### Consumption by sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry (TJ)</td>
<td>166,859</td>
<td>190,797</td>
</tr>
<tr>
<td>Transport (TJ)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Households (TJ)</td>
<td>611,339</td>
<td>618,046</td>
</tr>
<tr>
<td>Other (TJ)</td>
<td>186,967</td>
<td>211,728</td>
</tr>
</tbody>
</table>

### Renewable energy consumption in 2020

- **Non-renewable**: 30,824 TJ
- **Renewable**: 13,943 TJ
  - Hydro/marine: 10,833 TJ
  - Solar: 1,243 TJ
  - Wind: 1,435 TJ
  - Bioenergy: 433 TJ
  - Geothermal: 0 TJ

### Capacity change (%)

<table>
<thead>
<tr>
<th>Type</th>
<th>2017-22</th>
<th>2021-22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-renewable</td>
<td>+37</td>
<td>+9.3</td>
</tr>
<tr>
<td>Renewable</td>
<td>+51</td>
<td>+8.2</td>
</tr>
<tr>
<td>Hydro/marine</td>
<td>+46</td>
<td>+7.9</td>
</tr>
<tr>
<td>Solar</td>
<td>+90</td>
<td>+15.4</td>
</tr>
<tr>
<td>Wind</td>
<td>+82</td>
<td>+7.5</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>+15</td>
<td>0.0</td>
</tr>
<tr>
<td>Geothermal</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

### Total

- **Non-renewable**: 44,767 TJ
- **Renewable**: 100 TJ

### Installed capacity trend

- **Fossil fuels**: 26, 26, 32, 37, 39, 40, 41, 45 GW
- **Hydro/marine**: 26, 26, 32, 37, 39, 40, 41, 45 GW
- **Wind**: 26, 26, 32, 37, 39, 40, 41, 45 GW
- **Solar**: 26, 26, 32, 37, 39, 40, 41, 45 GW
- **Bioenergy**: 26, 26, 32, 37, 39, 40, 41, 45 GW

### Renewable capacity in 2022

- **Hydro/marine**: 33%
- **Solar**: 9%
- **Wind**: 78%
- **Bioenergy**: 10%

### Net capacity change (GW)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fossil fuels</th>
<th>Renewable</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>4.6</td>
<td>3.0</td>
</tr>
<tr>
<td>2016</td>
<td>2.6</td>
<td>2.0</td>
</tr>
<tr>
<td>2017</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>2018</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2019</td>
<td>0.0</td>
<td>0.3</td>
</tr>
<tr>
<td>2020</td>
<td>0.0</td>
<td>15.0</td>
</tr>
<tr>
<td>2021</td>
<td>0.0</td>
<td>11.1</td>
</tr>
</tbody>
</table>

### Capacity utilisation in 2021 (%)

- **Fossil fuels**: 40% (16% N. F., 24% R. F.)
- **Nuclear**: 40% (16% N. F., 24% R. F.)
- **Hydro/Marine**: 43% (16% N. F., 27% R. F.)
- **Solar**: 16% (16% N. F., 0% R. F.)
- **Wind**: 33% (16% N. F., 17% R. F.)
- **Bioenergy**: 79% (15% N. F., 64% R. F.)
- **Geothermal**: 98% (15% N. F., 83% R. F.)
**ELECTRICITY GENERATION**

<table>
<thead>
<tr>
<th>Generation in 2021</th>
<th>GWh</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-renewable</td>
<td>106 449</td>
<td>70</td>
</tr>
<tr>
<td>Renewable</td>
<td>45 183</td>
<td>30</td>
</tr>
<tr>
<td>Hydro and marine</td>
<td>37 526</td>
<td>25</td>
</tr>
<tr>
<td>Solar</td>
<td>1 165</td>
<td>1</td>
</tr>
<tr>
<td>Wind</td>
<td>3 481</td>
<td>2</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>3 011</td>
<td>2</td>
</tr>
<tr>
<td>Geothermal</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>151 631</td>
<td>100</td>
</tr>
</tbody>
</table>

**Per capita electricity generation (kWh)**

- **Total**
- **Renewable**

**LATEST POLICIES, PROGRAMMES AND LEGISLATION**

1. Pakistan MEPS and labelling for electric fans  
   **2016**

2. Pakistan net metering policy for solar PV and wind projects  
   **2015**

3. Minimum Energy Performance Standard (MEPS) For Window Type & Split Air Conditioners With Cooling Capacity under: 14000 W (12000 - 48000 BTU/hr)  
   **2014**

4. Pakistan feed-in tariff for solar power  
   **2014**

5. Upfront Generation Tariff for Solar PV Power Plants  
   **2014**

**ENERGY AND EMISSIONS**

**Energy-related CO₂ emissions by sector**

- **Elec. & heat**
- **Other Industrial**
- **Transport**
- **Other**
- **Buildings**

**Avoided emissions from renewable elec. & heat**

- **Emitted CO₂**
- **RE Avoided CO₂**

**Electricity generation trend**

- **Fossil fuels**
- **Nuclear**
- **Other Non-RE**
- **Hydro/marine**
- **Wind**
- **Solar**
- **Bioenergy**
- **Geothermal**
- **Renewable share**

**CO₂ emission factor for elec. & heat generation**

- **PAK**
- **...... Asia**
- **...... World**

Avoided emissions based on fossil fuel mix used for power

Calculated by dividing power sector emissions by elec. + heat gen.
**Distribution of solar potential**

- World
- Pakistan

**Distribution of wind potential**

- World
- Pakistan

**Biomass potential: net primary production**

- Annual generation per unit of installed PV capacity (MWh/kWp)
- Wind power density at 100m height (W/m²)

**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 tC/ha/yr.

**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.

**Last updated on:** 8th August, 2023