Ghana

IRENA — International Renewable Energy Agency

COUNTRY INDICATORS AND SDGS

GDP per capita ▪ / 8.1.1 Real GDP growth rate —

7.3.1 Energy intensity

7.1.1 Access to electricity (% population) —
7.1.2 Access to clean cooking (% population) —
7.2.1 Renewable energy (% TFEC) —

7.a.1 Public flows to renewables

7.b.1 Per capita renewable capacity

11.6.2 Air particulate matter (PM$_{2.5}$)
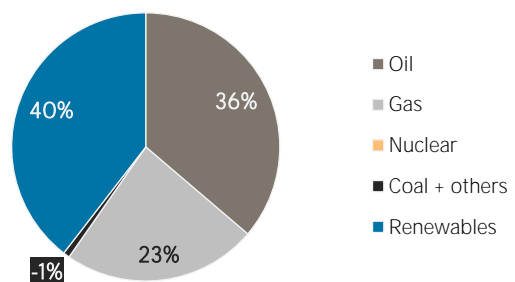Urban ▪ Average ▪ Rural ▪ WHO safe —
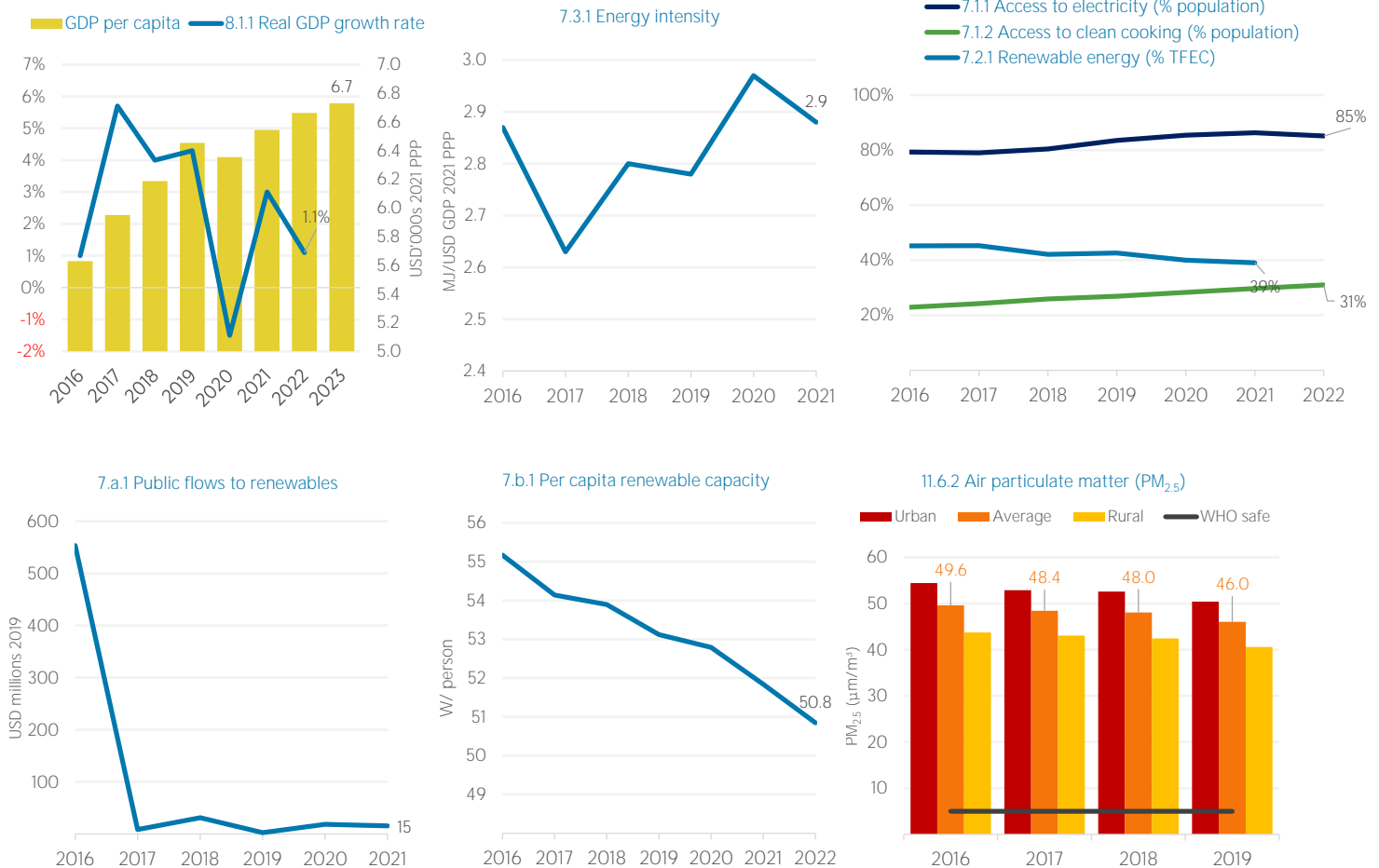
TOTAL ENERGY SUPPLY (TES)

Total Energy Supply (TES)	2016	2021
Non-renewable (TJ)	204 428	301 912
Renewable (TJ)	172 901	202 562
Total (TJ)	377 329	504 474
Renewable share (%)	46	40

Growth in TES	2016-21	2020-21
Non-renewable (%)	+47.7	+5.2
Renewable (%)	+17.2	-0.7
Total (%)	+33.7	+2.7

Primary energy trade	2016	2021
Imports (TJ)	212 803	204 684
Exports (TJ)	204 756	345 162
Net trade (TJ)	- 8 047	140 478
Imports (% of supply)	56	41
Exports (% of production)	53	54
Energy self-sufficiency (%)	103	128

Total energy supply in 2021

Oil ▪ Gas ▪ Nuclear ▪ Coal + others ▪ Renewables

Renewable energy supply in 2021

Hydro/marine ▪ Wind ▪ Solar ▪ Bioenergy ▪ Geothermal
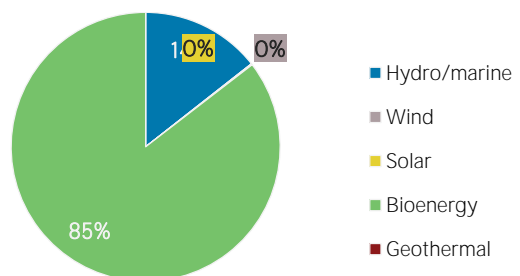
RENEWABLE ENERGY CONSUMPTION (TFEC)

Renewable TFEC trend

Legend: ■ Electricity ■ Commercial heat ■ Bioenergy

Petajoules (PJ)

Year	Value
2016	192
2017	204
2018	225
2019	226
2020	233
2021	232
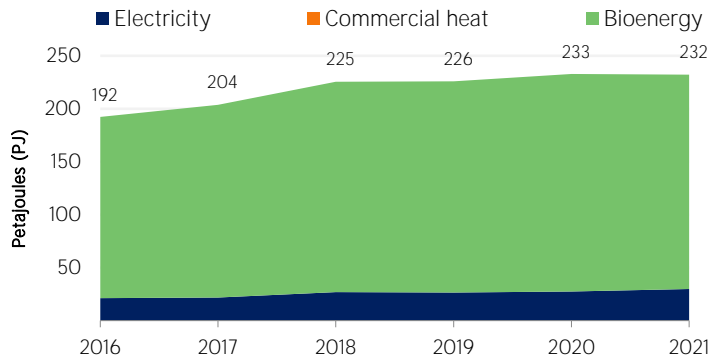
Consumption by sector	2016	2021
Industry (TJ)	17 065	25 641
Transport (TJ)	11	9
Households (TJ)	104 565	120 472
Other (TJ)	70 584	86 129

Renewable energy consumption in 2021

Legend: ■ Geothermal ■ Solar direct

Pie chart (top): 13%, 87%

Pie chart (bottom): 0%, 11%, 52%, 37%
Legend: ■ Industry ■ Transport ■ Households ■ Other
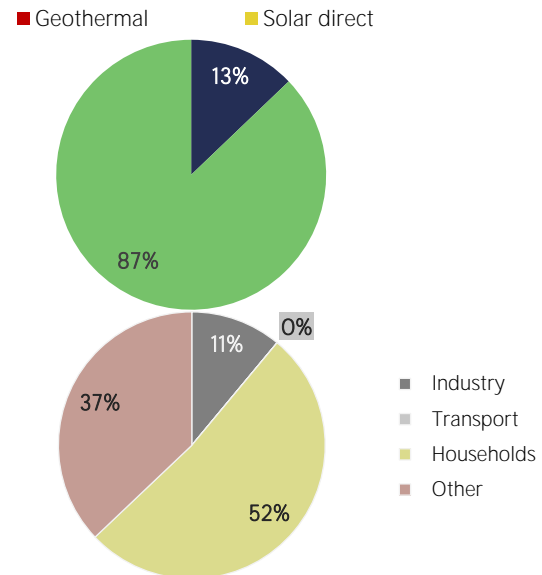
ELECTRICITY CAPACITY

Installed capacity trend

Legend: ■ Fossil fuels ■ Nuclear ▦ Other Non-RE ■ Hydro/marine ■ Wind ■ Solar ■ Bioenergy ■ Geothermal — Renewable share

Gigawatts (GW) / Renewable share (%)

Year	Capacity (GW)
2016	3.8
2017	4.6
2018	4.8
2019	5.1
2020	5.3
2021	5.6
2022	5.7
2023	5.7

Renewable share 2023: 31%

Renewable capacity in 2023

0% 0% 10% 90%

Legend: ■ Hydro/marine ■ Solar ■ Wind ■ Bioenergy ■ Geothermal
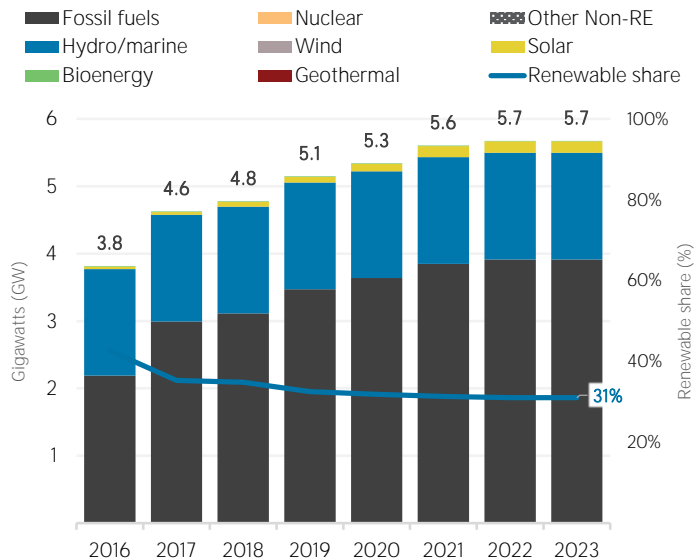
Net capacity change in 2023 (MW)

Non-renewable	0
Hydro and marine	0
Solar	0
Wind	0
Bioenergy	0
Geothermal	0

Net capacity change (GW)

Legend: ■ Fossil fuels ■ Renewable

Year	Fossil fuels	Renewable
2018	0.1	0.0
2019	0.4	0.0
2020	0.2	0.0
2021	0.2	0.1
2022	0.1	0.0
2023	0.0	0.0
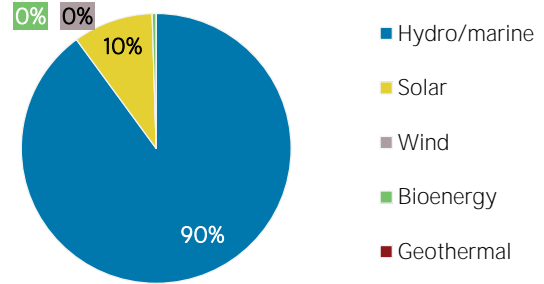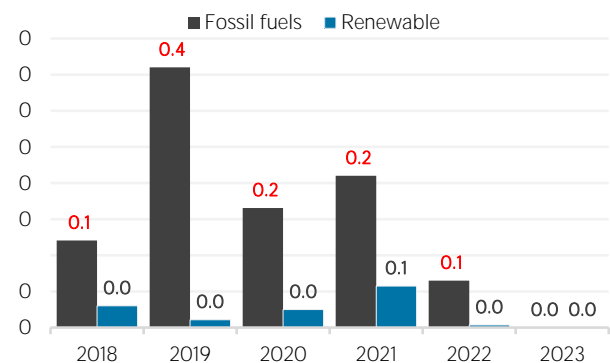
Capacity utilisation in 2022 (%)

Source	%
Fossil fuels	44%
Nuclear	
Hydro/Marine	59%
Solar	5%
Wind	20%
Bioenergy	27%
Geothermal	
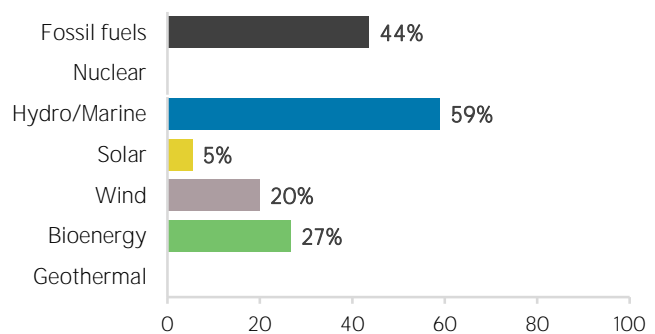
ELECTRICITY GENERATION

| Generation in 2022	GWh	%
Non-renewable	14 818	64
Renewable	8 291	36
Hydro and marine	8 192	35
Solar	79	0
Wind	0	0
Bioenergy	20	0
Geothermal	0	0
Total	23 109	100

Electricity generation trend

Per capita electricity generation (kWh)
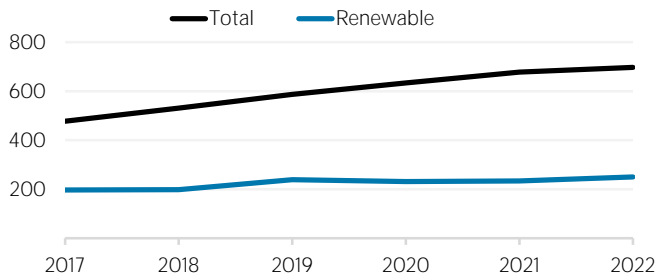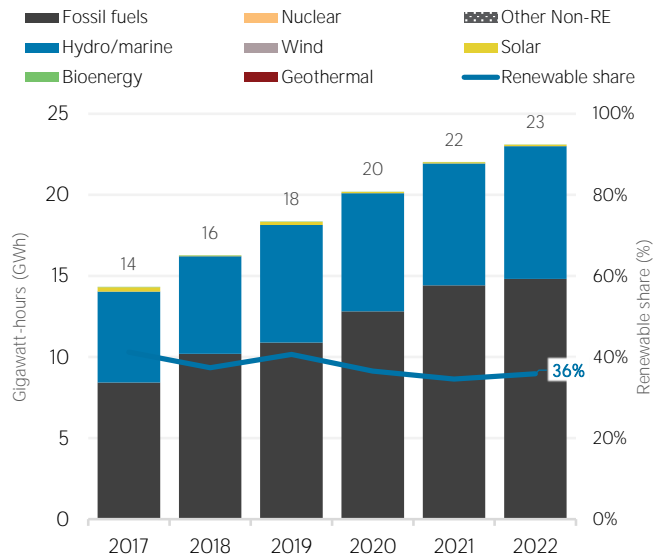
LATEST POLICIES, PROGRAMMES AND LEGISLATION

1 Petroleum (Exploration and Production) (Health, Safety and Environment) Regulations, 2017 — **2017**

2 Petroleum (Exploration and Production) Act 2016, Act 919 — **2016**

3 Petroleum (Exploration and Production) Measurement Regulations of 2016 — **2016**

4 Net Metering Code — **2015**

5 Feed-in tariff for electricity generated from renewable energy sources — **2013**

ENERGY AND EMISSIONS

CO_2 emissions by sector

Elec. & heat generation CO_2 emissions in
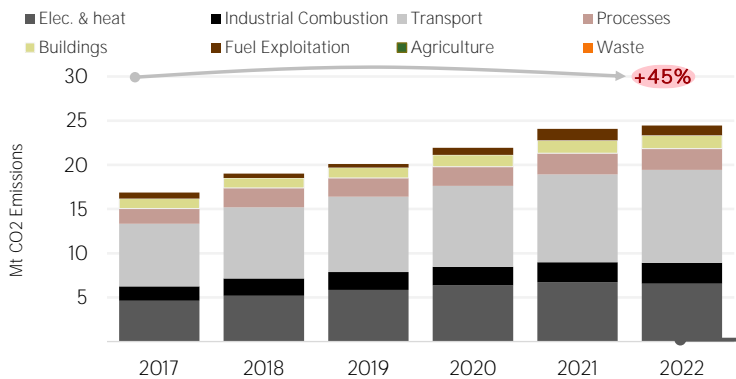
Avoided emissions from renewable elec. & heat
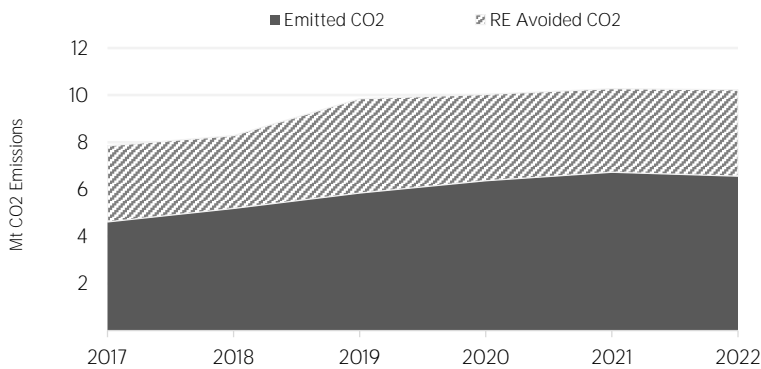
Avoided emissions based on fossil fuel mix used for power
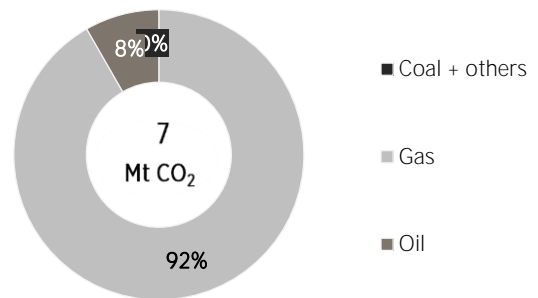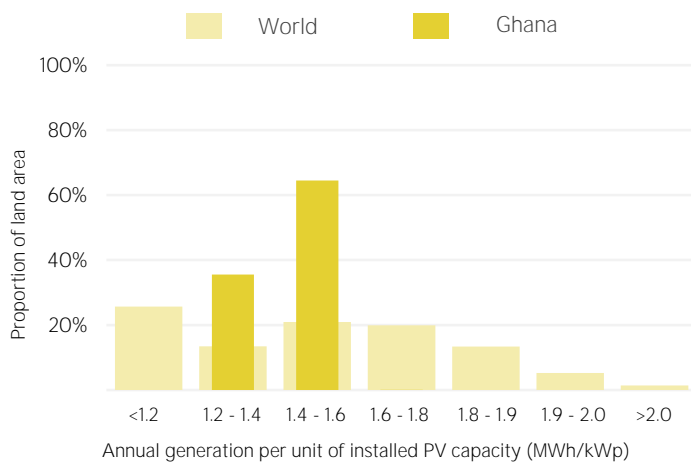
CO_2 emission factor for elec. & heat generation
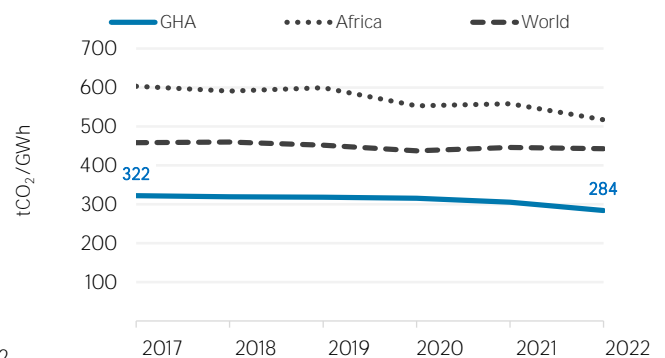
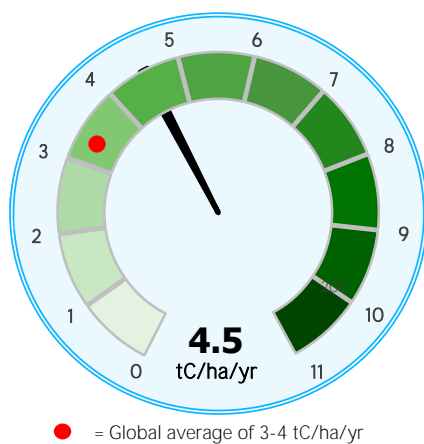*Calculated by dividing power sector emissions by elec. + heat gen.*

RENEWABLE RESOURCE POTENTIAL

Distribution of solar potential

World Ghana

100%
80%
60%
40%
20%

Proportion of land area

<1.2 | 1.2 - 1.4 | 1.4 - 1.6 | 1.6 - 1.8 | 1.8 - 1.9 | 1.9 - 2.0 | >2.0

Annual generation per unit of installed PV capacity (MWh/kWp)

Distribution of wind potential

World Ghana

100%
80%
60%
40%
20%

Proportion of land area

<260 | 260-420 | 420-560 | 560-670 | 670-820 | 820-1060 | >1060

Wind power density at 100m height (W/m^2)
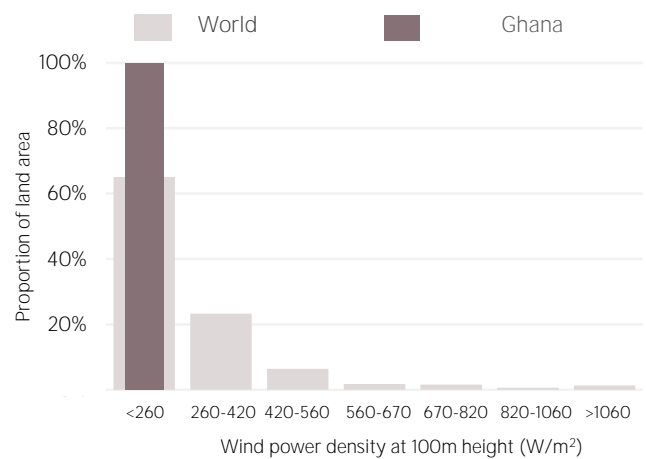
Biomass potential: net primary production

4.5 tC/ha/yr

● = 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/m^2) 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