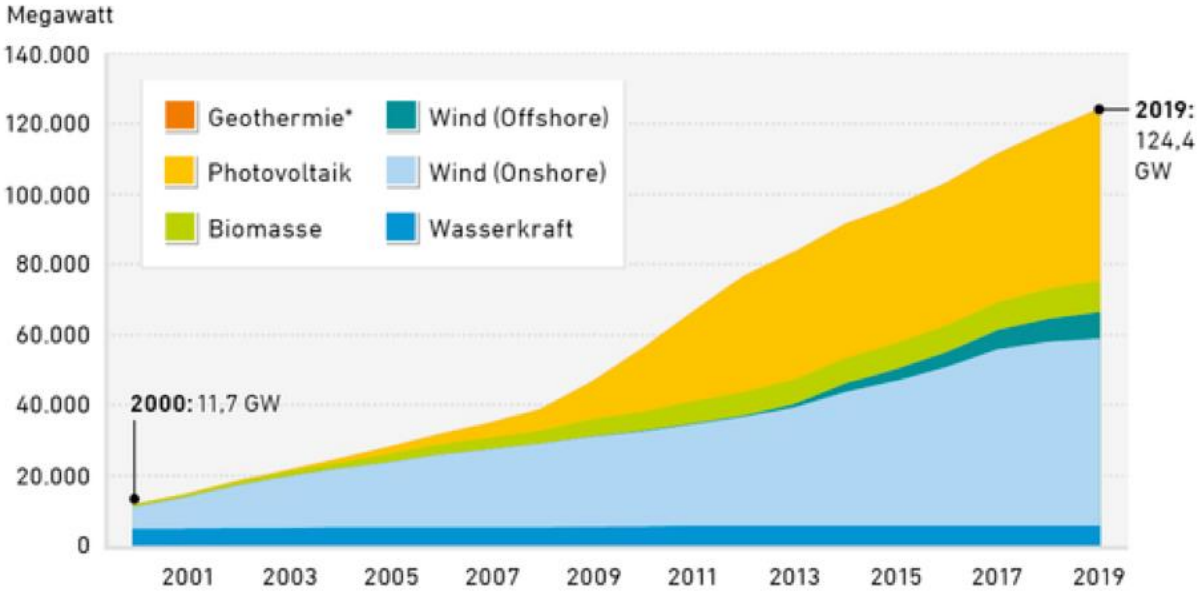


Costs for renewables have gone down dramatically for wind and solar and are in the range of new fossil fuel power plants

Source: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jun/IRENA_Power_Generation_Costs_2019.pdf

Renewables

Struggle for acceptance of wind energy



- **Installation rates for on-shore wind have declined in recent years**
- **Local protests against wind are one of the key barriers**

https://www.unendlich-viel-energie.de/mediathek/fotos/windenergie

https://www.handelsblatt.com/unternehmen/energie/erneuerbare-energien-cdu-energieexperte-fordert-bundesweite-abstandsregelung-fuer-windkraft/24356604.html

https://www.unendlich-viel-energie.de/media/image/46981.Installierte_Leistung_2000_2019_mrz20_72dpi.jpg

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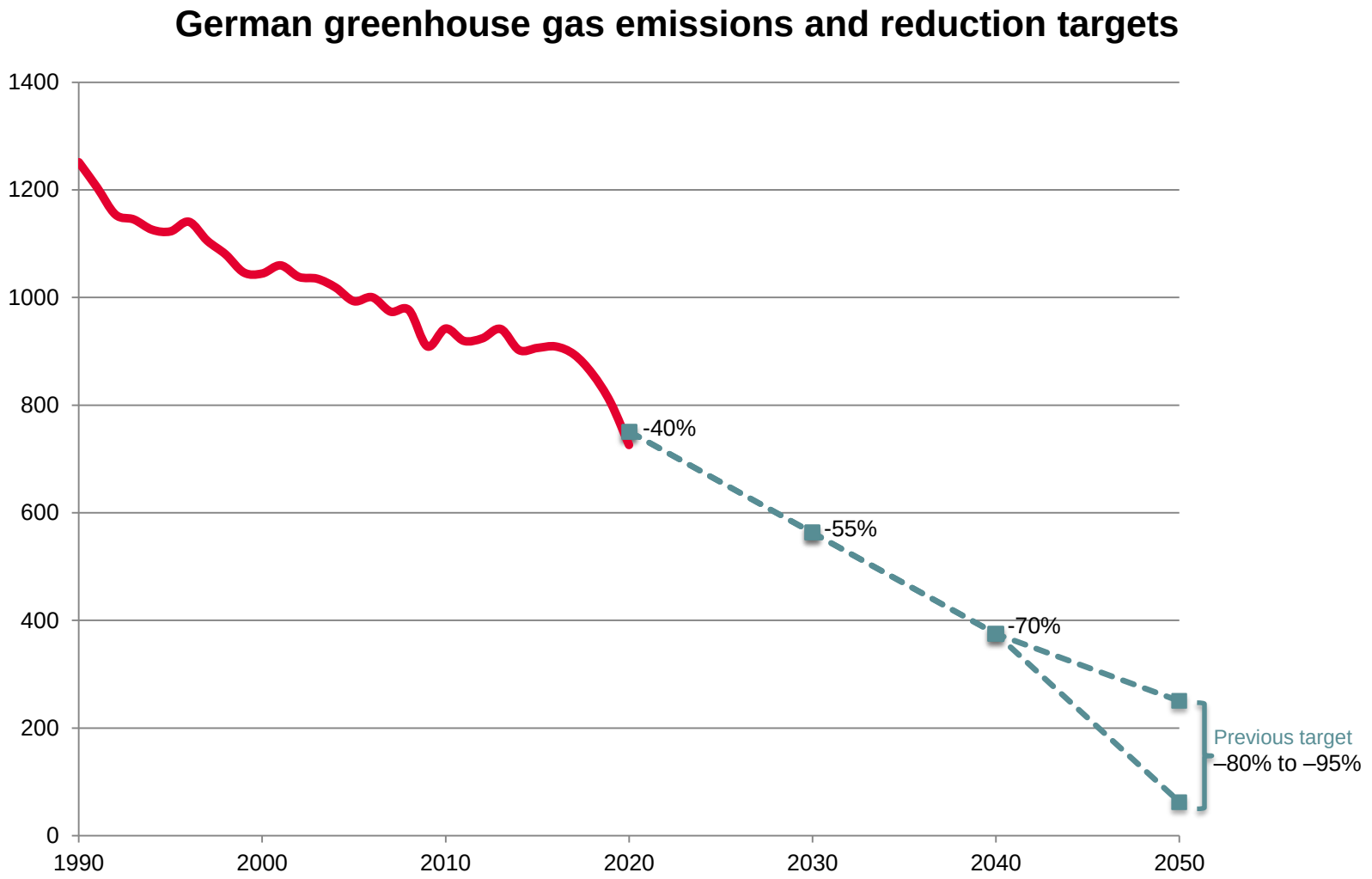
The path towards climate neutrality

Climate ambitions have been rising

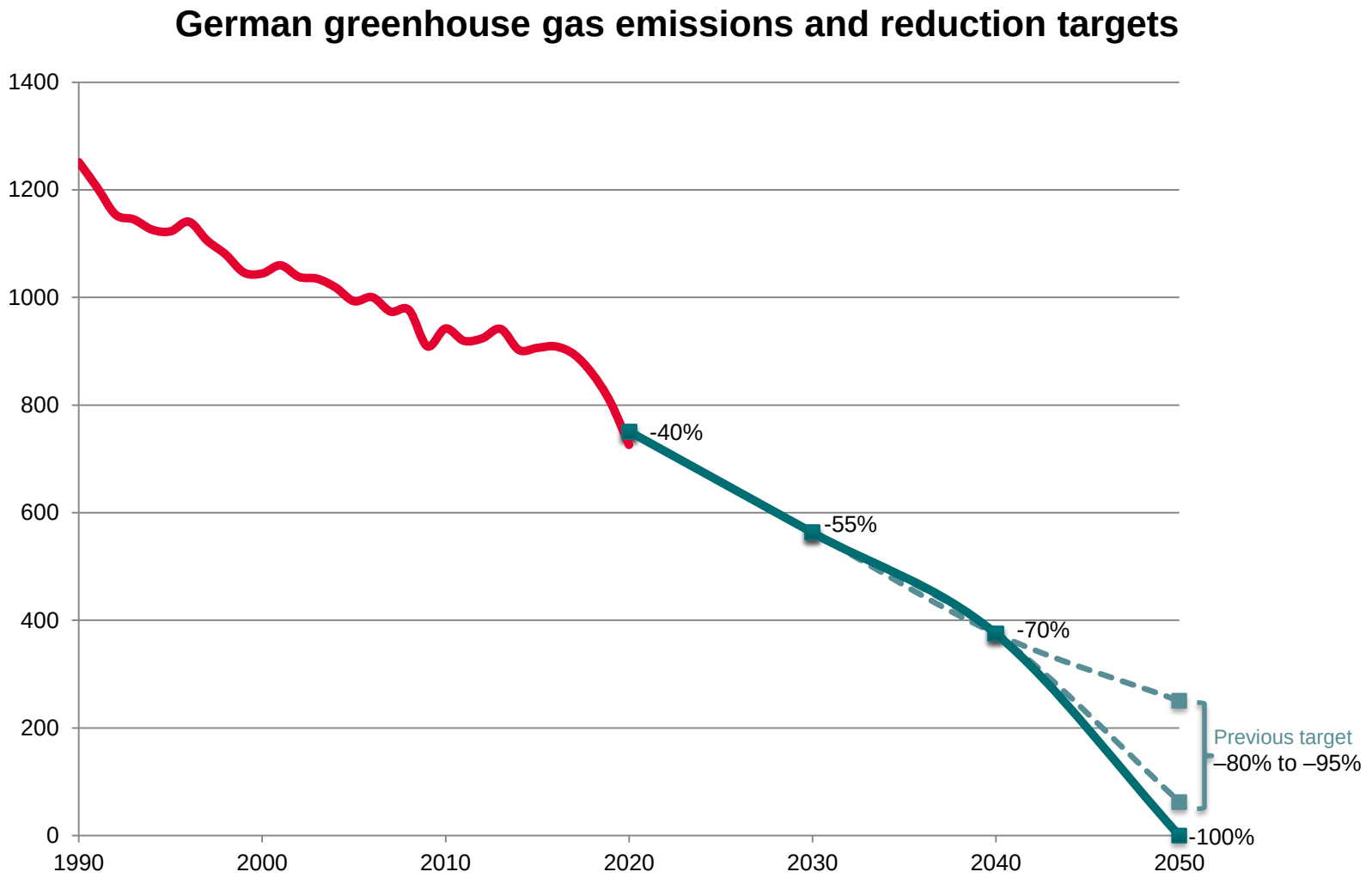
A scenario for climate neutrality by 2050

Development of national GHG reduction targets



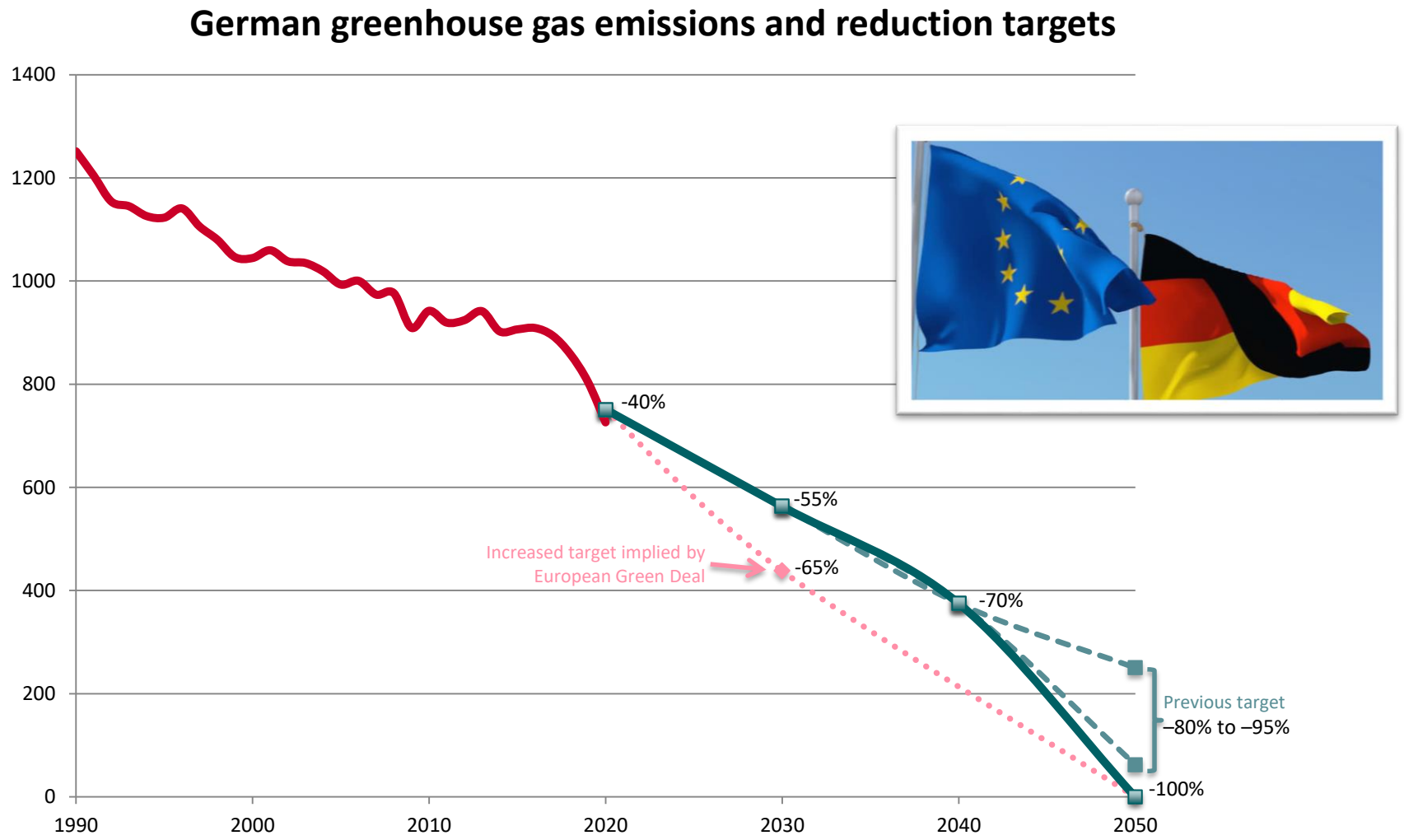
- **In 2016, Germany's Climate Protection Plan aimed for -80% to -95% reduction by 2050.**

Development of national GHG reduction targets



- **In 2019, the newly passed Climate Protection Law proclaimed climate neutrality as the nation's goal for 2050. Interim targets were not revised.**

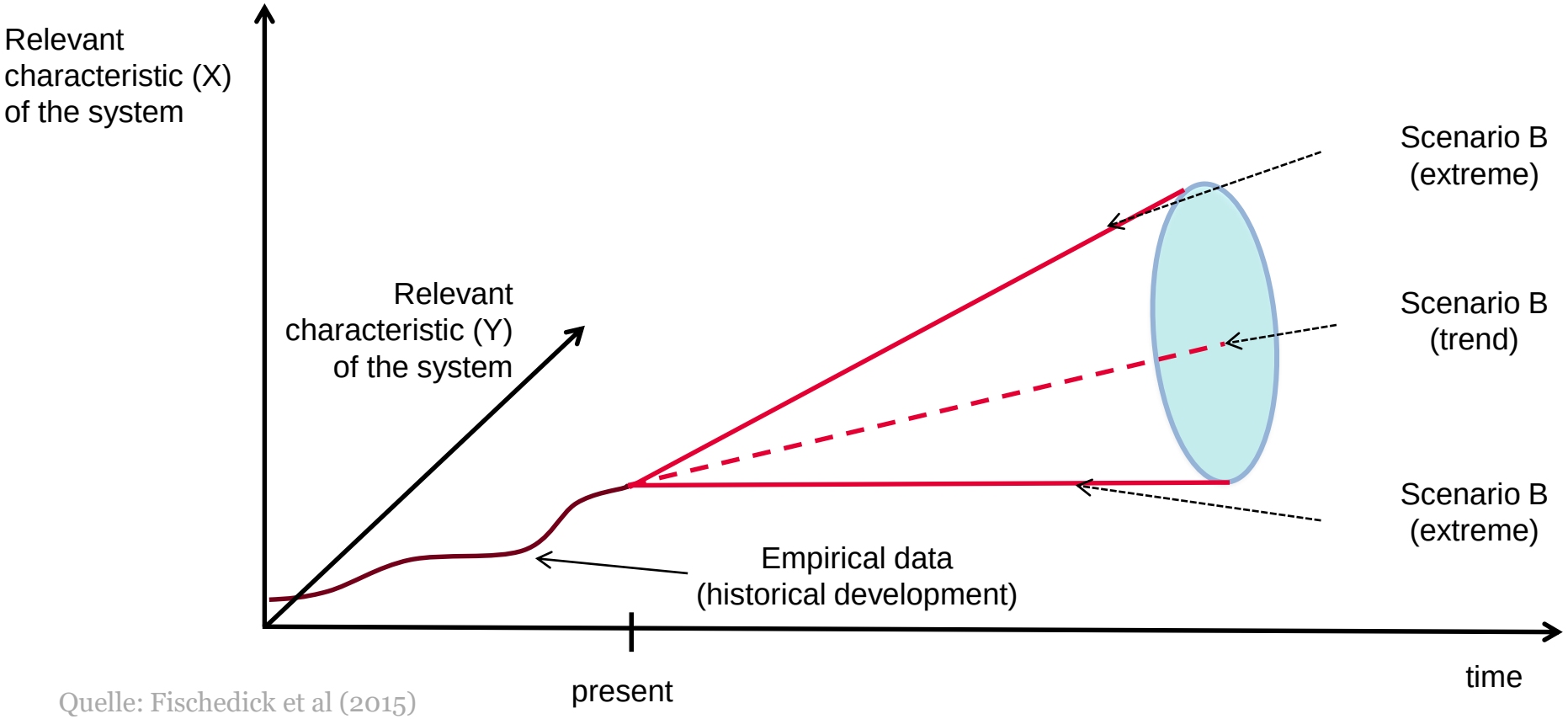
Development of national GHG reduction targets



- **In 2020, the EU raised its 2030 target to -55% as part of the Green Deal. For Germany, this would imply raising the national 2030 target to -65%.**

Methodoly excursion
What are scenarios ?

- Scenarios are not a prediction of the future
  nor are they necessarily linked to political commitment
- They **describe possible future pathways** and can be used as
  a tool to understand challenges and options of how to reach a target better



Quelle: Fischedick et al (2015)

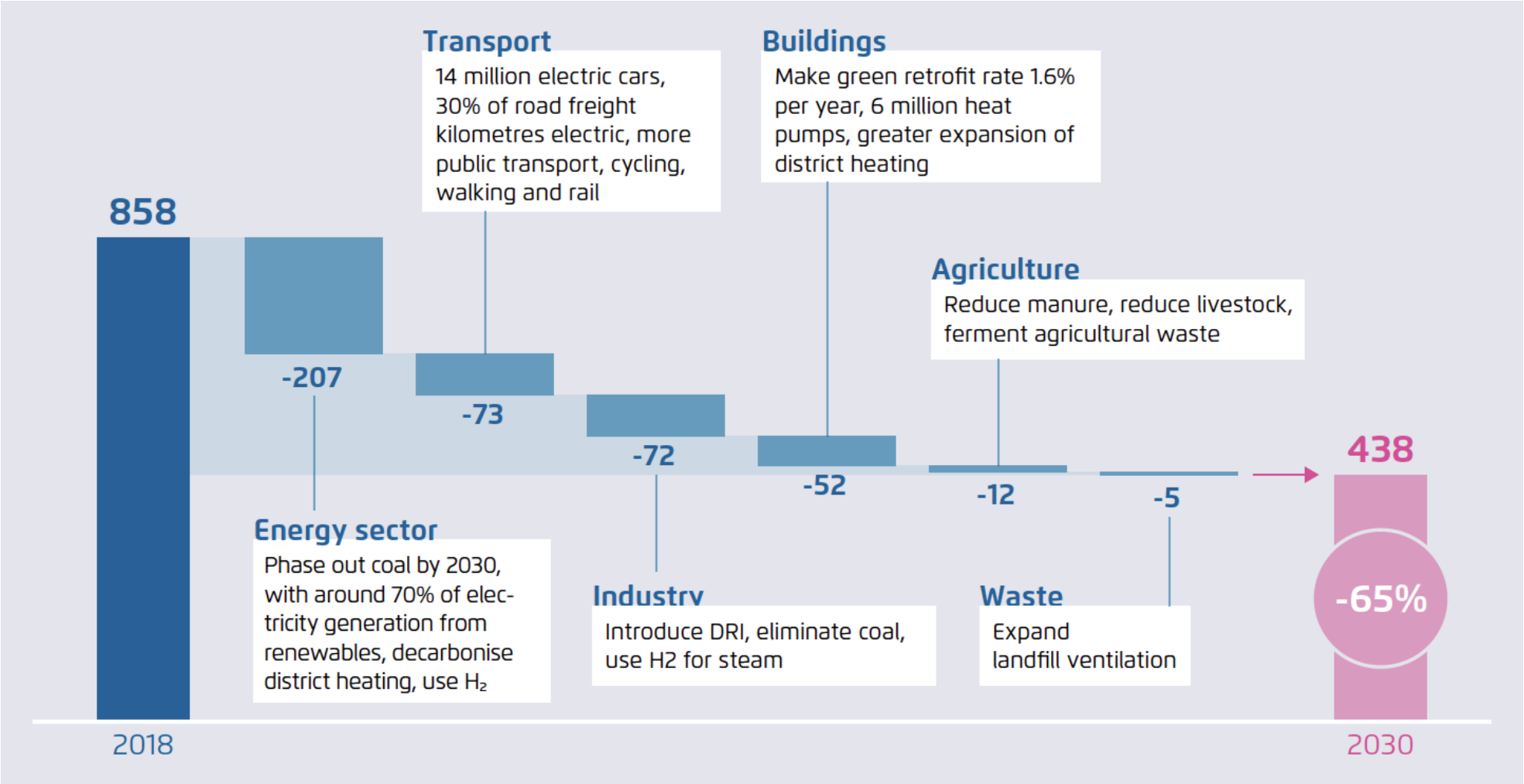
Exploring pathways to climate neutrality

- **What does a climate-neutral Germany look like?**
- **How do we get there?**

- Scenarios are a way to explore possible future pathways
- There are a number of existing detailed scenarios showing different developments toward a low-carbon future
- In 2020, Agora Energiewende commissioned a study to explore a scenario which:
  - reaches **climate neutrality** by 2050
  - considers **current targets** and political developments at national and EU scale
  - explores all **key sectors** under the German Climate Protection Law
  - is as progressive as necessary and as conservative as possible

Raising the 2030 target

- **In a first phase, the 2030 target is raised to -65%. All sectors contribute to reaching it.**



Source: Agora Energiewende et al. (2020)

Reaching near carbon neutrality

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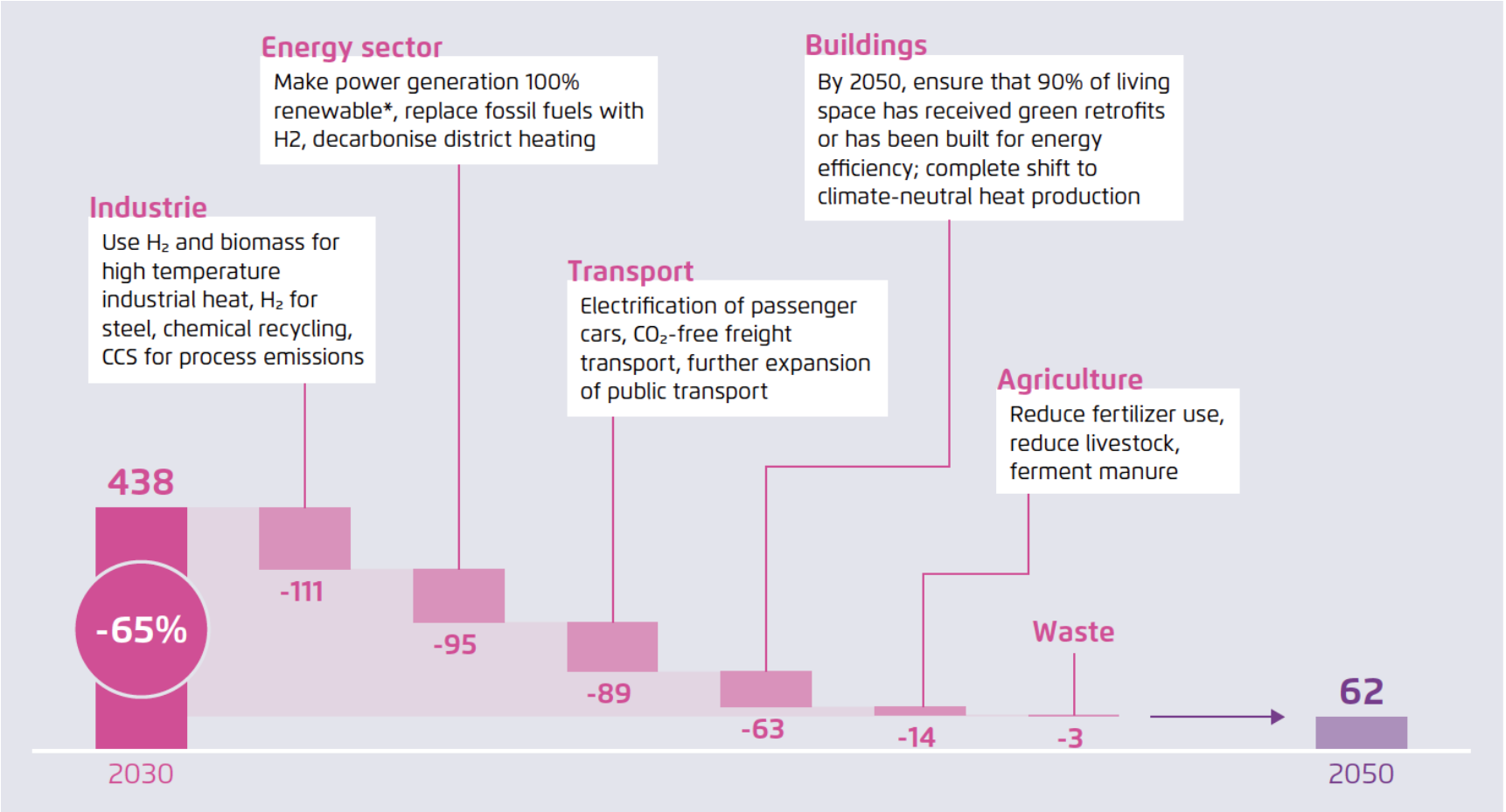
- **In a second phase, total emissions are reduced by 95% until 2050.**

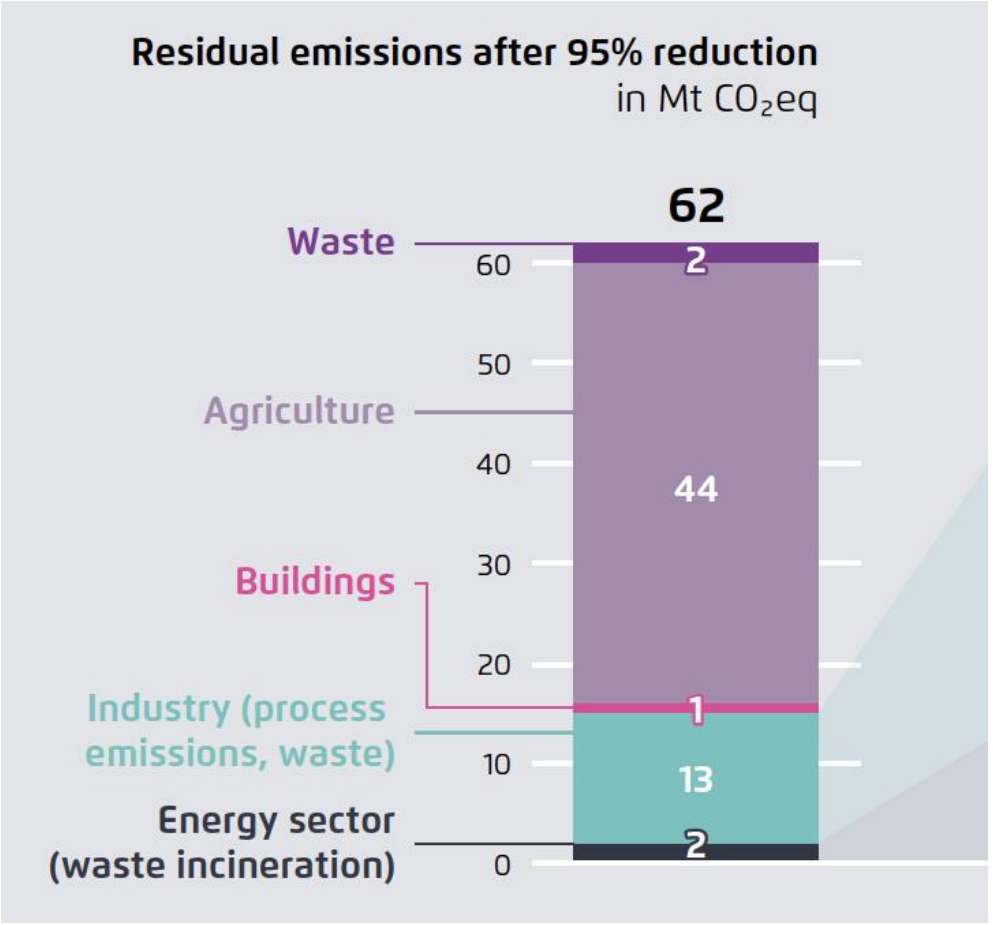


* Includes power generation from renewable hydrogen together with stored and imported renewable electricity.
Prognos, Öko-Institut, Wuppertal Institut (2020)

Source: Agora Energiewende et al. (2020)

Residual greenhouse gas emissions

- **62 million tonnes of annual greenhouse gas emissions still remain in 2050.**



Source: Agora Energiewende et al. (2020)

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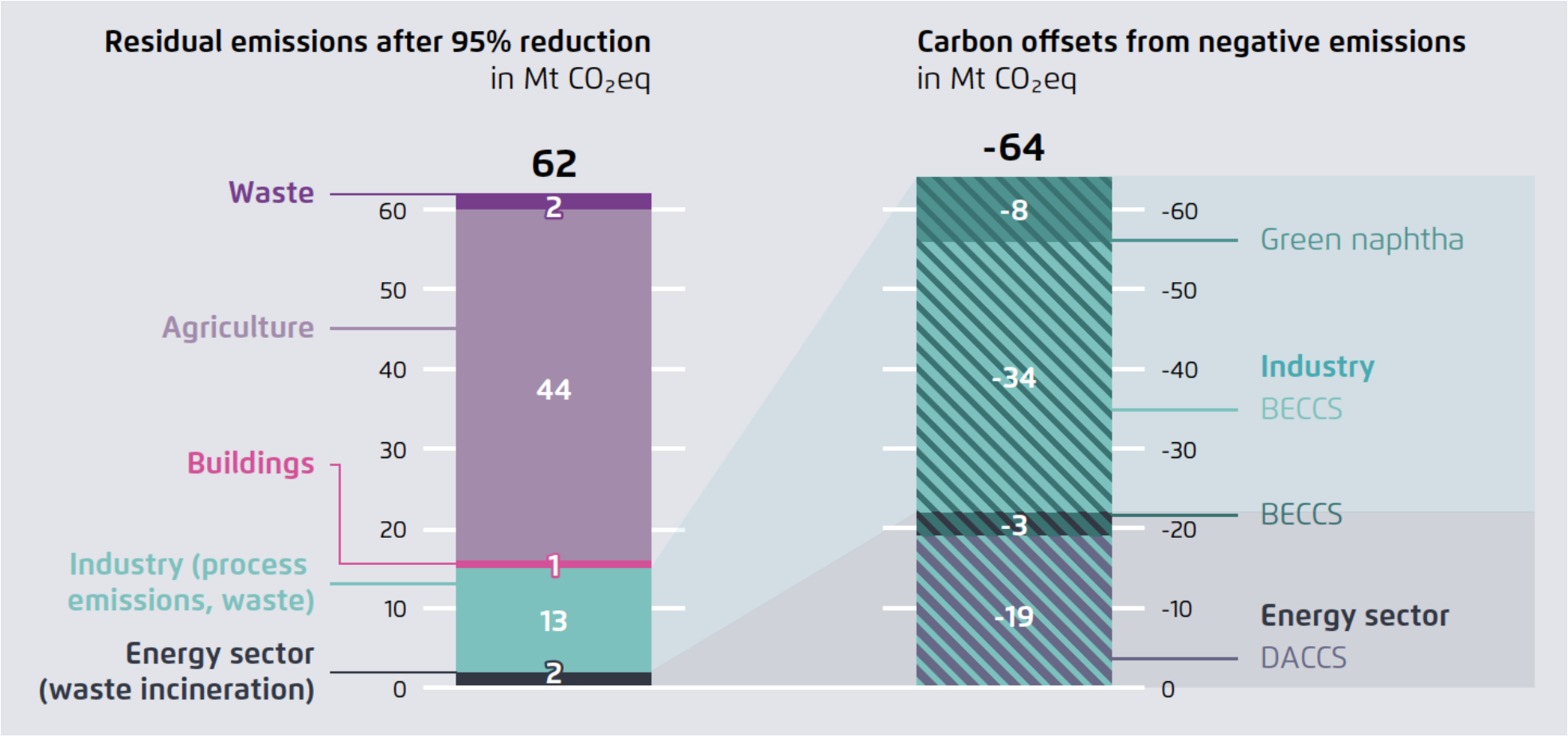
- **These residual emissions are offset by negative emissions to reach net-zero.**



Source: Agora Energiewende et al. (2020)

A closer look at the energy sector

- **The Agora scenario implies that current regulation on the transformation of the energy sector is likely insufficient for reaching German and EU climate goals.**

	Current policy	Agora Scenario
	9.7 GW new solar & wind capacity per year	15.5 GW new solar & wind capacity per year
	Coal phase-out by 2038	Coal phase-out by 2030
	≤ 10 GW by 2035 installed electrolyser capacity	10 GW by 2030 25 GW by 2040 installed electrolyser capacity

Climate neutrality by when?

Is climate neutrality by 2050 in line with the Paris agreement?

Should ambition be raised?

- In the PARIS AGREEMENT, parties agreed on *"holding the increase in the global average temperature to well below 2°C above pre-industrial levels and* ***pursuing efforts to limit the temperature increase to 1.5°C*** *above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."*

- **Is Germany doing its fair share to achieve this goal?**
- According to calculations by the GERMAN COUNCIL OF EXPERTS ON ENVIRONMENTAL ISSUES, current targets will not suffice if Germany is to contribute fairly to reaching the 1.5-degree goal.

United Nations Framework Convention on Climate Change

Image Sources: twitter/Fridays for Future Germany; UNFCC; Facebook/Extinction Rebellion North

What would 1.5° degrees mean for Germany's climate ambition?

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Assuming that every person on earth had the right to emit the same amount of greenhouse gases
t**hen the German energy sector would need to be carbon neutral by 2035**

	Current policy	Agora Scenario	FfF Study
	9.7 GW new solar & wind capacity per year	15.5 GW new solar & wind capacity per year	25 - 30 GW new solar & wind capacity per year
	Coal phase-out by 2038	Coal phase-out by 2030	Coal phase-out by ASAP (well before 2035)
	≤ 10 GW by 2035 installed electrolyser capacity	10 GW by 2030 25 GW by 2040 installed electrolyser capacity	70 - 90 GW by 2035 installed electrolyser capacity

Summary

Climate targets are being revised - and **will become more ambitious**
Increasing targets on EU level lead to more ambitious targets in Germany

Specific sectors:

- **electricity** - sector with best reductions / achievements
  but current RES installation rates are too low,
  coal phase-out is decided, but too late
- **transport** - very difficult because of high importance of car industry
- **industry** - change of paradigm: low achievements in last decade - but carbon neutrality by 2050 becomes more and more an established target

Right framework conditions are important: long-term targets, carbon prices

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Thank You For Your Attention

For further information please see:
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