### TOTAL ENERGY SUPPLY (TES)

<table>
<thead>
<tr>
<th>Total Energy Supply (TES)</th>
<th>2014</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-renewable (TJ)</td>
<td>2,327,645</td>
<td>3,001,934</td>
</tr>
<tr>
<td>Renewable (TJ)</td>
<td>841,686</td>
<td>868,808</td>
</tr>
<tr>
<td>Total (TJ)</td>
<td>3,169,331</td>
<td>3,870,742</td>
</tr>
<tr>
<td>Renewable share (%)</td>
<td>27</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Growth in TES</th>
<th>2014-19</th>
<th>2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-renewable (%)</td>
<td>+29.0</td>
<td>-0.2</td>
</tr>
<tr>
<td>Renewable (%)</td>
<td>+3.2</td>
<td>+13</td>
</tr>
<tr>
<td>Total (%)</td>
<td>+22.1</td>
<td>+0.1</td>
</tr>
</tbody>
</table>

### Primary energy trade

<table>
<thead>
<tr>
<th>Imports (TJ)</th>
<th>2014</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports (TJ)</td>
<td>35,695</td>
<td>26,900</td>
</tr>
<tr>
<td>Net trade (TJ)</td>
<td>-876,234</td>
<td>-1,495,165</td>
</tr>
</tbody>
</table>

| Imports (%) of supply | 29 | 39 |
| Exports (%) of production | 2 | 1 |
| Energy self-sufficiency (%) | 74 | 62 |

### Renewable energy supply in 2019

- Oil: 22%
- Gas: 25%
- Nuclear: 14%
- Coal + others: 3%
- Renewables: 35%
- Hydro/marine: 16%
- Wind: 5%
- Solar: 4%
- Bioenergy: 2%
- Geothermal: 82%
### Renewable TFEC Trend

- **Electricity**
- **Commercial heat**
- **Bioenergy**

### Renewable energy consumption in 2019

- **Geothermal**: 17%
- **Solar direct**: 83%

### Consumption by sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>2014</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry (TJ)</td>
<td>170,411</td>
<td>188,545</td>
</tr>
<tr>
<td>Transport (TJ)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Households (TJ)</td>
<td>594,629</td>
<td>596,496</td>
</tr>
<tr>
<td>Other (TJ)</td>
<td>34,053</td>
<td>44,759</td>
</tr>
</tbody>
</table>

### Installed capacity trend

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

### Renewable capacity in 2021

- **Hydro/marine**: 78%
- **Solar**: 8%
- **Wind**: 3%
- **Bioenergy**: 10%
- **Geothermal**: 3%

### Net capacity change (GW)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fossil fuels</th>
<th>Renewable</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>0.7</td>
<td>4.6</td>
</tr>
<tr>
<td>2017</td>
<td>0.4</td>
<td>2.6</td>
</tr>
<tr>
<td>2018</td>
<td>0.2</td>
<td>3.0</td>
</tr>
<tr>
<td>2019</td>
<td>0.2</td>
<td>2.0</td>
</tr>
<tr>
<td>2020</td>
<td>0.0</td>
<td>0.3</td>
</tr>
<tr>
<td>2021</td>
<td>-0.1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

### Capacity utilisation in 2020 (%)

- **Fossil fuels**: 36%
- **Nuclear**: 99%
- **Hydro/marine**: 45%
- **Solar**: 15%
- **Wind**: 23%
- **Bioenergy**: 75%
- **Geothermal**: 75%
ENERGY AND EMISSIONS

Energy-related CO₂ emissions by sector

Avoided emissions from renewable elec. & heat

CO₂ emission factor for elec. & heat generation

Elec. & heat generation CO₂ emissions in

Avoided emissions based on fossil fuel mix used for power

Calculated by dividing power sector emissions by elec. + heat gen.
**RENEWABLE RESOURCE POTENTIAL**

### Distribution of solar potential

- **World**
- **Pakistan**

![Bar chart showing the distribution of solar potential](chart1.png)

**Proportion of land area**

- <12
- 12 - 14
- 14 - 16
- 16 - 18
- 18 - 19
- 19 - 2.0
- >2.0

**Annual generation per unit of installed PV capacity (MW/h/kWp)**

### Distribution of wind potential

- **World**
- **Pakistan**

![Bar chart showing the distribution of wind potential](chart2.png)

**Proportion of land area**

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

**Wind power density at 100m height (W/m²)**

### Biomass potential: net primary production

- **World**
- **Pakistan**

![Pie chart showing the distribution of biomass potential](chart3.png)

- **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/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 (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**: 24th August, 2022