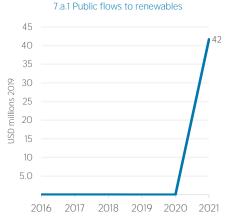
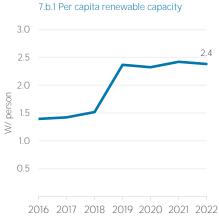
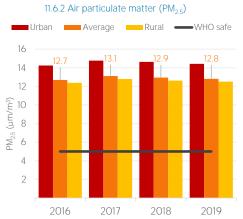
# Botswana



#### **COUNTRY INDICATORS AND SDGS** ■7.1.1 Access to electricity (% population) 7.3.1 Energy intensity GDP per capita ——8.1.1 Real GDP growth rate -7.1.2 Access to clean cooking (% population) ■7.2.1 Renewable energy (% TFEC) 3.5 18 15% 18 100% 10% 2.7 17 2.5 2.0 2.0 2.0 1.5 1.5 1.0 76% 80% 5% 60% 66% 0% 40% 15 -10% 20% 14 27% 14 -15% 208 208 202 202 202 202 2019 2020 2021 2016 2017 2018 2019 2020 2021 2022 2016 2017 2018







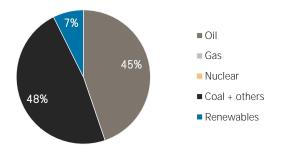
### **TOTAL ENERGY SUPPLY (TES)**

Total Energy Supply (TES)	2016	2021
Non-renewable (TJ)	85 635	81 852
Renewable (TJ)	6 451	6 494
Total (TJ)	92 086	88 346
Renewable share (%)	7	7

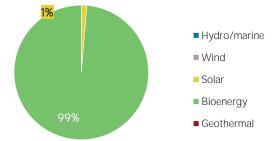
Growth in TES	2016-21	2020-21
Non-renewable (%)	-4.4	+6.0
Renewable (%)	+0.7	+0.5
Total (%)	-4.1	+5.6

Primary energy trade	2016	2021
Imports (TJ)	46 678	45 778
Exports (TJ)	4 835	13 717
Net trade (TJ)	- 41 843	- 32 061
Imports (% of supply)	51	52
Exports (% of production)	10	24
Energy self-sufficiency (%)	55	64

# Total energy supply in 2021

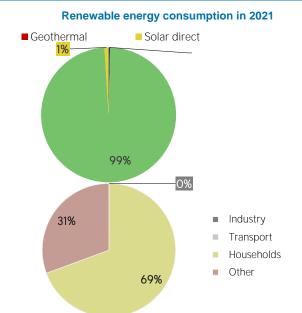


# Renewable energy supply in 2021

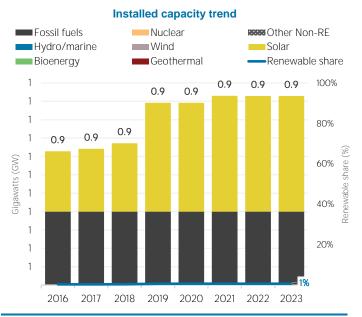


# **RENEWABLE ENERGY CONSUMPTION (TFEC)**

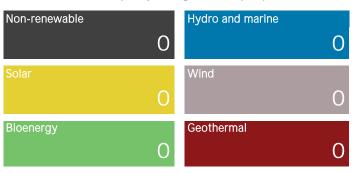
#### Renewable TFEC trend ■ Electricity ■ Commercial heat ■ Bioenergy 7 6 5 Petajoules (PJ) 4 3 2 1 2016 2017 2018 2019 2020 2021 Consumption by sector 2016 2021 Industry (TJ) 8 6 Transport (TJ) 0 0 Households (TJ) 2 2 7 6 4 506 1 991 Other (TJ) 4 130



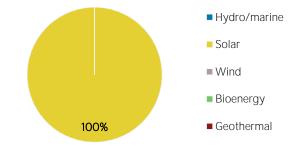
# **ELECTRICITY CAPACITY**



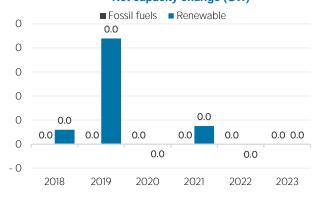
#### Net capacity change in 2023 (MW)



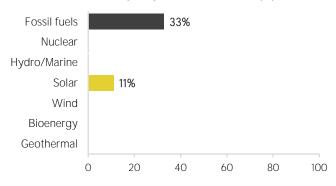
# Renewable capacity in 2023



# Net capacity change (GW)

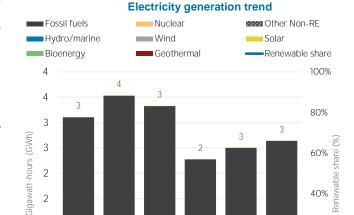


### Capacity utilisation in 2022 (%)



### **ELECTRICITY GENERATION**

Generation in 2022	GWh	%
Non-renewable	2 640	100
Renewable	6	0
Hydro and marine	0	0
Solar	6	0
Wind	0	0
Bioenergy	0	0
Geothermal	0	0
Total	2 646	100

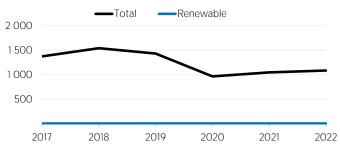


20%

0%

2022

### Per capita electricity generation (kWh)



Avoided emissions based on tossil tuel mix used tor power

# LATEST POLICIES, PROGRAMMES AND LEGISLATION

1

0

2017

2018

2019

2020

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

2021

1 Renewable Energy Fund for off-grid solutions 2015

2 10th National Development Plan 2009-2016 (NDP10) 2009

4

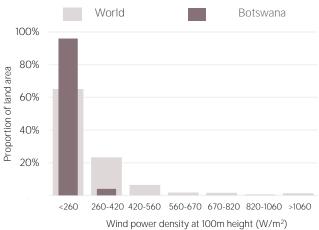
5

#### **ENERGY AND EMISSIONS** CO<sub>2</sub> emissions by sector Elec. & heat generation CO<sub>2</sub> emissions in ■ Elec. & heat ■ Industrial Combustion ■ Transport ■ Processes Buildings ■ Fuel Exploitation ■ Agriculture ■Waste 10 +10% ■ Coal + others 8 Mt CO2 Emissions 5 6 ■ Gas Mt CO<sub>2</sub> 4 ■ Oil 2 97% 2017 2018 2019 2020 2021 2022 Avoided emissions from renewable elec. & heat CO<sub>2</sub> emission factor for elec. & heat generation ■ Emitted CO2 ☑ RE Avoided CO2 BWA ••••Africa **--** • World 2 000 6 1,772 5 1 5001,377 Mt CO2 Emissions tCO<sub>2</sub>/GWh 4 1000 3 2 1 2017 2018 2019 2020 2021 2022 2017 2021 2022 2018 2019 2020

#### RENEWABLE RESOURCE POTENTIAL

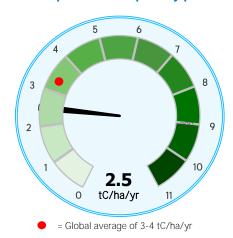
### Distribution of solar potential World Botswana 100% 80% Proportion of land area 60% 40% 20% 1.8 - 1.9 <12 12 - 14 1.4 - 1.6 1.6 - 1.8 19 - 20 >20

## Distribution of wind potential



#### Biomass potential: net primary production

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



#### 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

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 (H5). 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 <a href="statistics@irena.org">statistics@irena.org</a>.

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