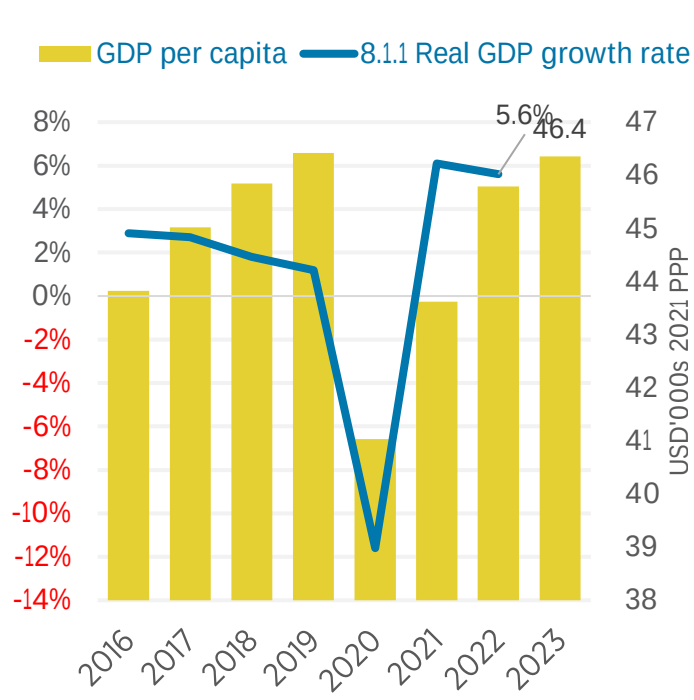
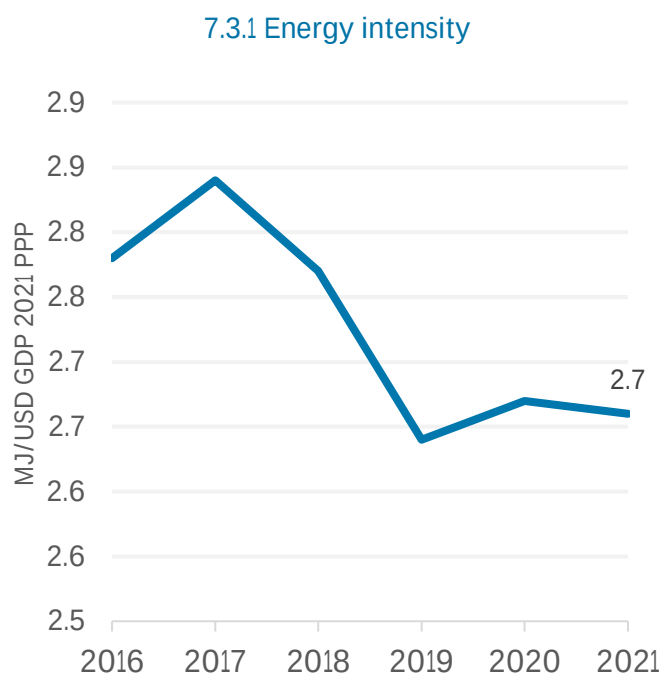
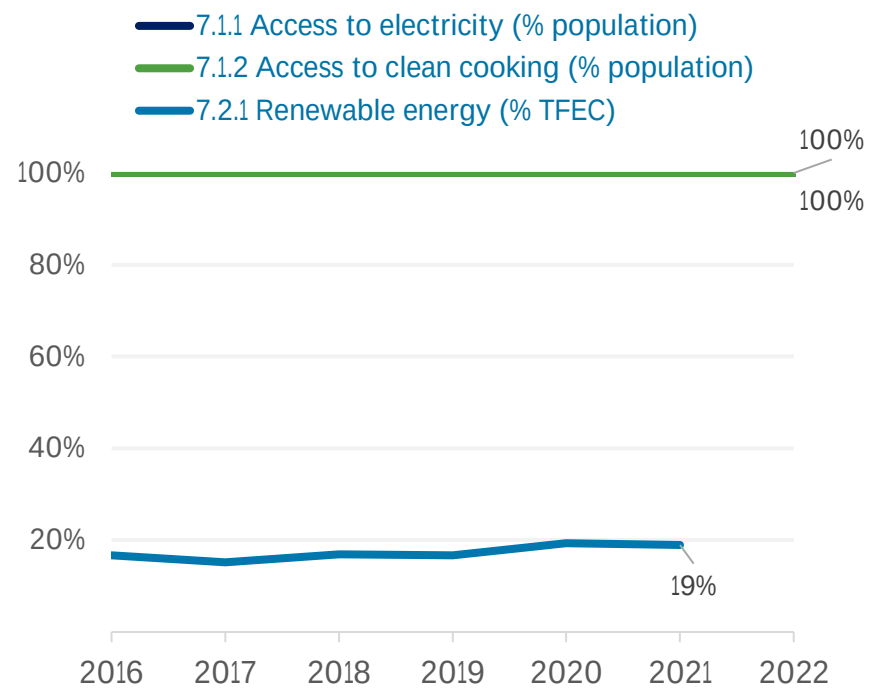
ENERGY PROFILE

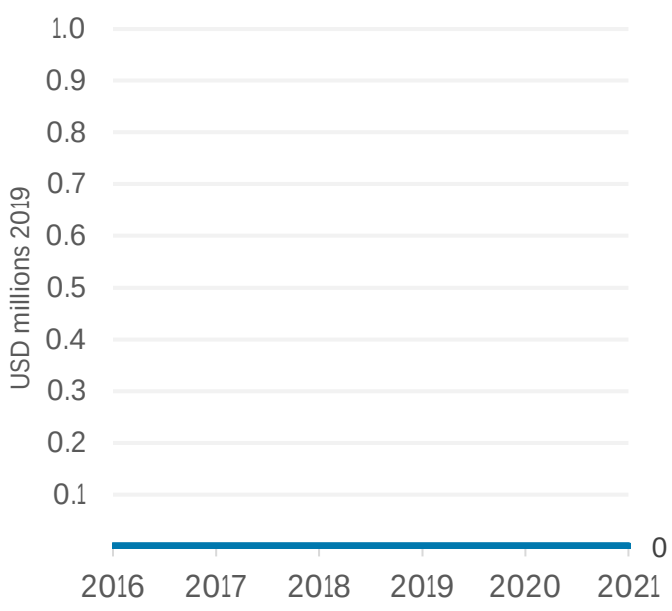
Spain

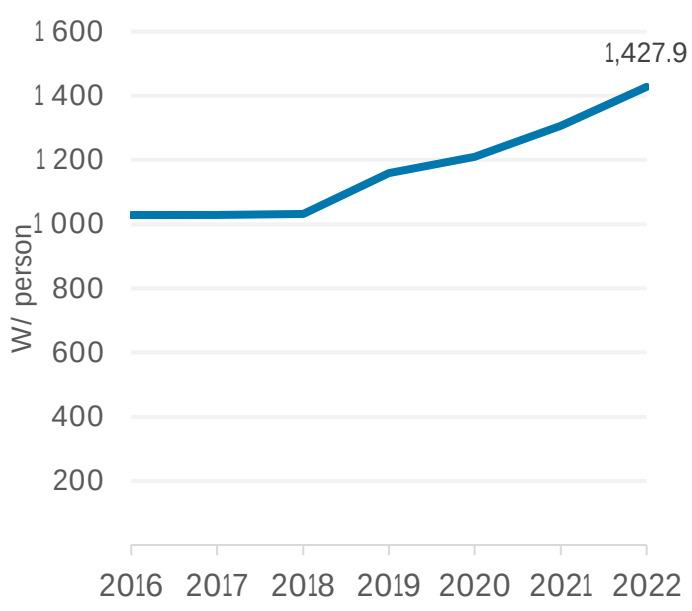
COUNTRY INDICATORS AND SDGS

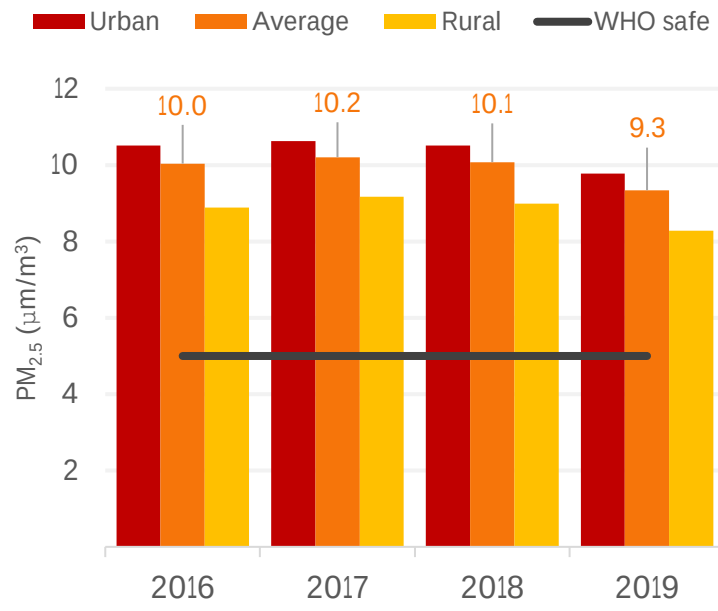












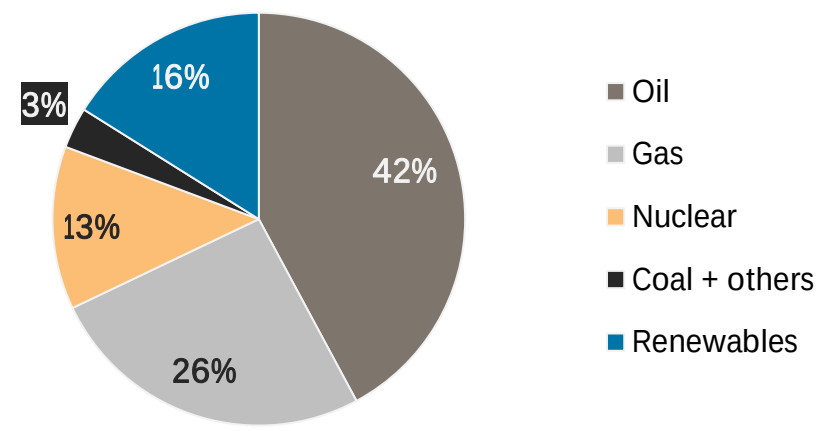
TOTAL ENERGY SUPPLY (TES)

Total Energy Supply (TES)	2016	2021
Non-renewable (TJ)	4 231 986	4 010 321
Renewable (TJ)	648 463	769 077
Total (TJ)	4 880 449	4 779 397
Renewable share (%)	13	16

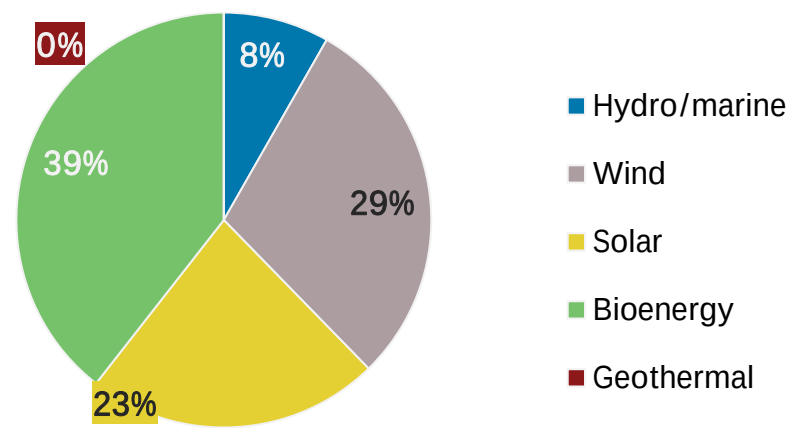
Growth in TES	2016-21	2020-21
Non-renewable (%)	-5.2	+5.7
Renewable (%)	+18.6	-0.9
Total (%)	-2.1	+4.6

Primary energy trade	2016	2021
Imports (TJ)	5 228 341	4 858 359
Exports (TJ)	1 292 030	1 227 285
Net trade (TJ)	-3 936 311	-3 631 074
Imports (% of supply)	107	102
Exports (% of production)	97	86
Energy self-sufficiency (%)	27	30

Total energy supply in 2021

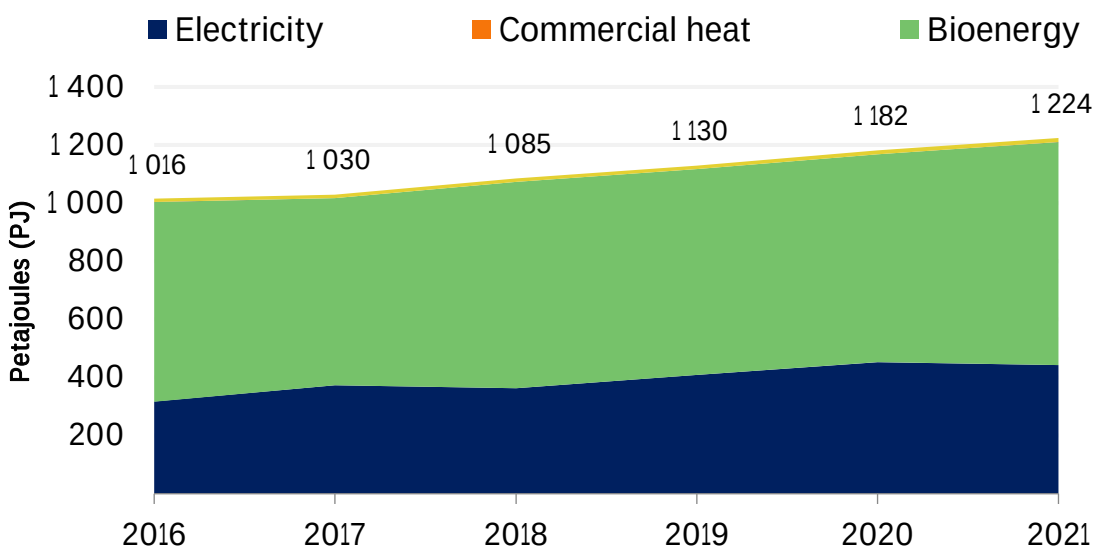


Renewable energy supply in 2021



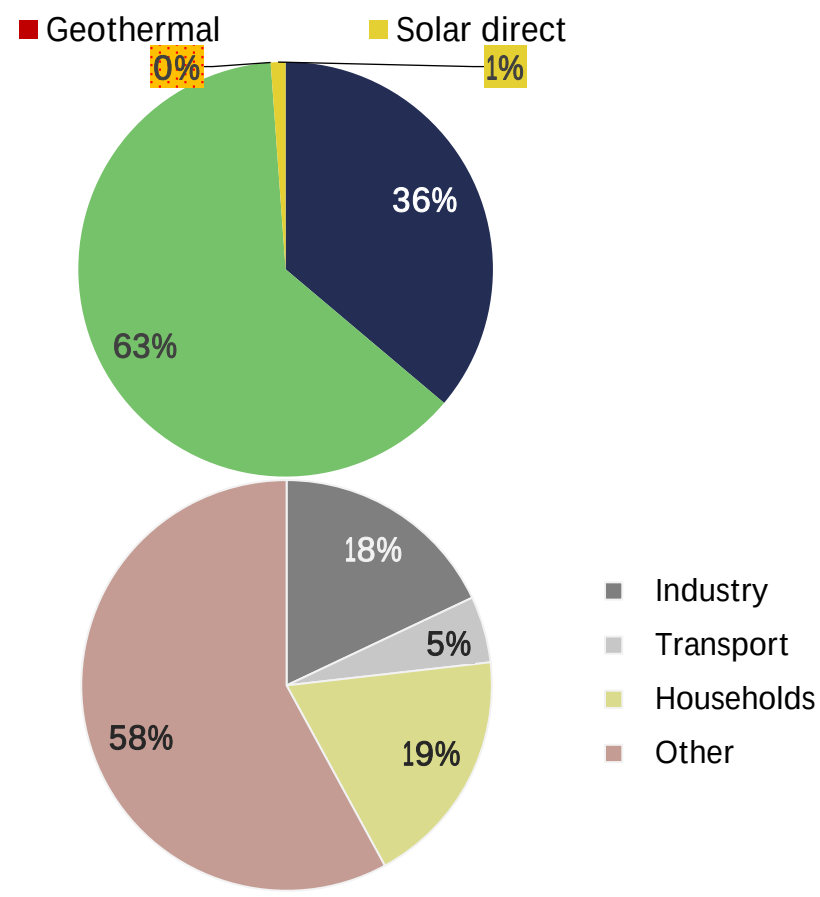
RENEWABLE ENERGY CONSUMPTION (TFEC)

Renewable TFEC trend



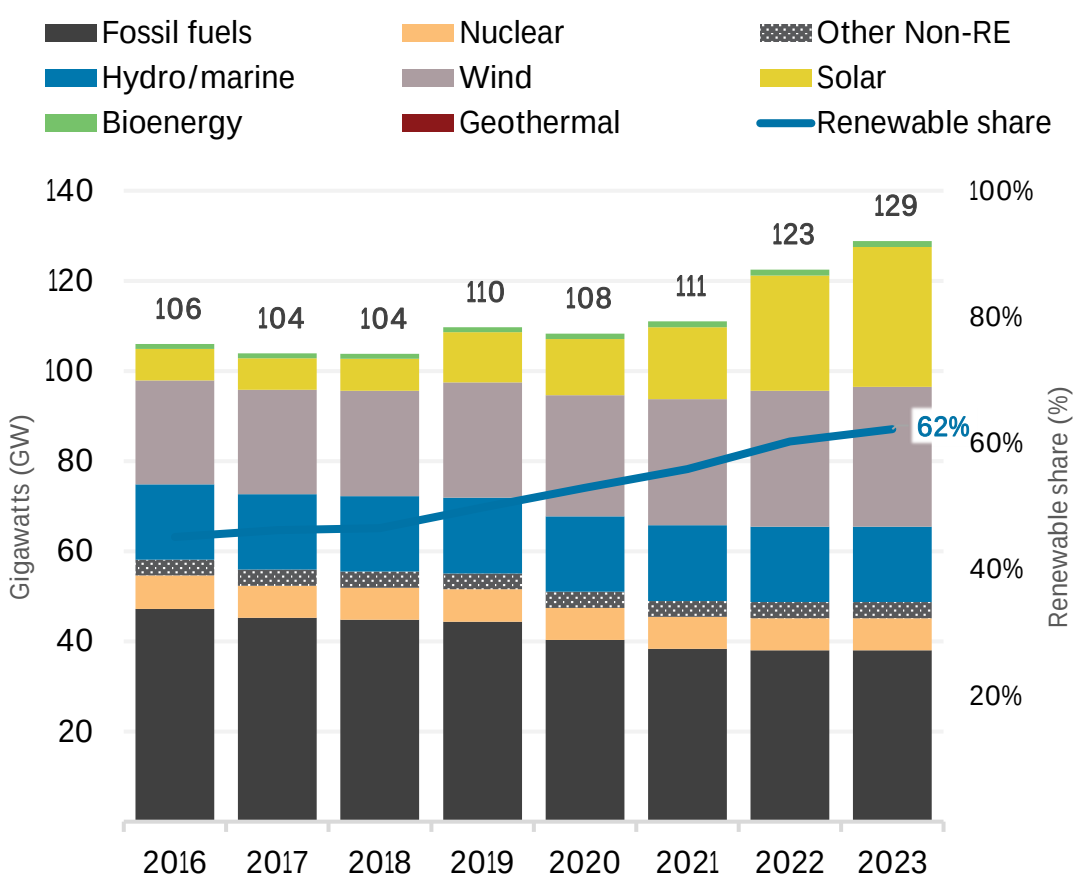
Consumption by sector	2016	2021
Industry (TJ)	164 104	220 080
Transport (TJ)	50 889	63 999
Households (TJ)	210 947	230 881
Other (TJ)	589 634	709 487

Renewable energy consumption in 2021

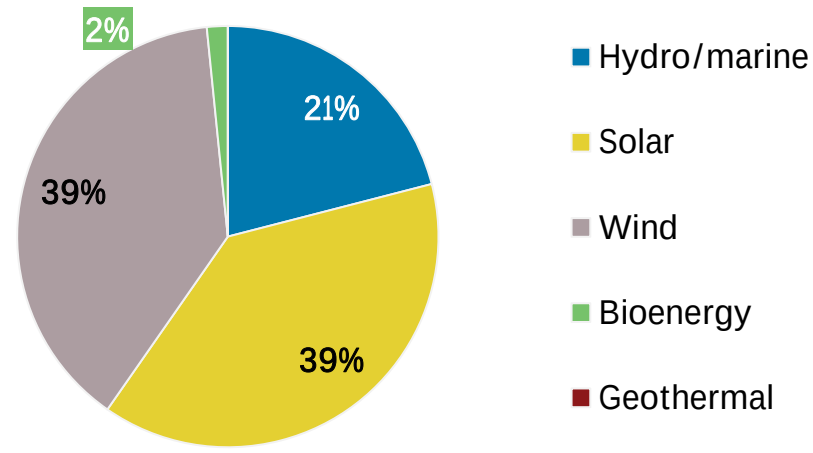


ELECTRICITY CAPACITY

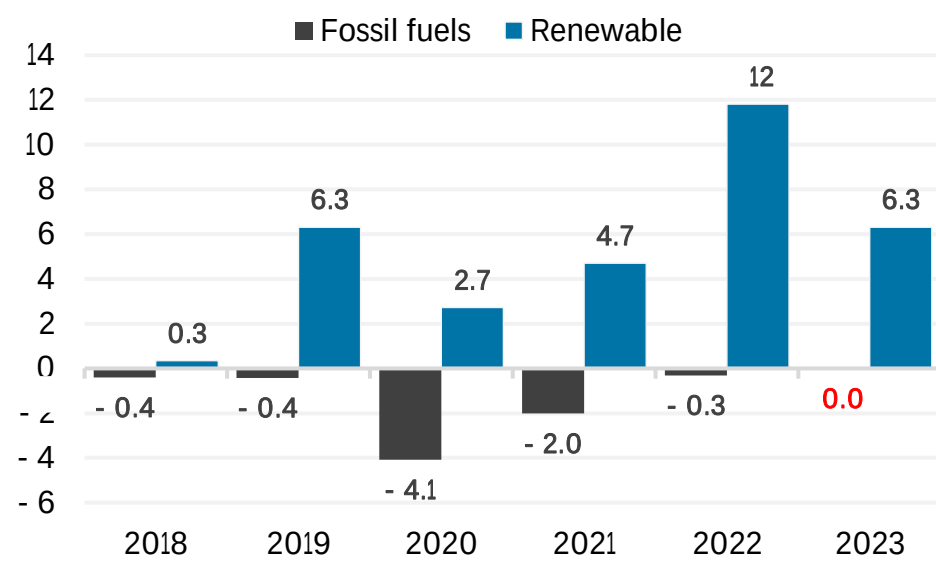
Installed capacity trend



Renewable capacity in 2023



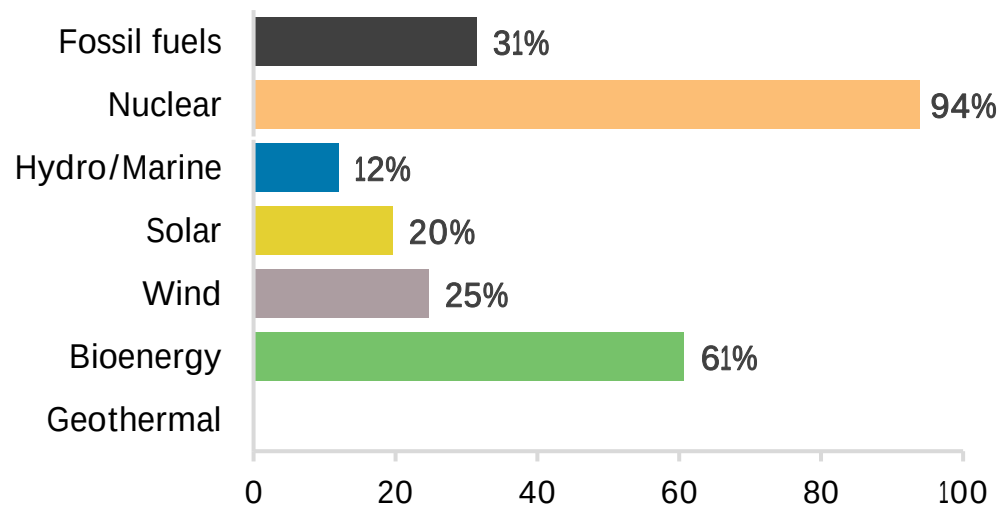
Net capacity change (GW)



Net capacity change in 2023 (MW)

Non-renewable	- 7
Hydro and marine	+ 3
Solar	+ 5 401
Wind	+ 914
Bioenergy	0
Geothermal	0

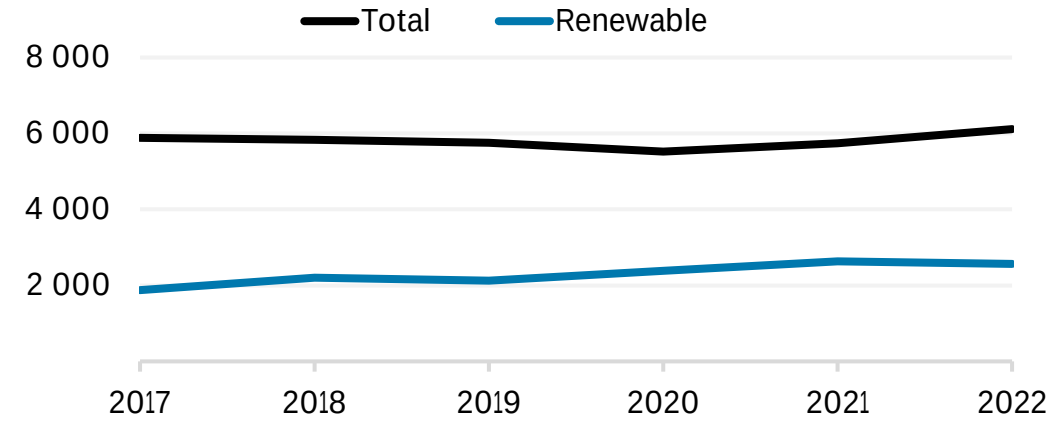
Capacity utilisation in 2022 (%)



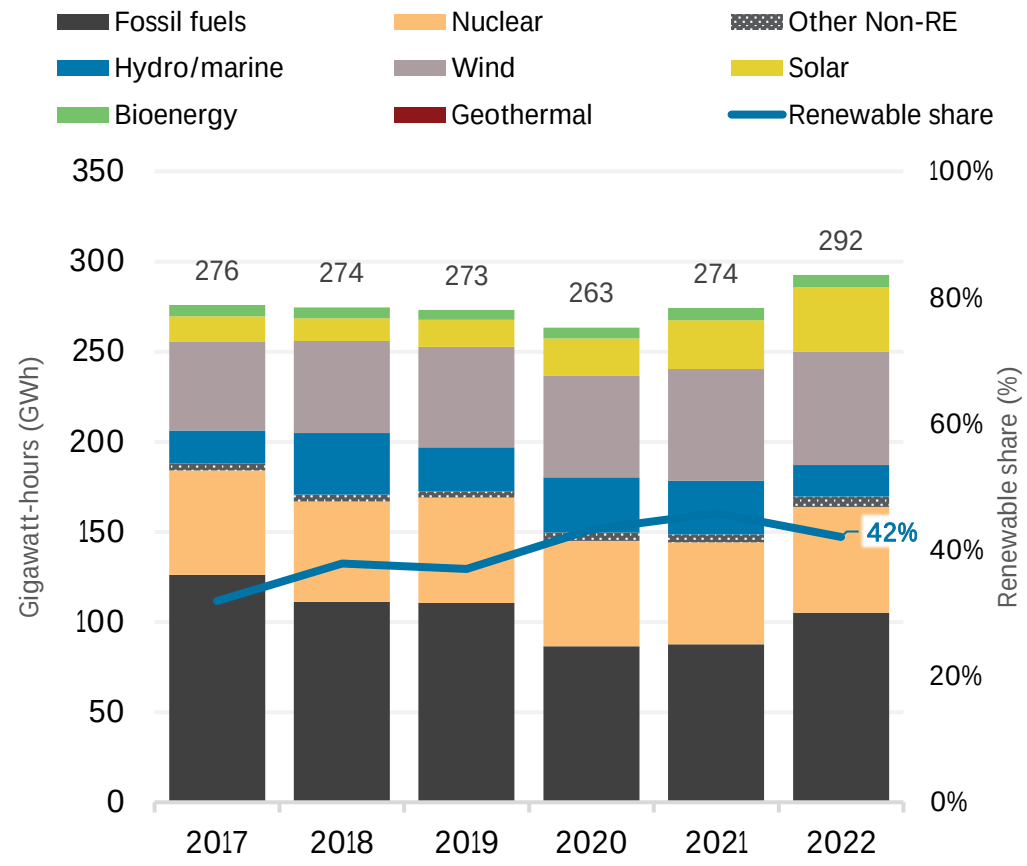
ELECTRICITY GENERATION

Generation in 2022	GWh	%
Non-renewable	**169 536**	**58**
Renewable	**122 960**	**42**
Hydro and marine	17 613	6
Solar	35 764	12
Wind	62 784	21
Bioenergy	6 799	2
Geothermal	0	0
Total	**292 495**	**100**

Per capita electricity generation (kWh)



Electricity generation trend

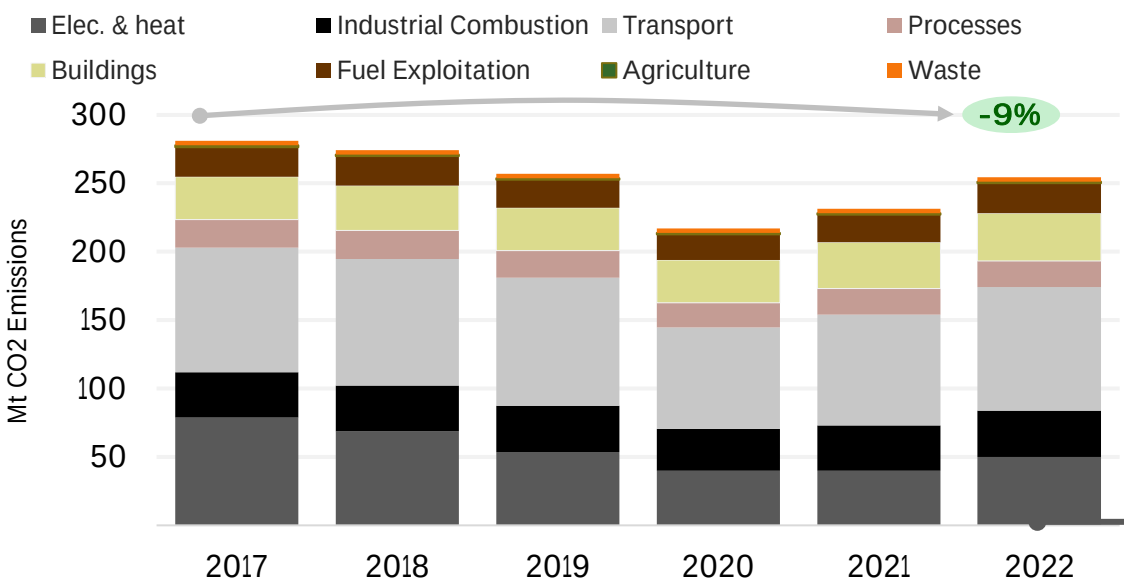


LATEST POLICIES, PROGRAMMES AND LEGISLATION

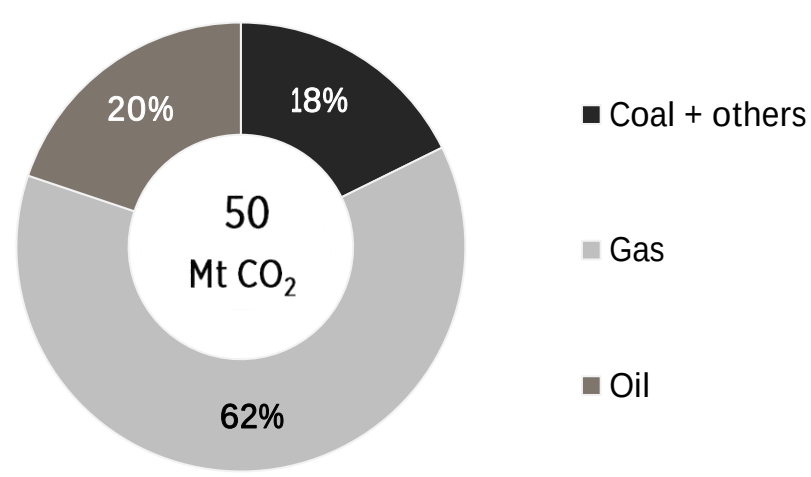
1	2023 price crisis response policies	2023
2	Temporary tax on financial institutions and electricity, gas and oil companies	2023
3	"More Energy Security" Plan	2022
4	2026 Electricity Grid Development Plan	2022
5	Aid for municipal infrastructure for Just Transition	2022

ENERGY AND EMISSIONS

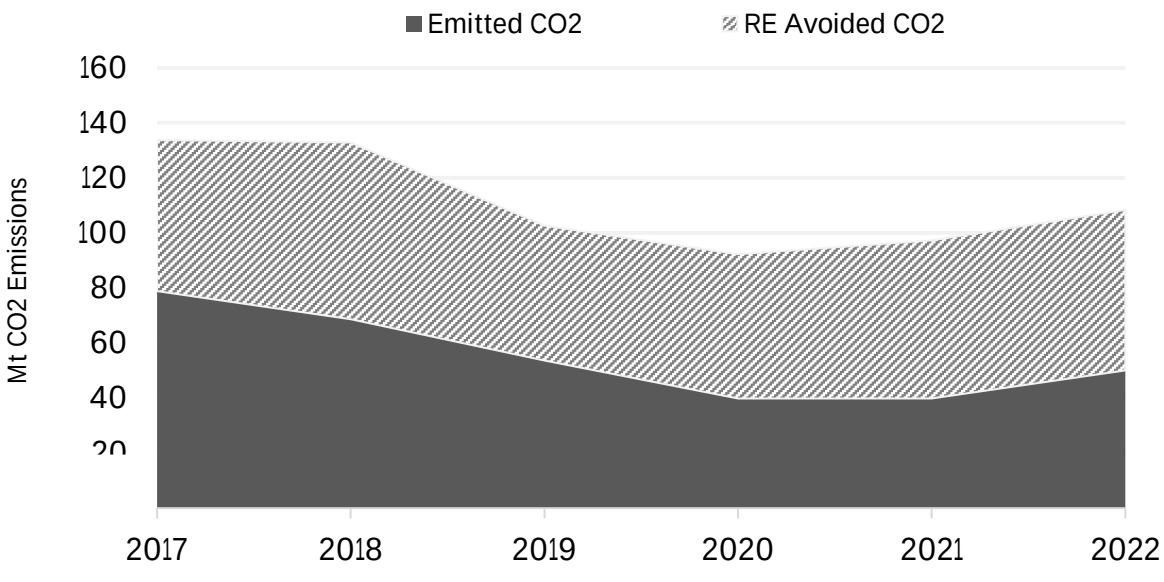
CO_2 emissions by sector



Elec. & heat generation CO_2 emissions in

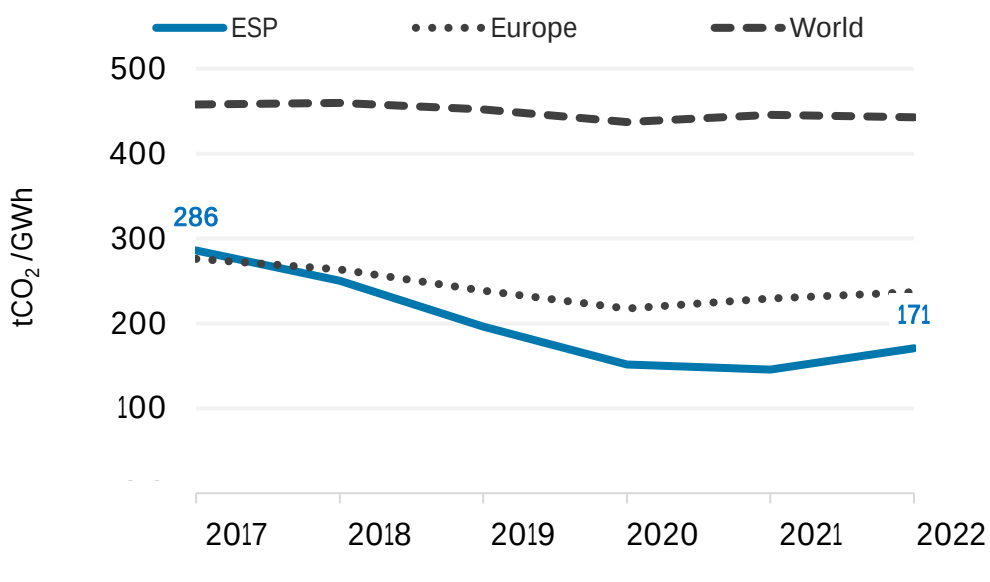


Avoided emissions from renewable elec. & heat



Avoided emissions based on fossil fuel mix used for power

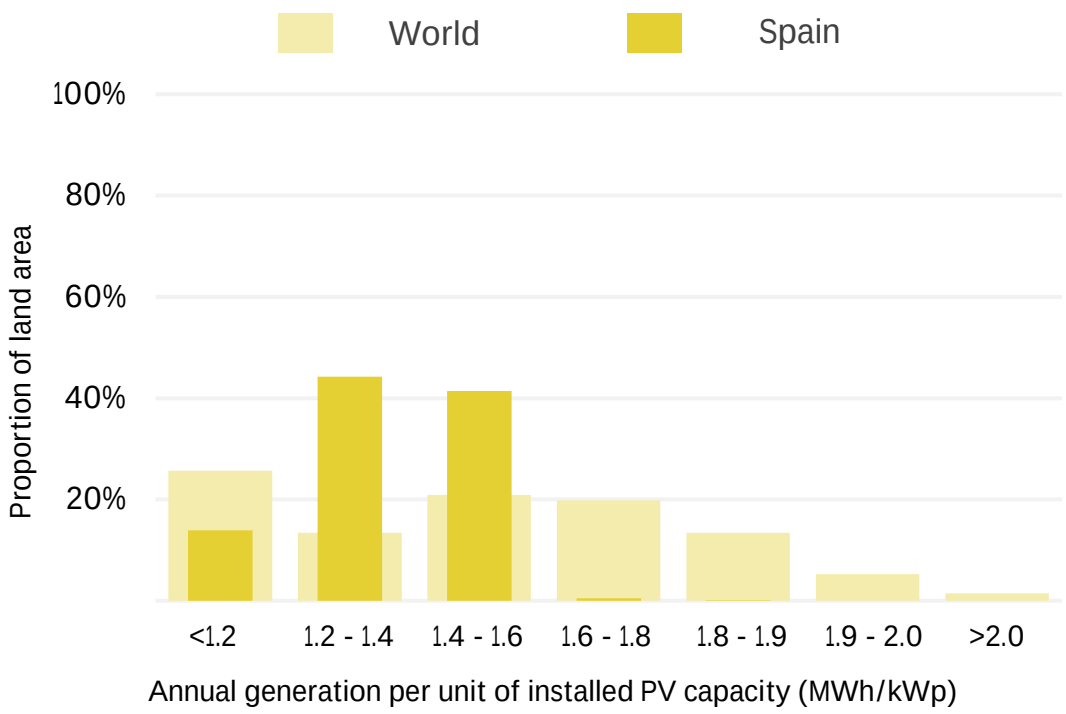
CO_2 emission factor for elec. & heat generation



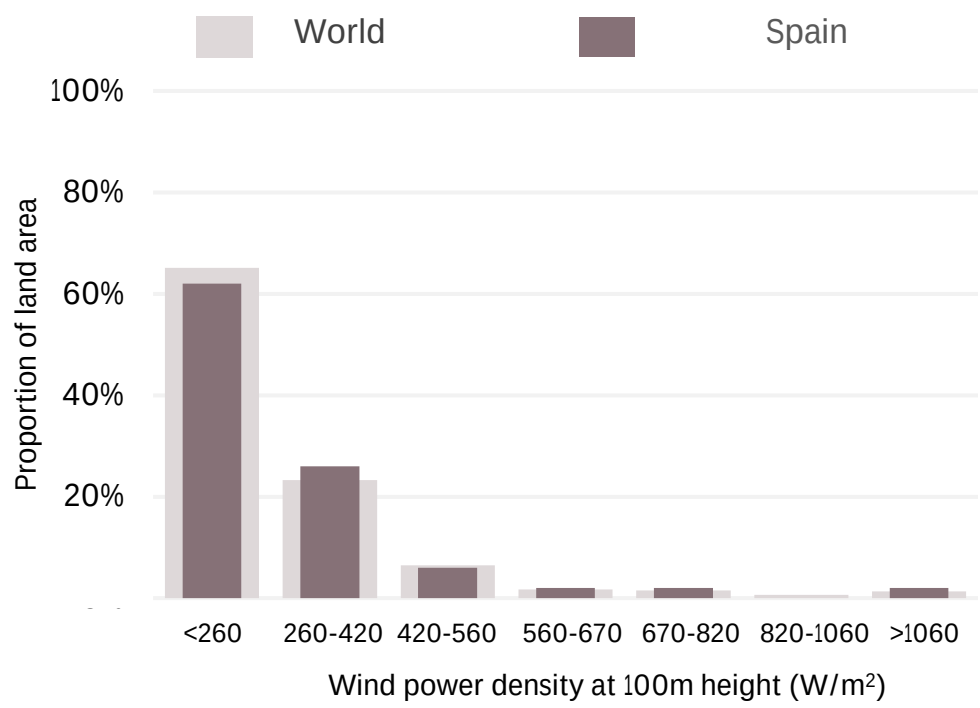
Calculated by dividing power sector emissions by elec. + heat gen.

RENEWABLE RESOURCE POTENTIAL

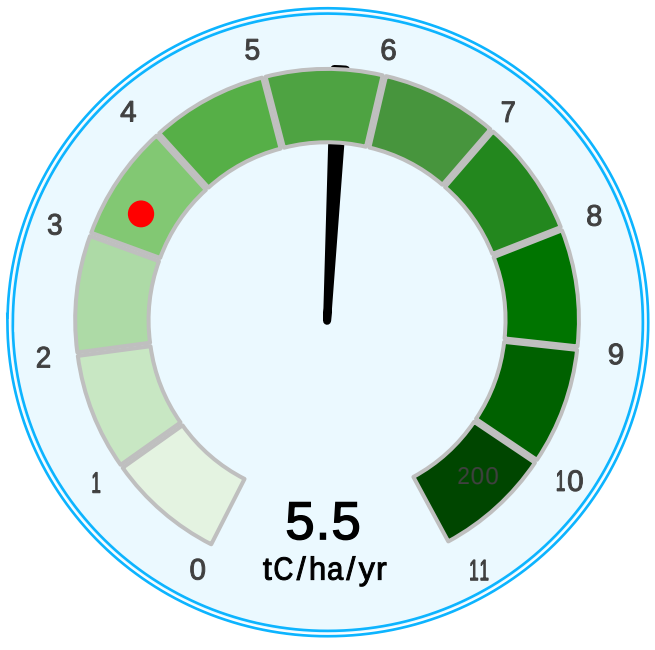
Distribution of solar potential



Distribution of wind potential



Biomass potential: net primary production



● = Global average of 3-4 tC/ha/yr

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/m²) 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

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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.

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