



GERMANY'S ENERGY TRANSITION

A DATA-DRIVEN ANALYSIS OF THE SHIFT FROM
FOSSIL TO RENEWABLE ENERGY

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Why is this topic relevant?

- Germany's "Energiewende" aims for carbon neutrality by 2045
- Energy security → Germany has to reduce dependence on imported fossil fuels
- According to the International Energy Agency (IEA), it's key to Germany's competitiveness

Analysis should show if Germany is on track to meet those goals

Research Question:

How has the share of renewable energy in Germany's electricity mix evolved in the years from 2020 to 2025, and which renewable energy source had the biggest impact?



DTATA AND METHODOLOGY

Datasets:

- **Smard (Federal Network Agency)**
- **Eurostat**
- **IEA**
- **Agora Energiewende**
- **Statistical federal agency (Statistisches Bundesamt)**

Variables:

- **Energy generation by source**
- **Energy share of renewable vs. fossil**
- **Imports/exports**

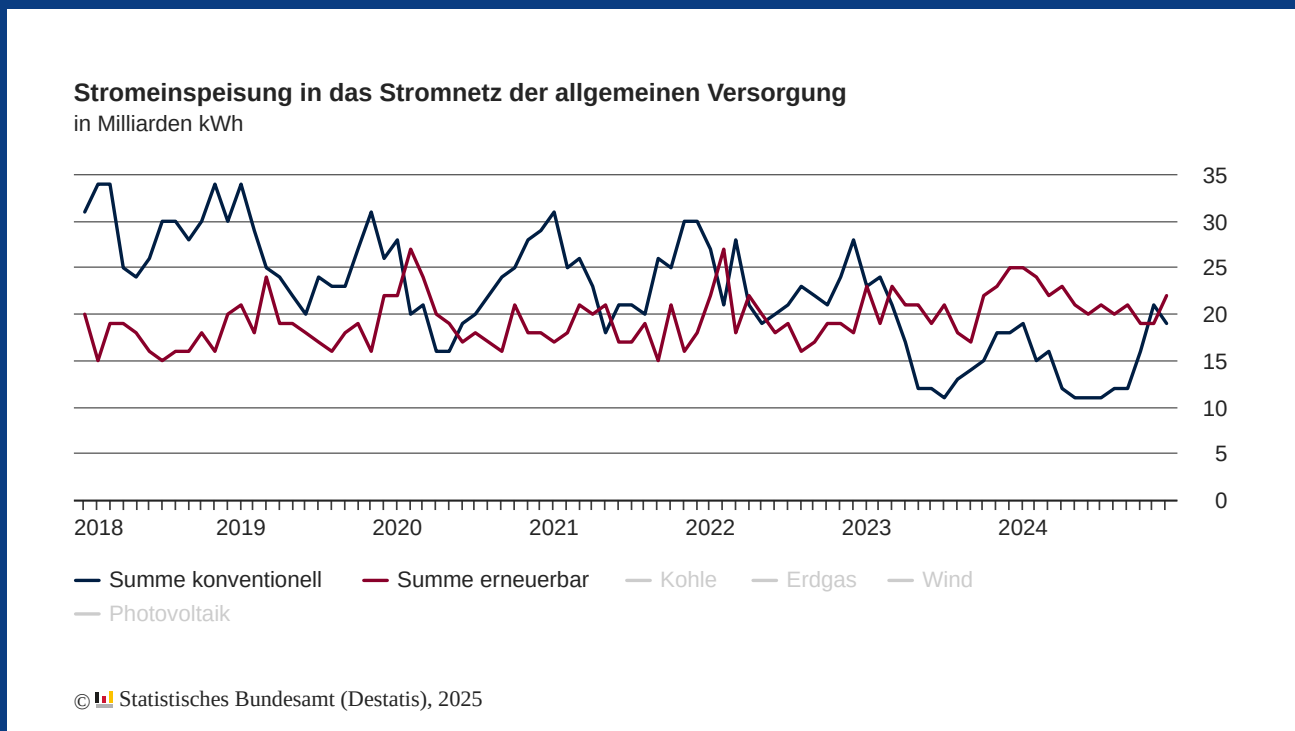
Tools:

- **R for data visualization and cleaning**
- **Quarto for publishing**
- **GitHub for sharing**



FINDINGS

```
data <- read.csv("C:/Users/frede/Downloads/Realisierte_Erzeugung_202001010000_202511020000_Jahr (2).csv",  
                sep = ";",  
                dec = ".",  
                header = TRUE,  
                stringsAsFactors = FALSE)
```



Line chart- fossil vs renewable share 2018-2024
Source: https://www.destatis.de/DE/Presse/Pressemitteilungen/2025/03/PD25_091_43312.html

	Datum.von	Datum.bis	Biomasse..MWh..Berechnete.Auflösungen	Wasserkraft..MWh..Berechnete.A
1	01.01.2020	01.01.2021	39.966.301,25	15.945.659,50
2	01.01.2021	01.01.2022	38.235.128,00	14.888.434,25
3	01.01.2022	01.01.2023	37.738.237,75	12.804.450,00
4	01.01.2023	01.01.2024	37.295.318,00	15.019.800,25
5	01.01.2024	01.01.2025	36.197.008,25	17.551.916,00
6	01.01.2025	01.01.2026	-	-

Table of all renewable energy sources in Germany from 2020-2025
Source: <https://www.smard.de/home/downloadcenter/download-marktdaten/>





CHALLENGES AND ISSUES

Technical aspects:

- R coding
- Quarto publishing

Data quality:

- Missing values and inconsistent data of the year 2025 or previous ones
- Difficult to read
- Massive data packages

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Datum von	Datum bis	Biomasse [M]	Wasserkraft	Wind Offshor	Wind Onshor	Photovoltaik	Sonstige Erne	Kernenergie	Braunkohle	Steinkohle	Erdgas [MWh]	Pumpspeiche	Sonstige Konventionelle [MWh]	Berechnete	Auflösungen		
2	01.01.2020	01.01.2021	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####			
3	01.01.2021	01.01.2022	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####			
4	01.01.2022	01.01.2023	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####			
5	01.01.2023	01.01.2024	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####			
6	01.01.2024	01.01.2025	#####	#####	#####	#####	#####	#####	-	#####	#####	#####	#####	#####	#####			
7	01.01.2025	01.01.2026	-	-	-	-	-	-	-	-	-	-	-	-	-			
8																		
9																		
10																		



Outlook

Next steps:

- Import data into R
- Visualization of the table
- Comparison and integration of the data
- Completion of report
- Research for import and export data

Sources

Folie 1: <https://www.bundeswirtschaftsministerium.de/Redaktion/EN/Pressemitteilungen/2025/04/20250328-international-energy-agency-recommends-germany-to-use-energy-transition-as-a-driver-of-energy-security-and-economic-competitiveness.html>

Folie 3 Chart: https://www.destatis.de/DE/Presse/Pressemitteilungen/2025/03/PD25_091_43312.html

Folie 3 Table: <https://www.smard.de/home/downloadcenter/download-marktdaten/>



THANK YOU

