# Germany, the EU, and the Goal of Climate Neutrality

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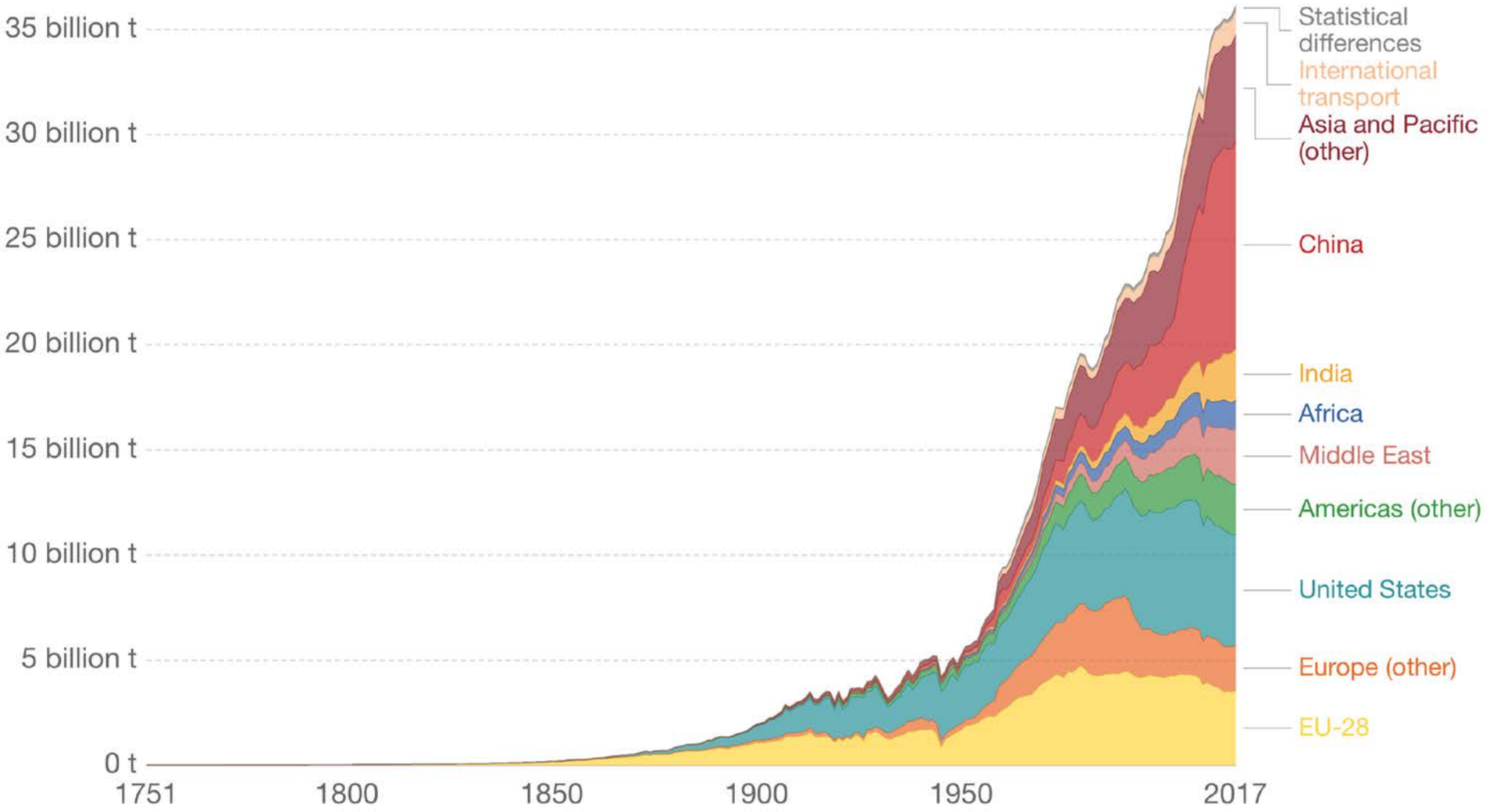
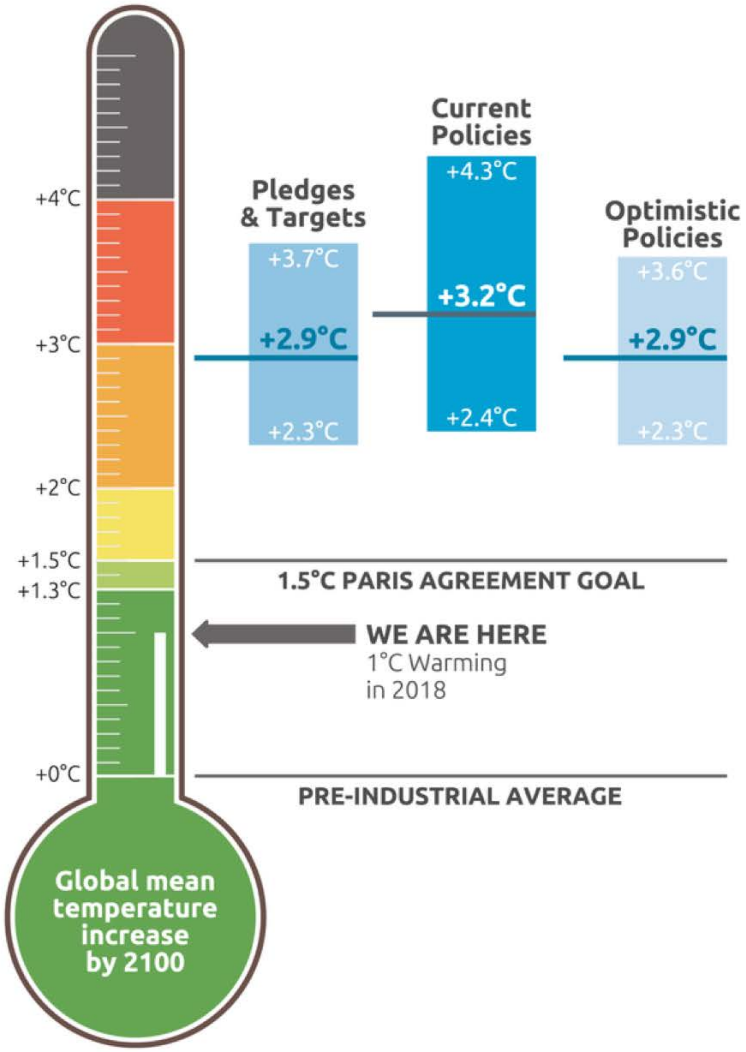
# Annual total $CO_2$ emissions, by world region




Source: Carbon Dioxide Information Analysis Center (CDIAC); Global Carbon Project (GCP)
Note: "Statistical differences" notes the discrepancy between estimated global emissions and the sum of all national and international transport emissions.
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

# IPCC Special Report on 1.5 Degrees

- Human Activities are estimated to have caused a 1.0 degree warming since pre-industrial levels.
- 1.5 Degree increase likely by 2030-2052
- Pathways chosen determine rate of increase, impacts, and costs (-45% of 2010 ghg levels by 2030 needed)




Climate Action Tracker

# CAT warming projections

## Global temperature increase by 2100

September 2019 Update

# Power of Narratives

- Dominant discourse has been based on the notion that economic growth is the main priority and that environmental protection is costly. Cheap energy and materials are viewed as essential.
- The American Dream– consumption oriented development– has been a second powerful discourse

These narratives have powerfully influenced economic and political decision making for years.

# Changing the Discourse

- Climate change, biodiversity loss, plastics in the oceans...
- There is a need for a new narrative one that places environmental protection on par with economic development
- There needs to be a shift towards more sustainable economic and energy models

# Demands for Radical Change

- Fridays for Future
- Extinction Rebellion
- WWF, Greenpeace,

- British Parliament declares Climate Emergency, Ireland follows
- Hundreds of local governments declare climate emergencies, including Constance.

# European Commission: Clean Planet for All (2018)

A vision for a modern, competitive, properous and climate neutral economy

- Energy efficiency: Net Zero emission buildings
- Renewables, greater use of electricity
- Investing in a sustainable society (investment and finance, R&D, job transformation...)
- Clean, safe, connected mobility
- Circular economy
- Bio-economy
- CCS

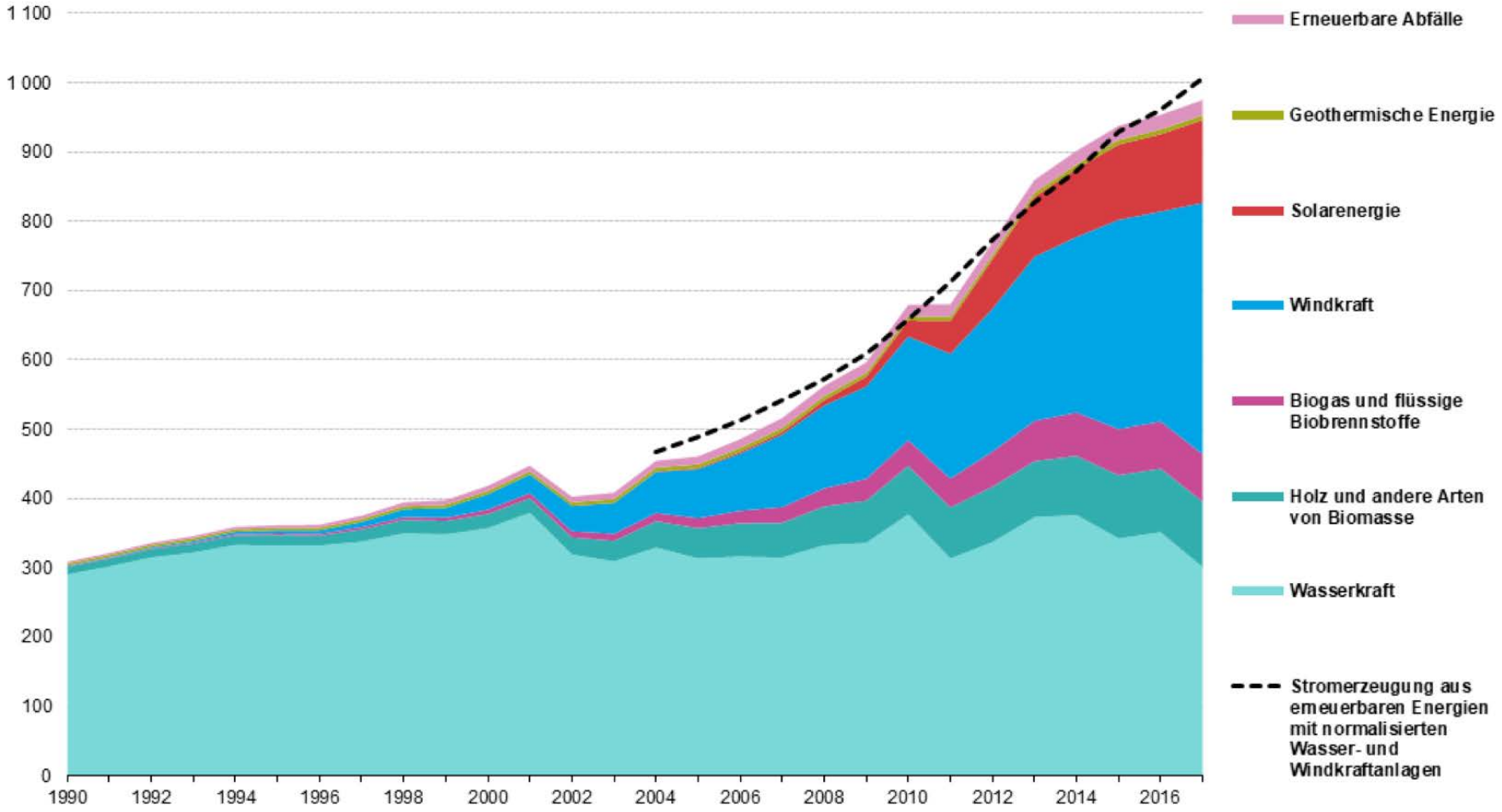
# EU's 2030 Framework for Climate and Energy Policy Targets (old ➔ new)

Set in 2014, revised in 2018.

- 40% reduction compared to 1990
- 27% ➔ 32% renewals in final energy
- 27% ➔ 32.5% energy efficiency

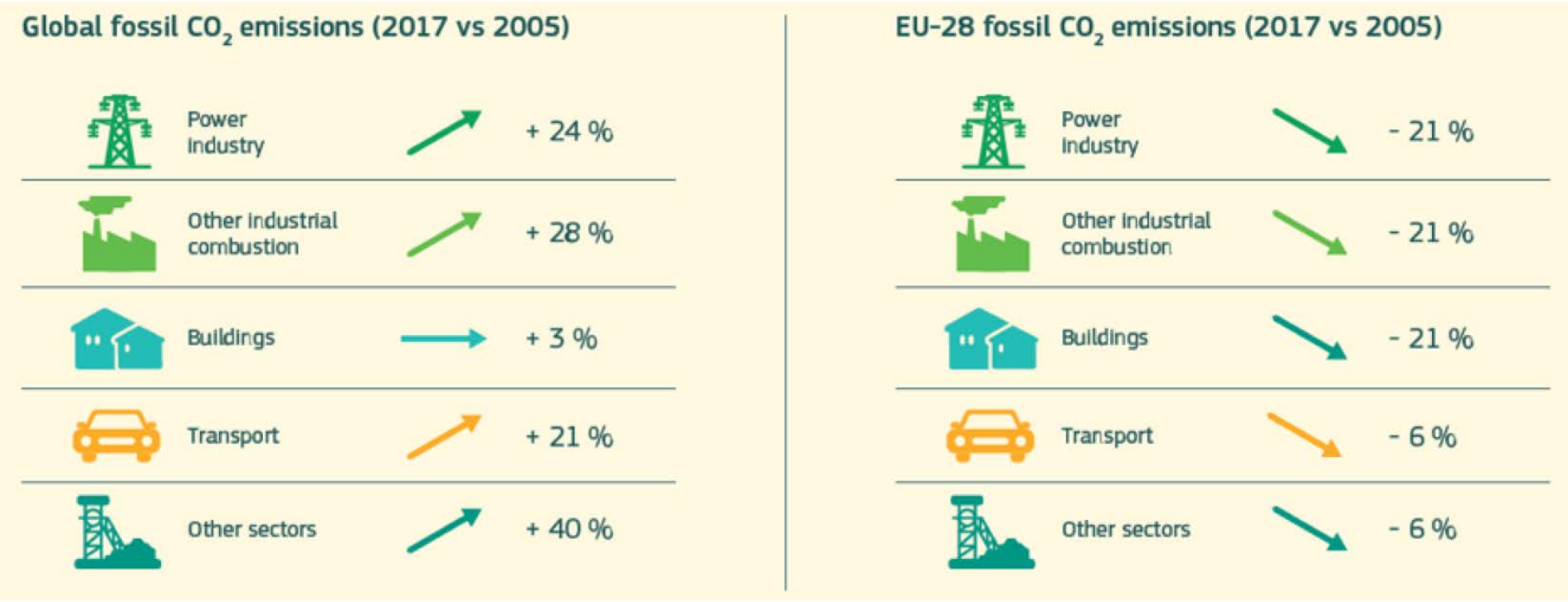
(if fully implemented, this would cut emissions by about 45%; with current policies, projection is 30% cut)

**Bruttostromerzeugung aus erneuerbaren Energien, EU-28, 1990-2017**
(in TWh)




*Quelle:* Eurostat (Online-Datencodes: nrg_bal_c und nrg_bal_peh) und SHARES_summary_results in http://ec.europa.eu/eurostat/web/energy/data/shares

eurostat




Muntean, M., Guizzardi, D., Schaaf, E., Crippa, M., Solazzo, E., Olivier, J.G.J., Vignati, E. Fossil CO2 emissions of all world countries - 2018 Report, EUR 29433 EN,
Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-97240-9, doi:10.2760/30158, JRC113738.

# Europe‘s Green New Deal

1.) Climate Neutrality 2050

2.) Circular Economy (action plan expected March 2020). Clean steelmaking using hydrogen by 2030, making batteries reusable & recyclable.

3.) Building renovation. Double/Triple renovation rate of buildings

4. Zero Pollution (air, water, soil) by 2050

5. Ecosystems & Biodiversity. New forestry strategy.

# Green New Deal cont.

6.) Green & Healthier Agric. System (significantly reducing chemical pesticies, fertilisers & antibiotics. Aligning  Common Agricultural Policy with Green Deal.

7.) Transport. 95g$CO_2$/km

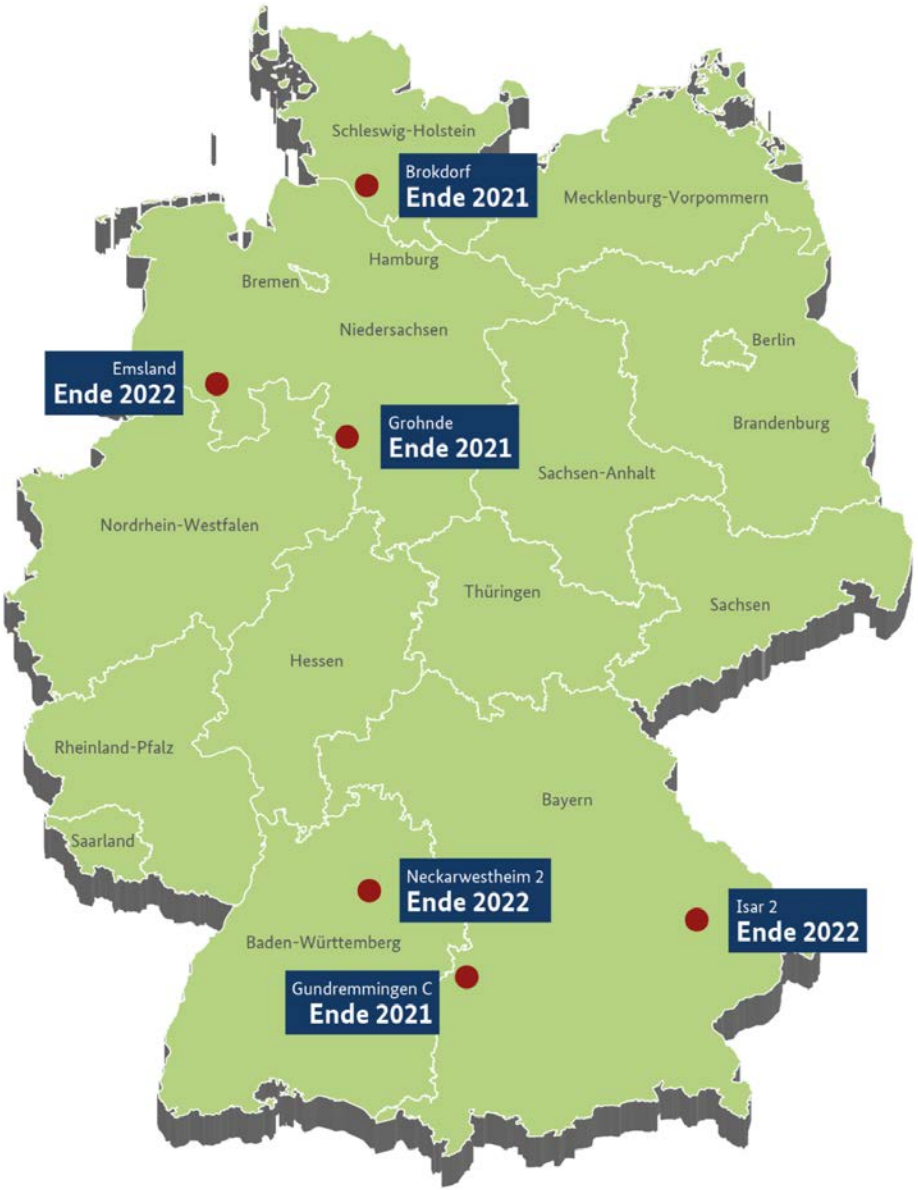
8.) Just transition fund for regions most impacted by transition away from fossil fuels

9.) R&D (35% of EU research for climate-friendly technologies)

10.) Carbon border tax/external relations

# Germany’s Energiewende

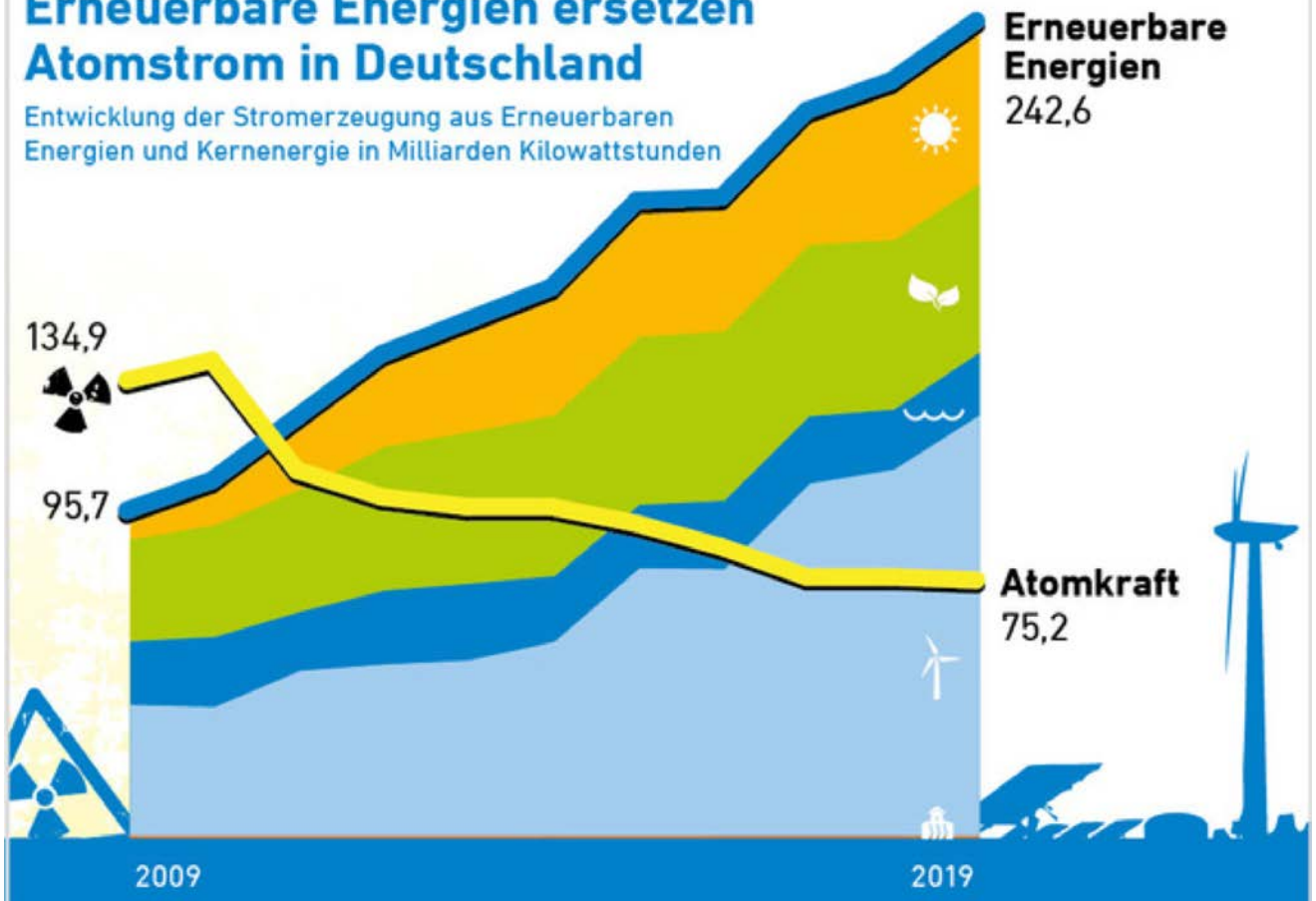
- Nuclear phase out until 2022
- Coal phase out until 2038
- Climate neutrality by 2050




https://www.bmu.de/themen/atomenergie-strahlenschutz/nukleare-sicherheit/aufsicht-ueber-kernkraftwerke/kernkraftwerke-in-deutschland/

# Erneuerbare Energien ersetzen Atomstrom in Deutschland

Entwicklung der Stromerzeugung aus Erneuerbaren Energien und Kernenergie in Milliarden Kilowattstunden



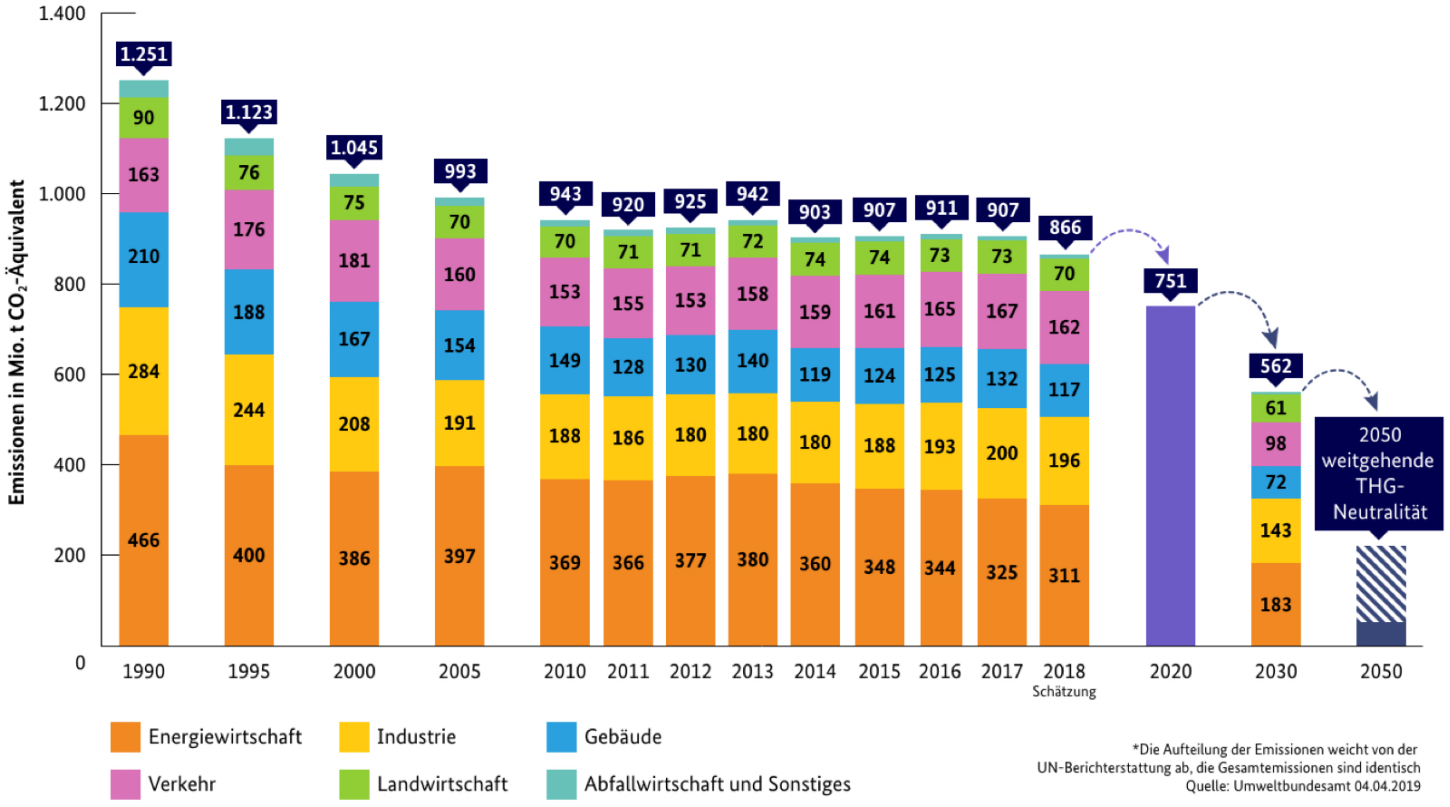

**Die Stromerzeugung aus Erneuerbaren Energien hat sich in den letzten 10 Jahren mehr als verdoppelt auf insgesamt 243 Mrd. kWh im Jahr 2019*.**

Quelle: AG Energiebilanzen; Stand: 12/2019 *Vorläufige Angaben

AGENTUR FÜR ERNEUERBARE ENERGIEN
unendlich-viel-energie.de

# Entwicklung der Treibhausgasemissionen in Deutschland

in der Abgrenzung der Sektoren des Klimaschutzplans 2050*




*Die Aufteilung der Emissionen weicht von der UN-Berichterstattung ab, die Gesamtemissionen sind identisch

Quelle: Umweltbundesamt 04.04.2019

# ENERGIEWENDE TARGETS REVISED

| | Reduction of nuclear energy | Share of Renewable Energy | | Reduction GHG-Emissions | Reduction of Energy Demand | | | |
|---|---|---|---|---|---|---|---|---|
| | | Gross final energy | Electricity Production | | Primary Energy | Domestic Heat | Final Energy Transport | Electricity Demand |
| 2015<br>2017<br>2019 | -47%<br>-56%<br>-60% | | | | | | | |
| 2020 | | 18% | 35% | -40% | -20% | -20% | -10% | -10% |
| 2021<br>2022<br>2025 | -80%<br>-100% | | 40-45% | | | | | |
| 2030<br>2035 | | 30% | 50%<br>55-60% | -55% | | | | |
| 2040 | | 45% | 65% | -70% | | | | |
| 2050 | | 60% | 80% | -80% bis 95% | -50% | -80% | -40% | -25% |
| Basis | 2010 | - | - | 1990 | 2008 | 2008 | 2005 | 2008 |

Braunkohle – nicht nur Gift für das Klima. Vattenfall-Tagebau bei Cottbus. Foto: Dirk Seifert - See more at: http://umweltfairaendern.de/2012/07/klimakatastrophe-jede-vierte-kilowattstunde-aus-braunkohle/#sthash.tI7vi9gm.dpuf


https://www.zdf.de/nachrichten/heute/zeitplan-fuer-den-ausstieg-kohlekommission-ohne-vorfestlegung-100.html

# Heizkraftwerk Nord supplying Munich

Abendzeitung München

https://de.wikipedia.org/wiki/Heizkraftwerk_Nord_(München)#/media/File:Heizkraftwerk_Nord.JPG

# Referendum in Munich

- 60% vote to close the Heizkraftwerk North (by 2022)
- 17,8% participated in the referendum

Abend Zeitung München

# Strong Public Involvement in Germany‘s Energiewende

- Long history of protest and citizen involvement
- Concerns about nuclear
- Concerns about climate change
- Concerns about energy import dependency and instability in global energy prices
- Desire to democratize energy structures
- Desire to transform the economy towards more sustainable structures

# Germany: Commission for Growth, Structural Change and Employment (Coal Commission)

# Main Proposals

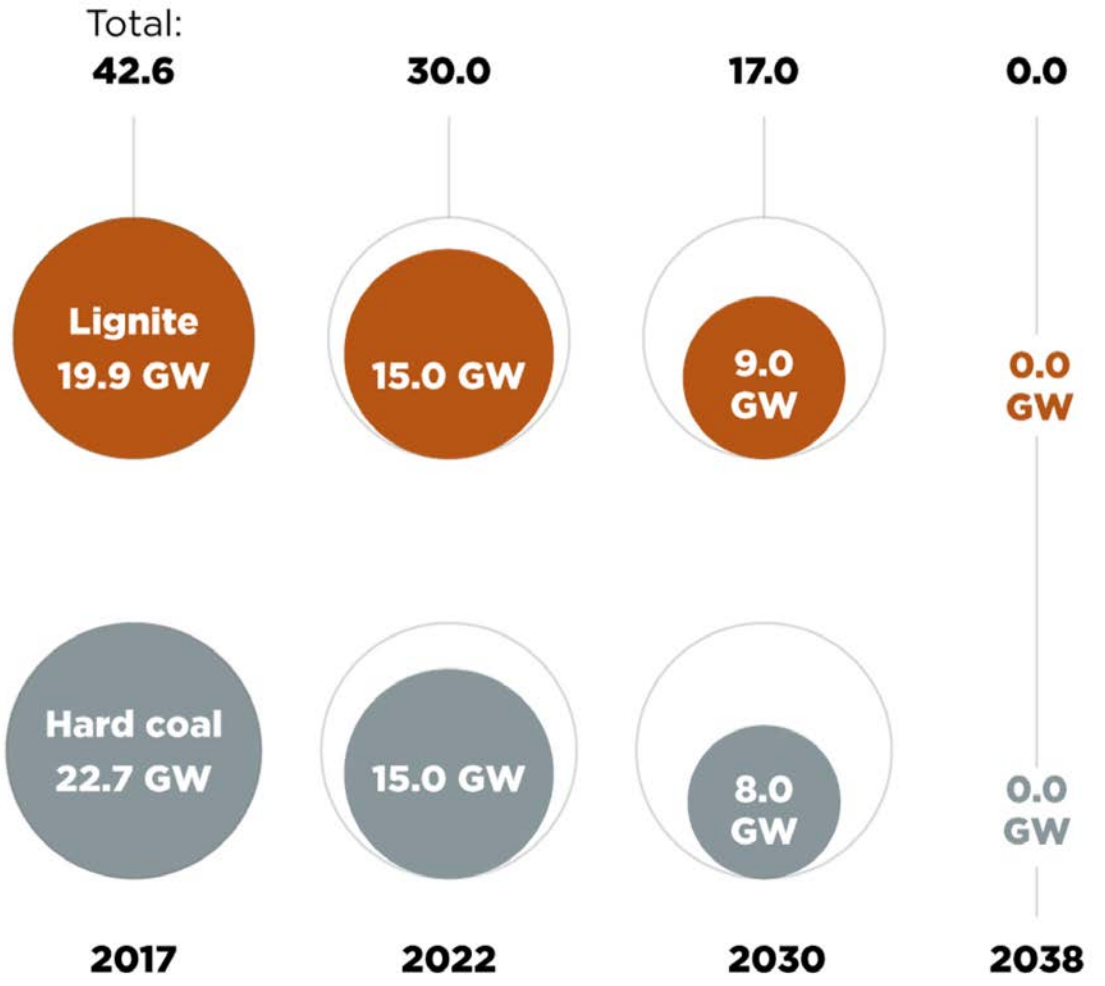
- Cost 40 billion Euros ($45.7 Billion): primarily aid to affected regions
- Begin phase out with shut downs in 2022
- Last plants to be shut down by 2038 (possibly 2035)

(20,000 employed directly in lignite; 12,000 in coal)

Energy transition

# The grand coal phase-out

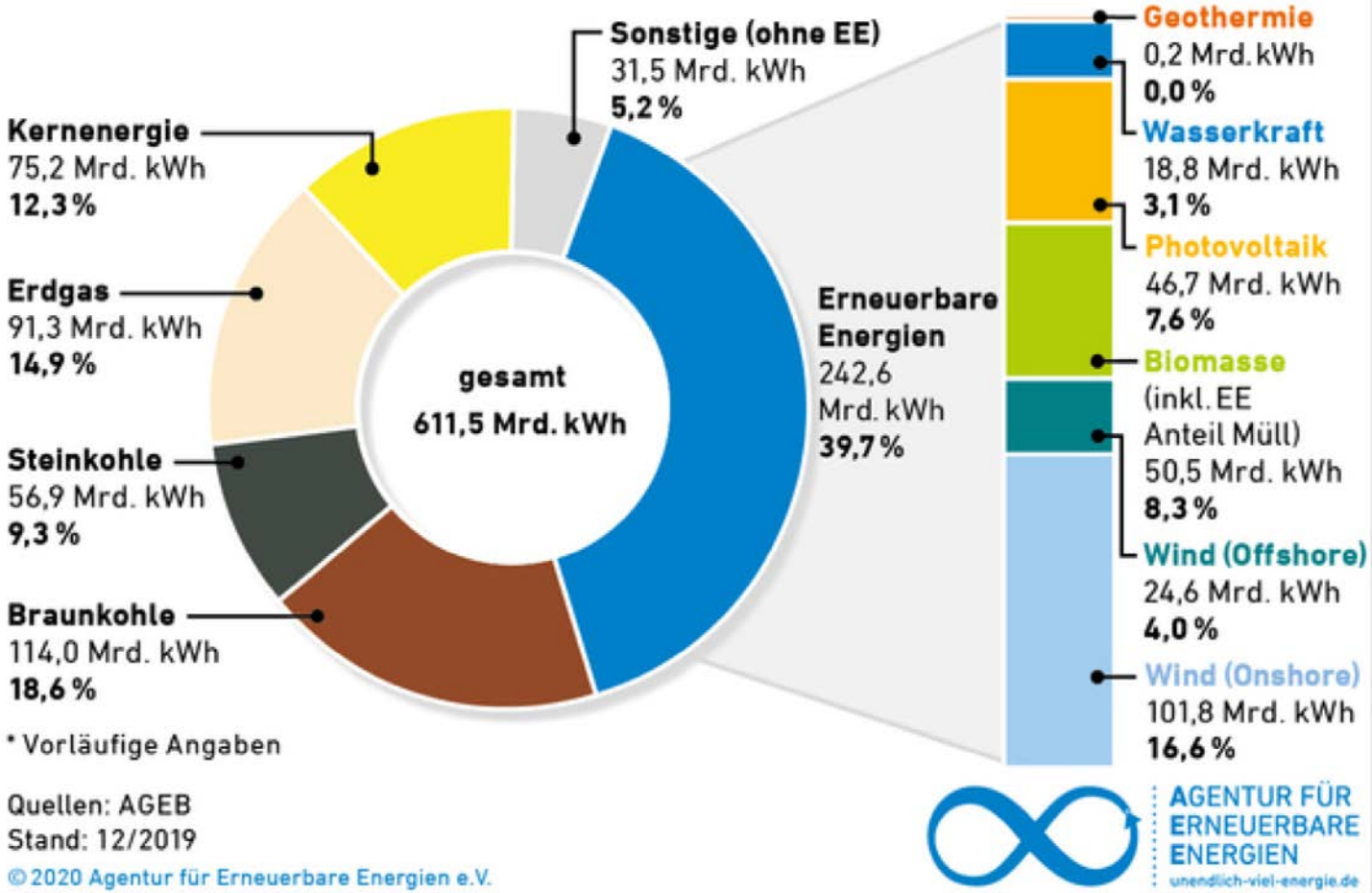
**Net output of German coal-fired power plants** in gigawatts




HANDELSBLATT GRAPHIC

# Der Strommix in Deutschland im Jahr 2019*

**Mit 243 Milliarden Kilowattstunden lieferten Erneuerbare Energien rund 40 Prozent der deutschen Bruttostromerzeugung. Ihr Anteil am Bruttostromverbrauch betrug 42 Prozent.**




* Vorläufige Angaben

Quellen: AGEB
Stand: 12/2019



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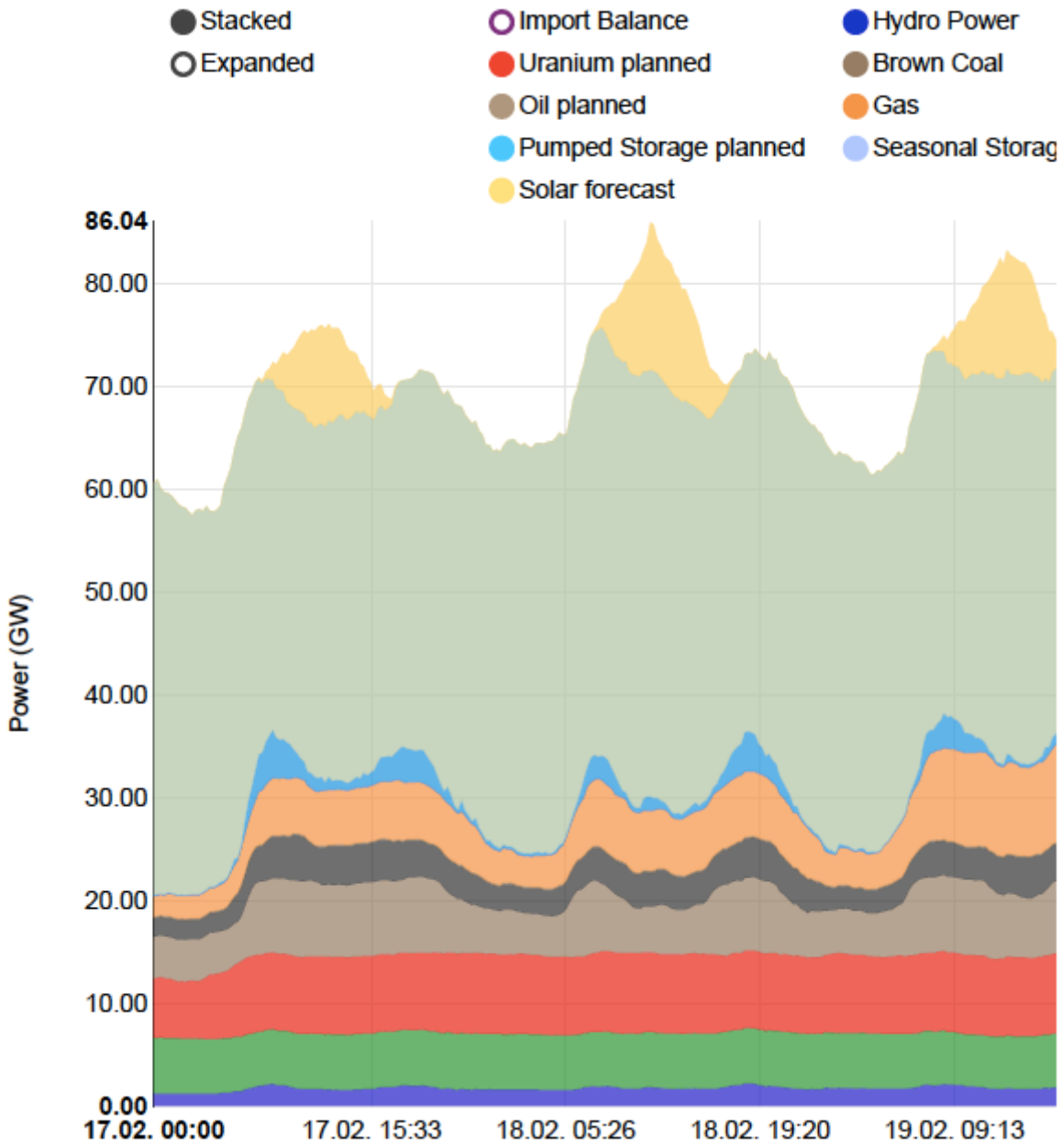
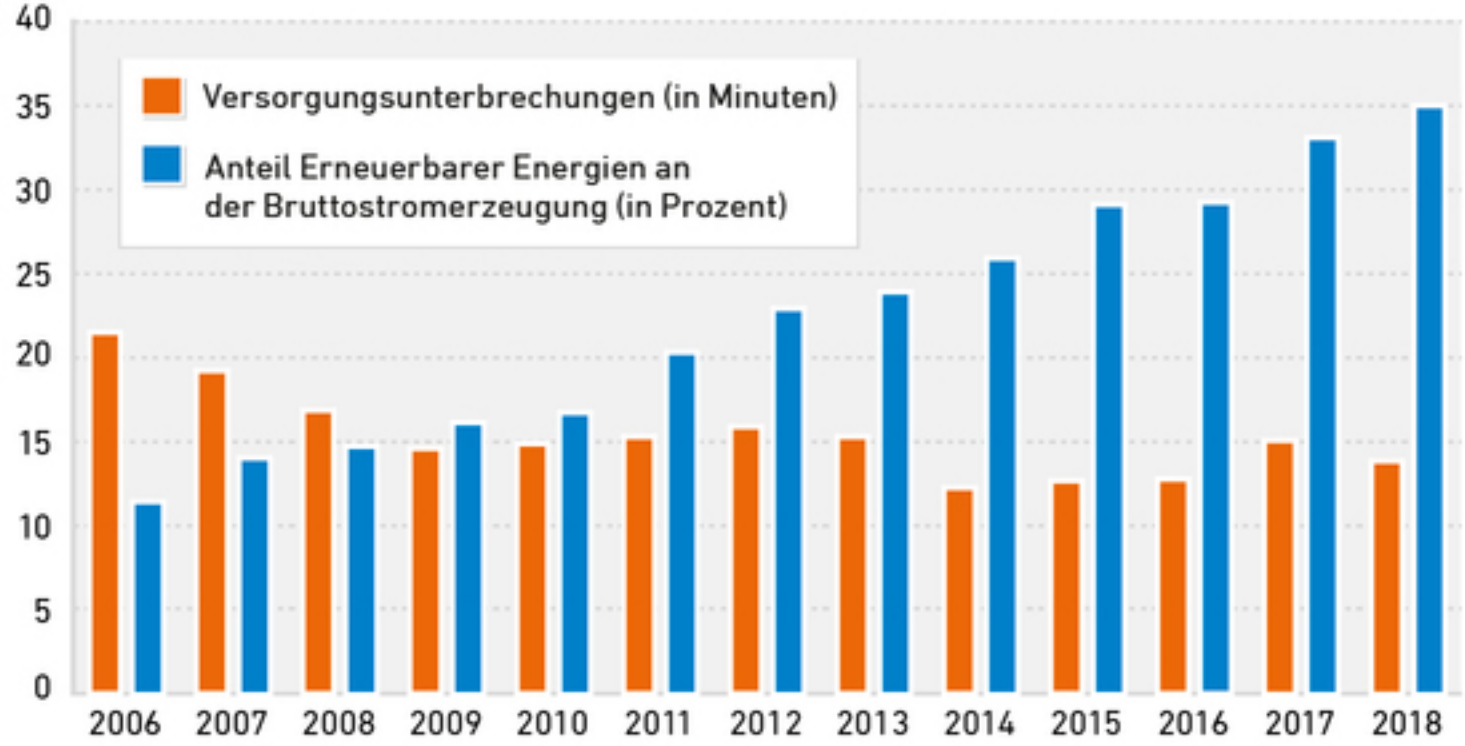



Frauenhofer Energy Charts. February 17-19, 2020.

# Versorgungsunterbrechungen in Deutschland und Anteil Erneuerbarer Energien 2006–2018

**Der wachsende Anteil Erneuerbarer Energien an der Stromerzeugung in Deutschland hat keine negativen Auswirkungen auf die Versorgungssicherheit.**




Quellen: BNetzA, BDEW
Stand: 1/2020



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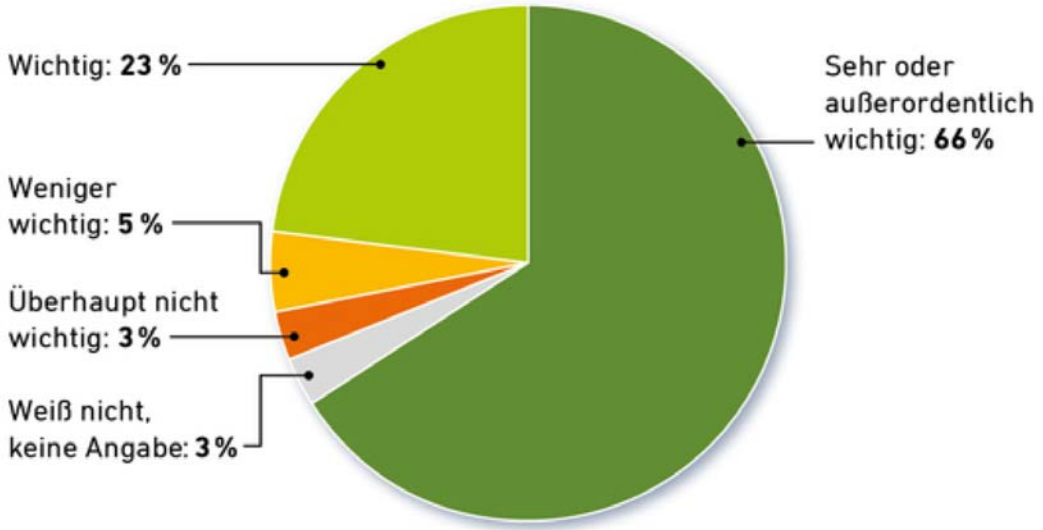
# 89 Prozent der Deutschen unterstützen den Ausbau der Erneuerbaren Energien

**Stärkere Nutzung und Ausbau Erneuerbarer Energien sind ...**




Quelle: Umfrage von YouGov im Auftrag der Agentur für Erneuerbare Energien, n=1003; Stand: 9/2019



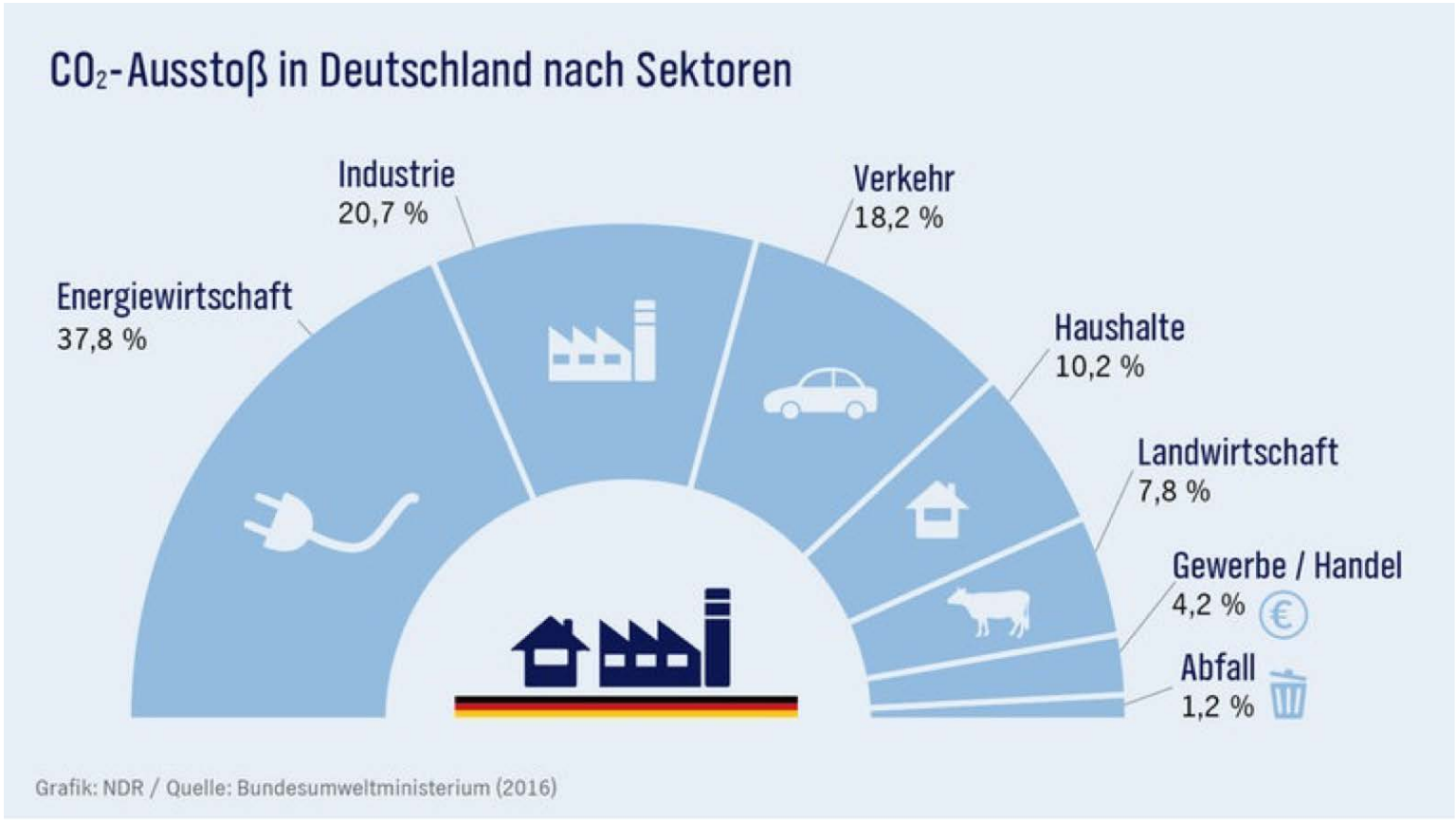
AGENTUR FÜR ERNEUERBARE ENERGIEN
unendlich-viel-energie.de

## German lignite plant exit path

15.01.2020

| Operator | Power plant unit | Coal region | Start of operation | MW capacity | Closure date | Reaching coal commission targets |
|---|---|---|---|---|---|---|
| short term | | | | | | |
| RWE | Nord-Süd-Bahn (NSB) | Rheinland | 1959-1976 | 300 | 31.12.2020 | 15 GW by 31 December 2022 |
| RWE | NSB | Rheinland | | 300 | 31.12.2021 | |
| RWE | NSB | Rheinland | | 300 | 31.12.2021 | |
| RWE | NSB oder Weisweiler | Rheinland | | 300 | 31.12.2021 | |
| RWE | NSB oder Weisweiler | Rheinland | | 300 | 01.04.2022 | |
| RWE | Brikettierung | Rheinland | | 120 | 31.12.2022 | |
| RWE | NSB | Rheinland | | 600 | 31.12.2022 | |
| RWE | NSB | Rheinland | | 600 | 31.12.2022 | |
| by 2030 | | | | | | |
| RWE | Weisweiler F | Rheinland | 1967 | 300 | 01.01.2025 | 8.8 GW by 31 December 2030 |
| LEAG (EPH) | Jänschwalde A | Lausitz (BB) | 1981 | 500 | 31.12.2025 (security standby) | |
| LEAG (EPH) | Jänschwalde B | Lausitz (BB) | 1982 | 500 | 31.12.2027 (security standby) | |
| RWE | Weisweiler G | Rheinland | 1974 | 600 | 01.04.2028 | |
| LEAG (EPH) | Jänschwalde C | Lausitz (BB) | 1984 | 500 | 31.12.2028 | |
| LEAG (EPH) | Jänschwalde D | Lausitz (BB) | 1985 | 500 | 31.12.2028 | |
| RWE | Weisweiler H | Rheinland | 1975 | 600 | 01.04.2029 | |
| LEAG (EPH) | Boxberg N | Lausitz (SN) | 1979 | 500 | 31.12.2029 | |
| LEAG (EPH) | Boxberg P | Lausitz (SN) | 1980 | 500 | 31.12.2029 | |
| RWE | Niederaußem G | Rheinland | 1974 | 600 | 31.12.2029 | |
| RWE | Niederaußem H | Rheinland | 1974 | 600 | 31.12.2029 (security standby) | |
| after 2030 | | | | | | |
| Uniper / EPH | Schkopau A | Mitteldeutschland (ST) | 1996 | 450 | 31.12.2034 | 0 GW by 31 December 2038 |
| Uniper / EPH | Schkopau B | Mitteldeutschland (ST) | 1996 | 450 | 31.12.2034 | |
| LEAG (EPH) | Lippendorf R | Mitteldeutschland (SN) | 2000 | 875 | 31.12.2035 | |
| EnBW | Lippendorf S | Mitteldeutschland (SN) | 1999 | 875 | 31.12.2035 | |
| RWE | Niederaußem K | Rheinland | 2002 | 1000 | 31.12.2038 | |
| RWE | Neurath F | Rheinland | 2012 | 1000 | 31.12.2038 | |
| RWE | Neurath G | Rheinland | 2012 | 1000 | 31.12.2038 | |
| LEAG (EPH) | Schwarze Pumpe A | Lausitz (BB/SN) | 1998 | 750 | 31.12.2038 | |
| LEAG (EPH) | Schwarze Pumpe B | Lausitz (BB/SN) | 1998 | 750 | 31.12.2038 | |
| LEAG (EPH) | Boxberg R | Lausitz (SN) | 2012 | 640 | 31.12.2038 | |
| LEAG (EPH) | Boxberg Q | Lausitz (SN) | 2000 | 860 | 31.12.2038 | |

Graphic: BMWi 2020




https://www.ndr.de/ratgeber/klimawandel/CO2-Ausstoss-in-Deutschland-Sektoren,kohlendioxid146.html