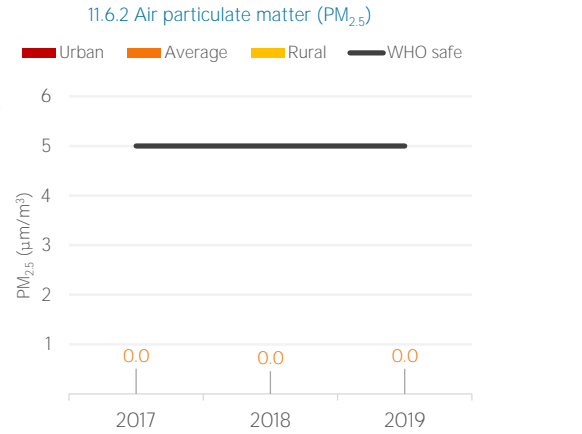
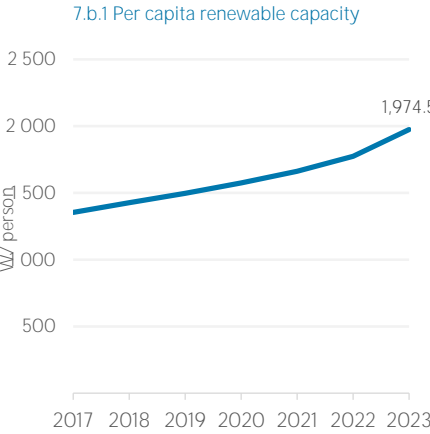
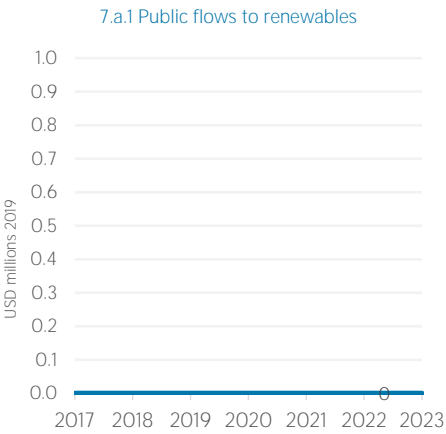
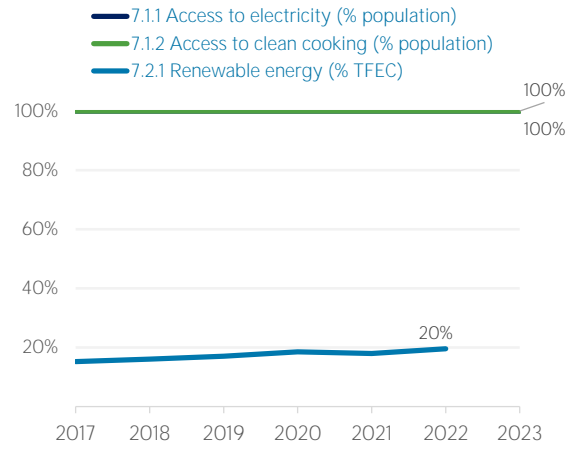
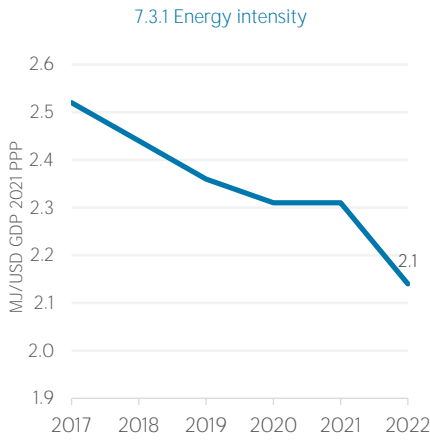
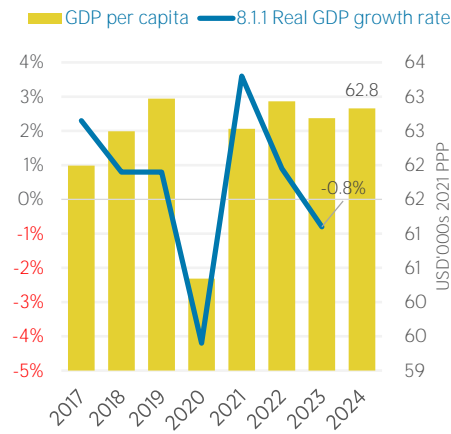


COUNTRY INDICATORS AND SDGS



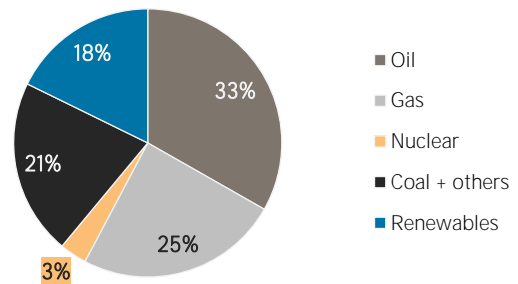
TOTAL ENERGY SUPPLY (TES)

Total Energy Supply (TES)	2017	2022
Non-renewable (TJ)	11 339 464	9 378 078
Renewable (TJ)	1 694 656	2 023 408
Total (TJ)	13 034 120	11 401 486
Renewable share (%)	13	18

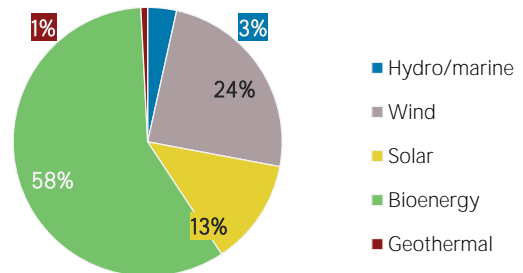
Growth in TES	2017-22	2021-22
Non-renewable (%)	-17.3	-8.0
Renewable (%)	+19.4	+5.4
Total (%)	-12.5	-5.9

Primary energy trade	2017	2022
Imports (TJ)	11 236 562	9 776 724
Exports (TJ)	2 547 711	1 628 430
Net trade (TJ)	-8 688 851	-8 148 294
Imports (% of supply)	86	86
Exports (% of production)	53	40
Energy self-sufficiency (%)	37	36

Total energy supply in 2022

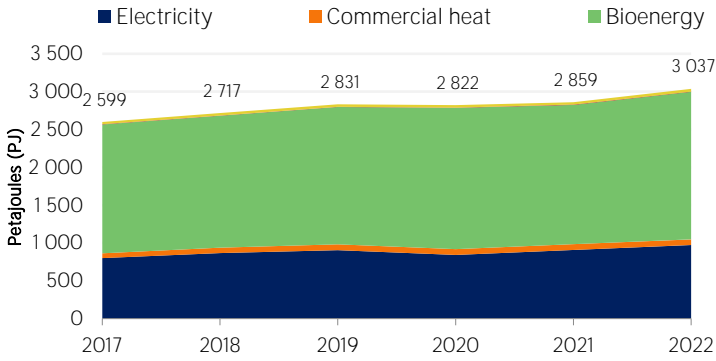


Renewable energy supply in 2022



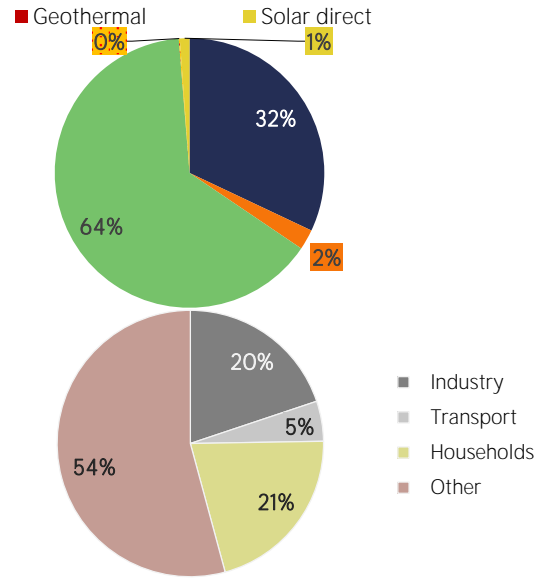
# RENEWABLE ENERGY CONSUMPTION (TFEC)

### Renewable TFEC trend



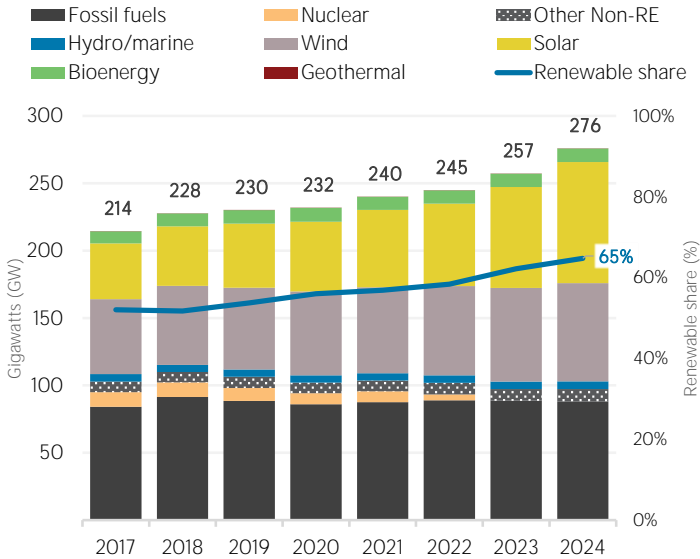
Consumption by sector	2017	2022
Industry (TJ)	498 180	603 235
Transport (TJ)	127 178	147 825
Households (TJ)	506 871	639 522
Other (TJ)	1 466 488	1 646 146

### Renewable energy consumption in 2022

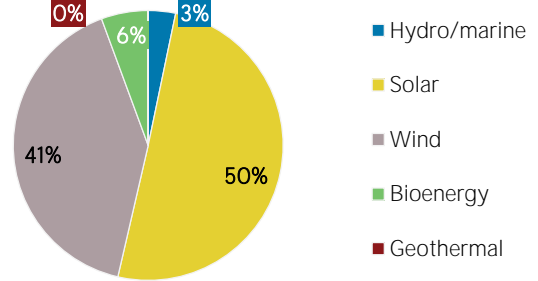


# ELECTRICITY CAPACITY

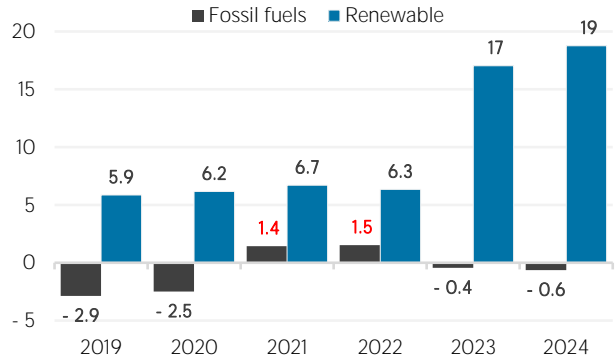
### Installed capacity trend



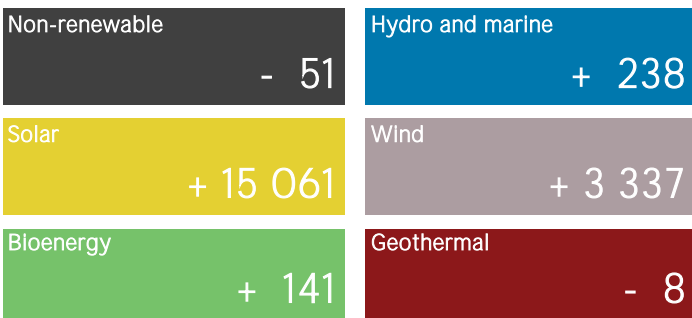
### Renewable capacity in 2024



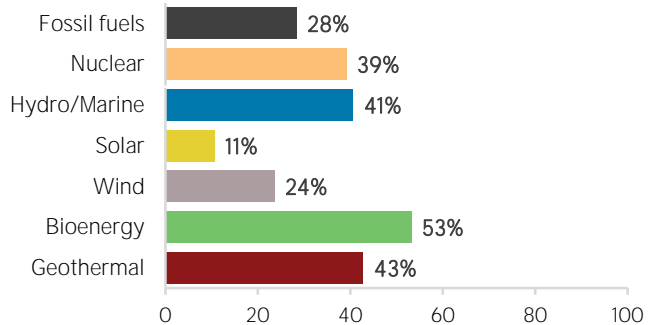
### Net capacity change (GW)



### Net capacity change in 2024 (MW)



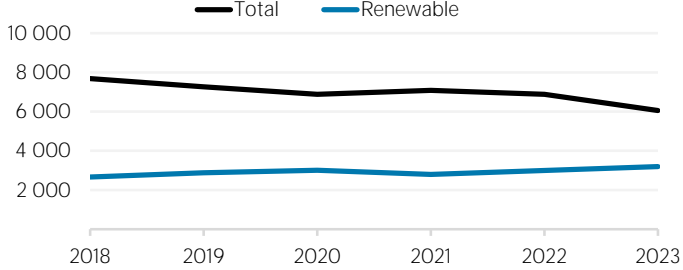
### Capacity utilisation in 2023 (%)



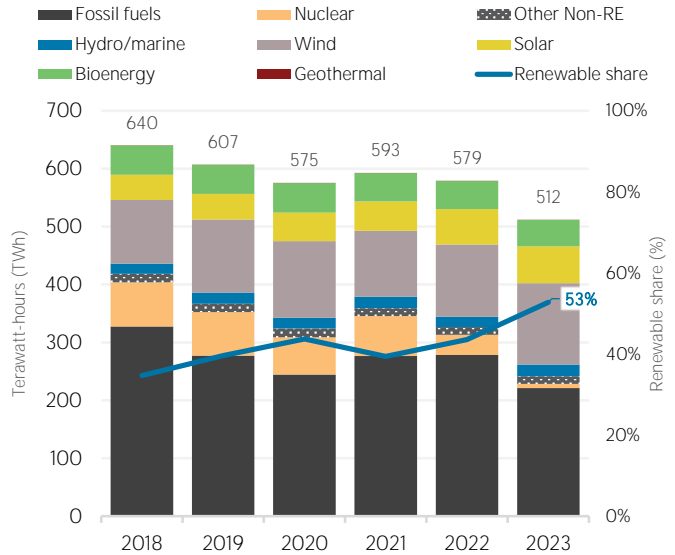
## ELECTRICITY GENERATION

Generation in 2023	GWh	%
<b>Non-renewable</b>	<b>241 771</b>	<b>47</b>
<b>Renewable</b>	<b>270 110</b>	<b>53</b>
Hydro and marine	19 894	4
Solar	63 576	12
Wind	140 538	27
Bioenergy	45 907	9
Geothermal	195	0
<b>Total</b>	<b>511 881</b>	<b>100</b>

Per capita electricity generation (kWh)



Electricity generation trend

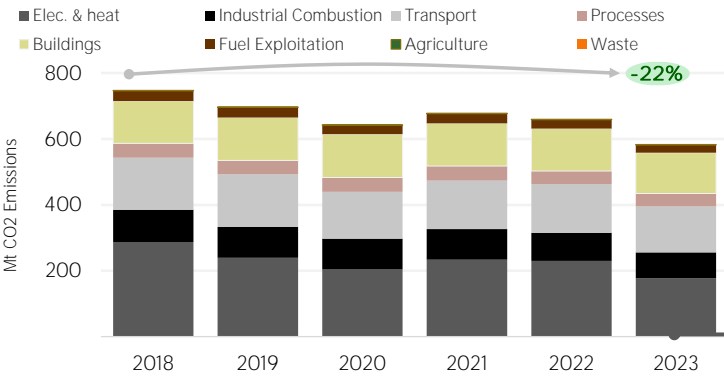


## LATEST POLICIES, PROGRAMMES AND LEGISLATION

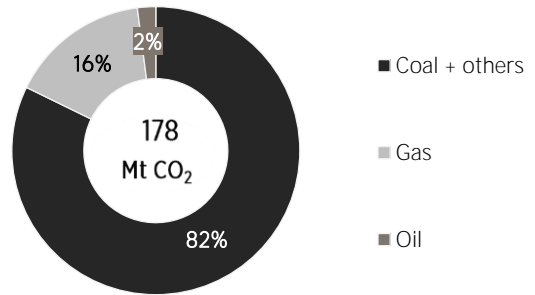
- 1 2024 Amendment of the Renewable Energy Sources Act (Solar Package I) 2024
- 2 Carbon contracts for difference scheme 2024
- 3 Germany Raw Materials Fund 2024
- 4 Germany's Special Climate and Transformation Fund 2024
- 5 Germany's Special Climate and Transformation Fund - CO<sub>2</sub> avoidance and use in basic industries 2024

## ENERGY AND EMISSIONS

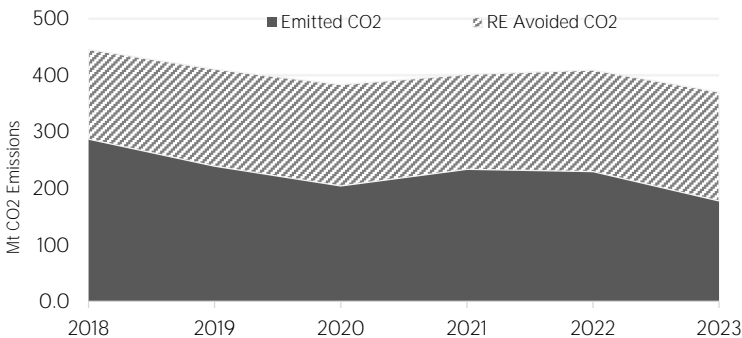
CO<sub>2</sub> emissions by sector



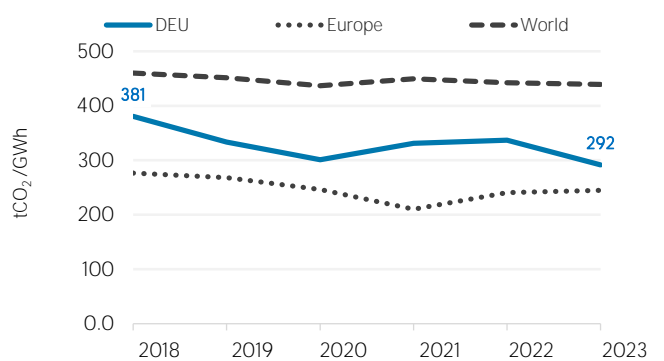
Elec. & heat generation CO<sub>2</sub> emissions in



Avoided emissions from renewable elec. & heat



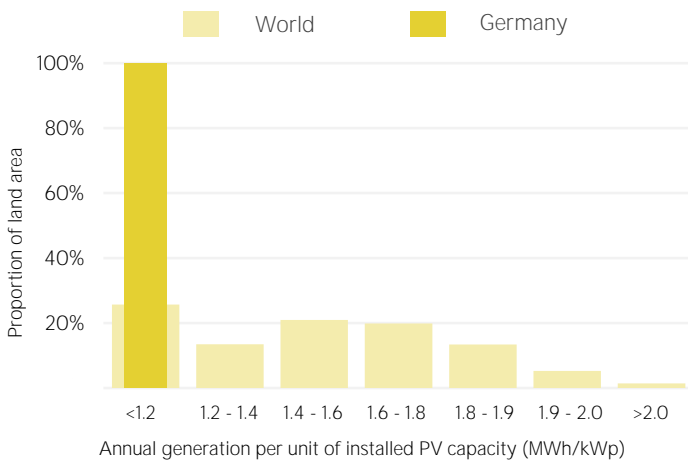
CO<sub>2</sub> emission factor for elec. & heat generation



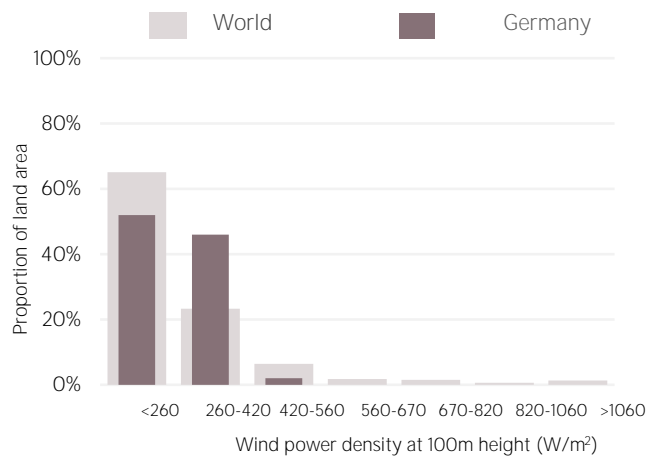
Avoided emissions based on fossil fuel mix used for power

Calculated by dividing power sector emissions by elec. + heat gen.

Distribution of solar potential



Distribution of wind potential



Biomass potential: net primary production



Indicators of renewable resource potential

**Solar PV:** Solar resource potential has been divided into seven classes, each representing a range of annual PV output per unit of capacity (kWh/kWp/yr). The bar chart shows the proportion of a country's land area in each of these classes and the global distribution of land area across the classes (for comparison).

**Onshore wind:** Potential wind power density (W/m<sup>2</sup>) is shown in the seven classes used by NREL, measured at a height of 100m. The bar chart shows the distribution of the country's land area in each of these classes compared to the global distribution of wind resources. Areas in the third class or above are considered to be a good wind resource.

**Biomass:** Net primary production (NPP) is the amount of carbon fixed by plants and accumulated as biomass each year. It is a basic measure of biomass productivity. The chart shows the average NPP in the country (tC/ha/yr), compared to the global average NPP of 3-4 tonnes of carbon

**Sources:** IRENA statistics, plus data from the following sources: UN SDG Database (original sources: WHO: World Bank: IEA: IRENA: and UNSD): UN World Population Prospects: UNSD Energy Balances: UN COMTRADE: World Bank World Development Indicators: EDGAR: REN21 Global Status Report: IEA-IRENA Joint Policies and Measures Database: IRENA Global Atlas: and World Bank Global Solar Atlas and Global Wind Atlas.

**Additional notes:** Capacity per capita and public investments SDGs only apply to developing areas. Energy self-sufficiency has been defined as total primary energy production divided by total primary energy supply. Energy trade includes all commodities in Chapter 27 of the Harmonised System (HS). Capacity utilisation is calculated as annual generation divided by year-end capacity x 8,760h/year. Avoided emissions from renewable power is calculated as renewable generation divided by fossil fuel generation multiplied by reported emissions from the power sector. This assumes that, if renewable power did not exist, fossil fuels would be used in its place to generate the same amount of power and using the same mix of fossil fuels. In countries and years where no fossil fuel generation occurs, an average fossil fuel emission factor has been used to calculate the avoided emissions.

These profiles have been produced to provide an overview of developments in renewable energy in different countries and areas. The IRENA statistics team would welcome comments and feedback on its structure and content, which can be sent to [statistics@irena.org](mailto:statistics@irena.org).

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