# Mongolia

IRENA
International Renewable Energy Agency

## COUNTRY INDICATORS AND SDGS

GDP per capita — 8.1.1 Real GDP growth rate
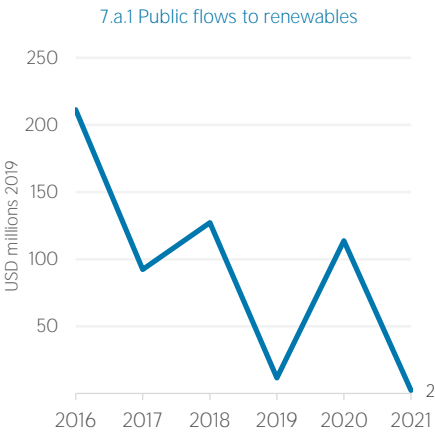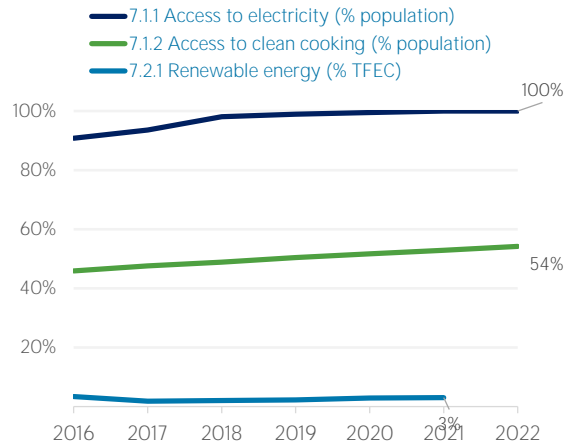
7.3.1 Energy intensity

— 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
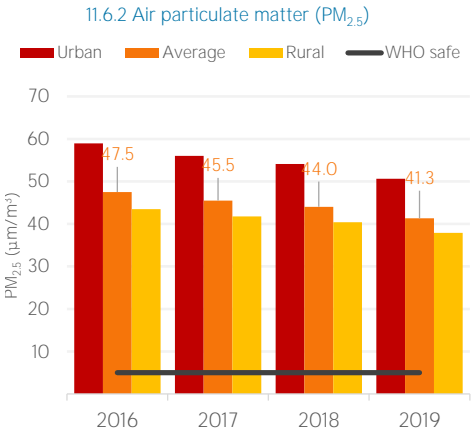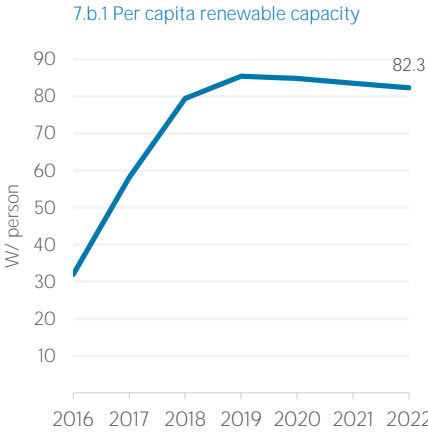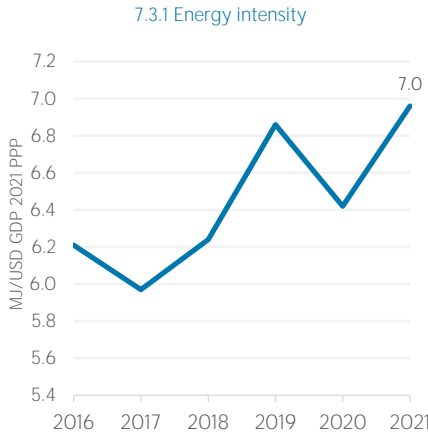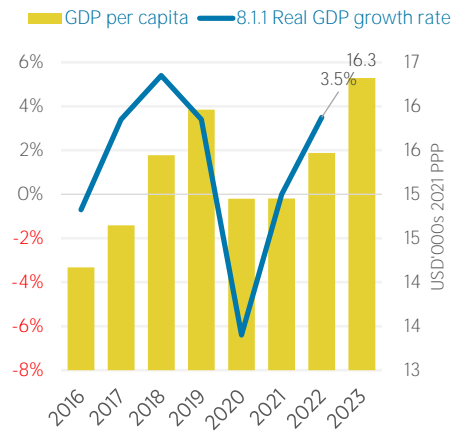
## TOTAL ENERGY SUPPLY (TES)

| Total Energy Supply (TES) | 2016 | 2021 |
|---|---|---|
| Non-renewable (TJ) | 290 618 | 472 791 |
| Renewable (TJ) | 6 671 | 9 770 |
| Total (TJ) | 297 289 | 482 561 |
| Renewable share (%) | 2 | 2 |

| Growth in TES | 2016-21 | 2020-21 |
|---|---|---|
| Non-renewable (%) | +62.7 | +12.4 |
| Renewable (%) | +46.4 | +8.7 |
| Total (%) | +62.3 | +12.3 |

| Primary energy trade | 2016 | 2021 |
|---|---|---|
| Imports (TJ) | 47 033 | 75 993 |
| Exports (TJ) | 711 450 | 475 460 |
| Net trade (TJ) | 664 417 | 399 467 |
| | | |
| Imports (% of supply) | 16 | 16 |
| Exports (% of production) | 74 | 54 |
| Energy self-sufficiency (%) | 323 | 183 |

**Total energy supply in 2021**

Oil
Gas
Nuclear
Coal + others
Renewables

2%
14%
84%

**Renewable energy supply in 2021**

Hydro/marine
Wind
Solar
Bioenergy
Geothermal

2%
19%
7%
71%
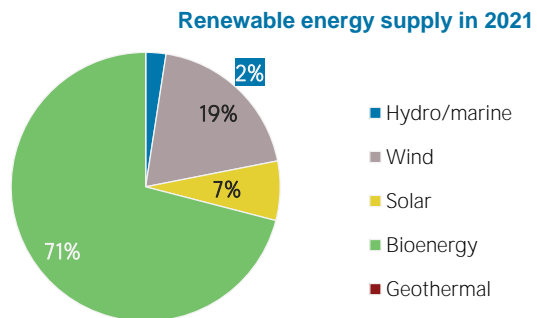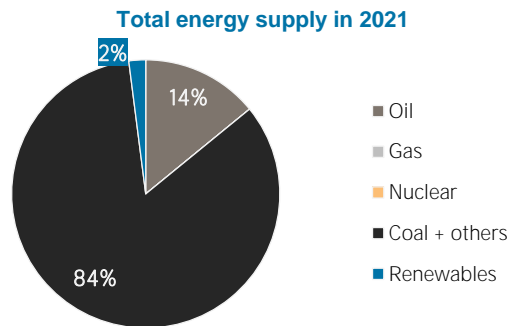
## RENEWABLE ENERGY CONSUMPTION (TFEC)

### Renewable TFEC trend

Legend: ■ Electricity ■ Commercial heat ■ Bioenergy

Petajoules (PJ)

Values shown: 7 (2016), 8 (2017), 10 (2018), 10 (2019), 10 (2020), 12 (2021)

### Renewable energy consumption in 2021

Legend: ■ Geothermal ■ Solar direct

Top pie: 22%, 78%

Bottom pie: Industry 14%, Transport 1%, Households 57%, Other 28%

Legend: ■ Industry ■ Transport ■ Households ■ Other
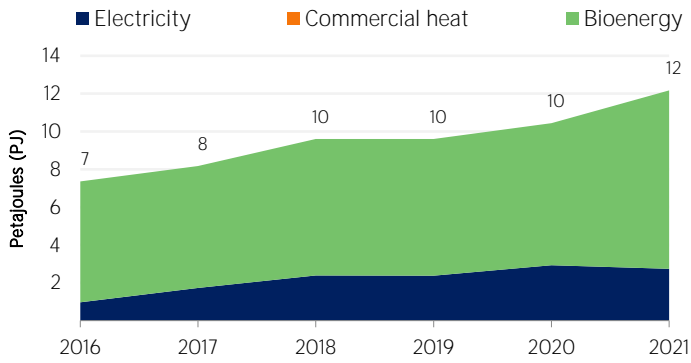
| Consumption by sector | 2016 | 2021 |
|---|---|---|
| Industry (TJ) | 598 | 1 689 |
| Transport (TJ) | 40 | 113 |
| Households (TJ) | 5 316 | 6 968 |
| Other (TJ) | 1 410 | 3 400 |
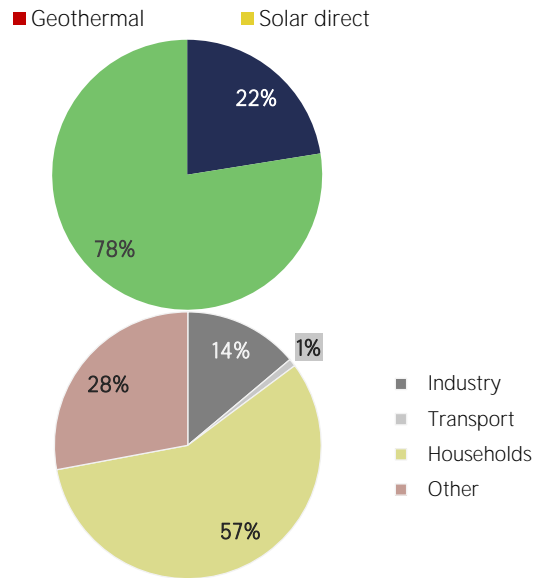
## ELECTRICITY CAPACITY

### Installed capacity trend

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

Gigawatts (GW) / Renewable share (%)

Values: 1.2 (2016), 1.3 (2017), 1.4 (2018), 1.4 (2019), 1.5 (2020), 1.6 (2021), 1.6 (2022), 1.6 (2023)

Renewable share: 18% 20%
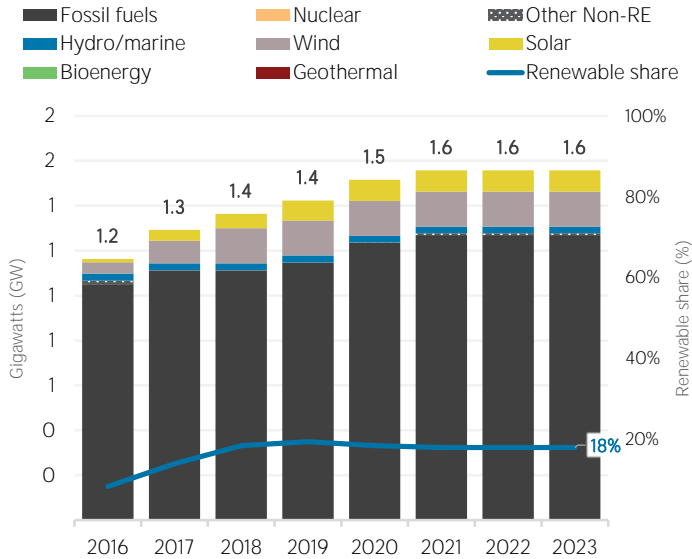
### Renewable capacity in 2023

Hydro/marine 10%, Solar 34%, Wind 56%

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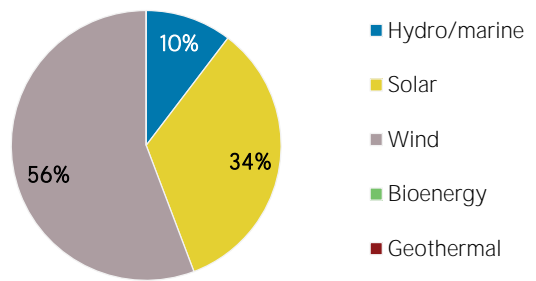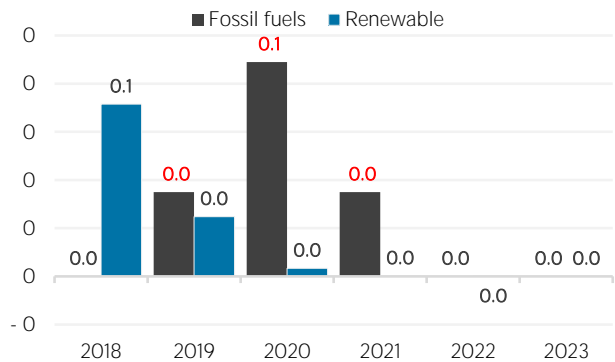
### Net capacity change in 2023 (MW)

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

### Net capacity change (GW)

Legend: ■ Fossil fuels ■ Renewable

2018: Renewable 0.1, Fossil fuels 0.0
2019: 0.0, 0.0
2020: Fossil fuels 0.1, Renewable 0.0
2021: 0.0, Fossil fuels shown
2022: 0.0, 0.0
2023: 0.0, 0.0

### Capacity utilisation in 2022 (%)

Fossil fuels: 100
Nuclear:
Hydro/Marine: 25%
Solar: 22%
Wind: 37%
Bioenergy:
Geothermal:
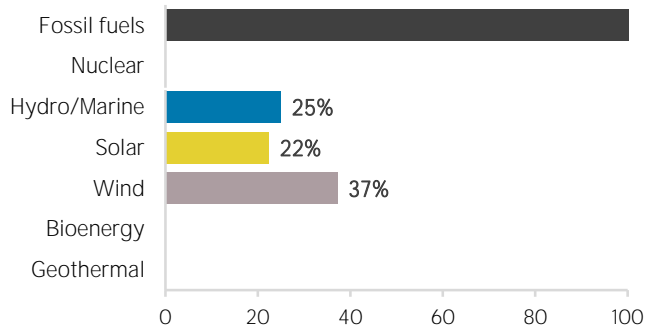
# ELECTRICITY GENERATION

| Generation in 2022 | GWh | % |
|---|---|---|
| Non-renewable | 14 858 | 95 |
| Renewable | 760 | 5 |
| Hydro and marine | 64 | 0 |
| Solar | 186 | 1 |
| Wind | 510 | 3 |
| Bioenergy | 0 | 0 |
| Geothermal | 0 | 0 |
| Total | 15 618 | 100 |

### Per capita electricity generation (kWh)
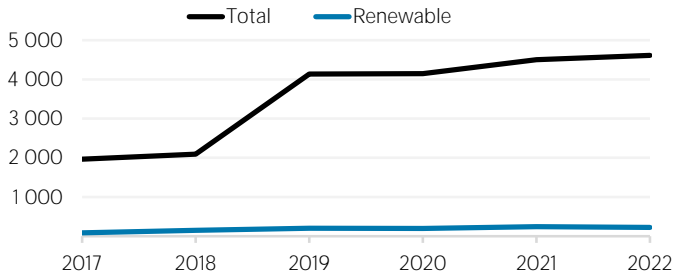


### Electricity generation trend
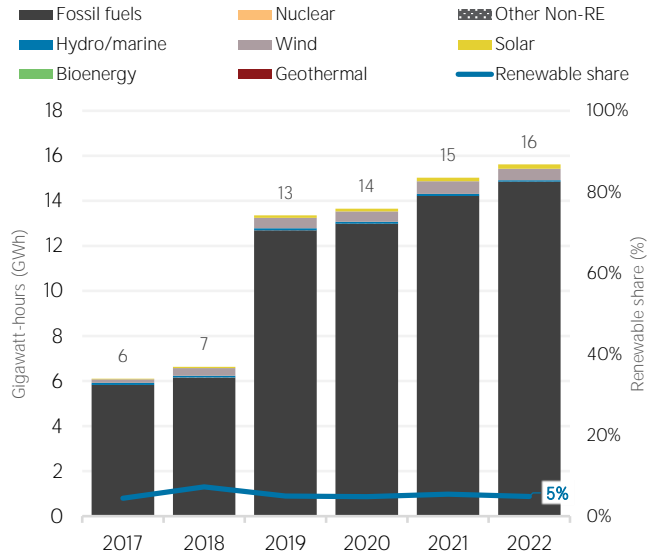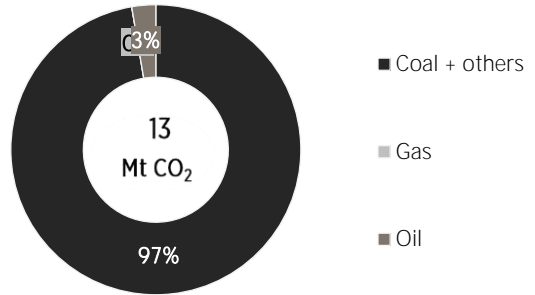


# LATEST POLICIES, PROGRAMMES AND LEGISLATION

**1** Mongolia State Policy on Energy 2015-2030     **2015**

**2** Mongolia Mineral Law 2014     **2014**

**3** Mongolian Law on Investment     **2013**

**4** Mongolia Concession Law     **2010**

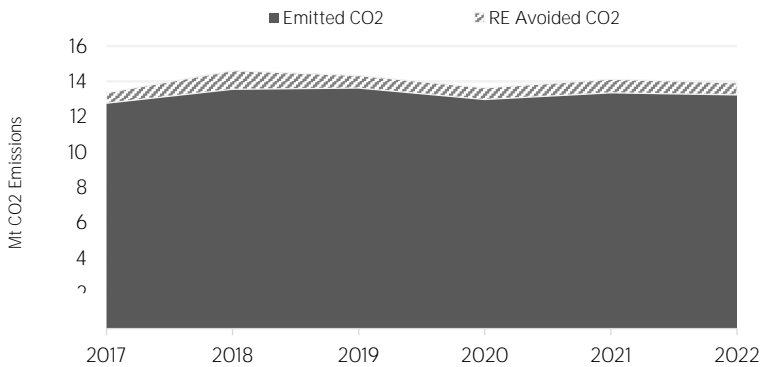**5** Mongolia renewable energy feed-in tariff     **2007**

# ENERGY AND EMISSIONS

### $CO_2$ emissions by sector
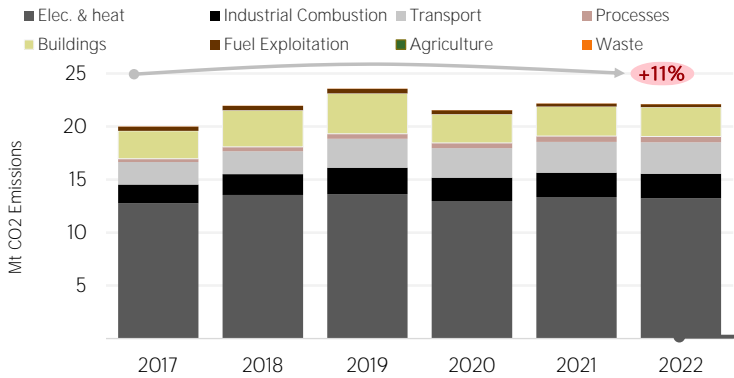


### Elec. & heat generation $CO_2$ emissions in



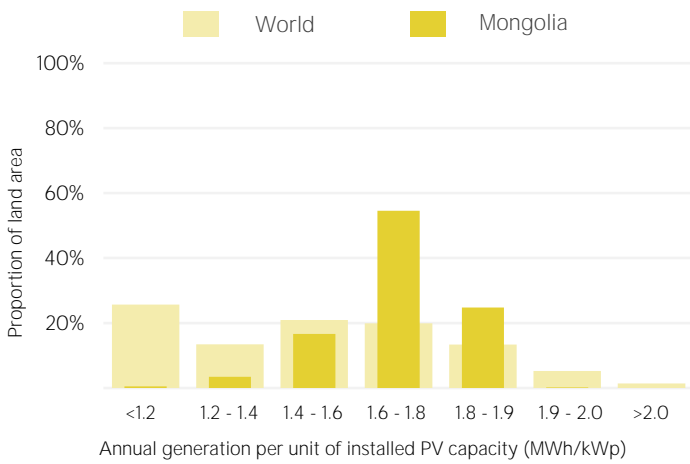### Avoided emissions from renewable elec. & heat



*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.*

## Distribution of solar potential

World   Mongolia

Proportion of land area

100%
80%
60%
40%
20%

<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   Mongolia

Proportion of land area

100%
80%
60%
40%
20%

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

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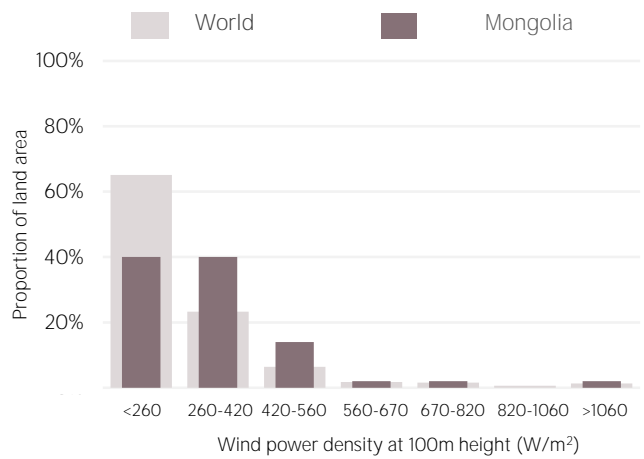
## Biomass potential: net primary production



0.5
tC/ha/yr

● = Global average of 3-4 tC/ha/yr
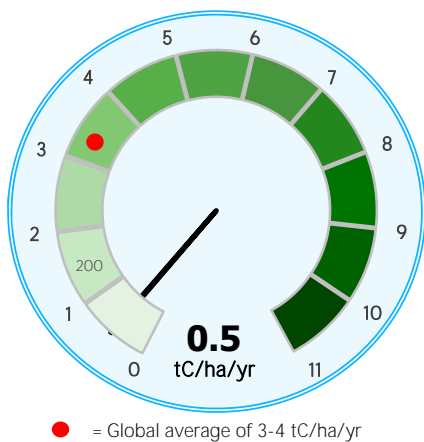
## Indicators of renewable resource potential

**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

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