**ENERGY PROFILE**

Russian Federation

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### TOTAL ENERGY SUPPLY (TES)

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-renewable (TJ)</td>
<td>28 832 462</td>
<td>30 843 697</td>
</tr>
<tr>
<td>Renewable (TJ)</td>
<td>737 148</td>
<td>901 907</td>
</tr>
<tr>
<td>Total (TJ)</td>
<td>29 569 610</td>
<td>31 745 604</td>
</tr>
<tr>
<td>Renewable share (%)</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Growth in TES**

<table>
<thead>
<tr>
<th></th>
<th>2014-19</th>
<th>2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-renewable (%)</td>
<td>+7.0</td>
<td>-4.8</td>
</tr>
<tr>
<td>Renewable (%)</td>
<td>+22.4</td>
<td>-8.2</td>
</tr>
<tr>
<td>Total (%)</td>
<td>+7.4</td>
<td>-4.5</td>
</tr>
</tbody>
</table>

### Primary energy trade

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imports (TJ)</td>
<td>1178 897</td>
<td>980 952</td>
</tr>
<tr>
<td>Exports (TJ)</td>
<td>25 943 348</td>
<td>32 733 228</td>
</tr>
<tr>
<td>Net trade (TJ)</td>
<td>24 764 451</td>
<td>31 752 276</td>
</tr>
<tr>
<td>Imports (% of supply)</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Exports (% of production)</td>
<td>47</td>
<td>51</td>
</tr>
<tr>
<td>Energy self-sufficiency (%)</td>
<td>187</td>
<td>203</td>
</tr>
</tbody>
</table>

---

### Country Indicators and SDGs

**7.1.1 Access to electricity (% population)**

**7.1.2 Access to clean cooking (% population)**

**7.2.1 Renewable energy (% TFEC)**

**10.9 Oil**

**11.6.2 Air particulate matter ($PM_{2.5}$)**

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**GDP per capita**

**Real GDP growth rate**

**PM$_{2.5}$ (μm/m$^3$)**

**Public flows to renewables**

**Per capita renewable capacity**

**7.a.1 Public flows to renewables**

**7.b.1 Per capita renewable capacity**

**11.6.2 Air particulate matter ($PM_{2.5}$)**

---

**Renewable energy supply in 2019**

- **Hydro/marine**: 84%
- **Wind**: 14%
- **Solar**: 6%
- **Bioenergy**: 5%
- **Geothermal**: 1%
### Consumption by sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>2014</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry (TJ)</td>
<td>194,823</td>
<td>247,963</td>
</tr>
<tr>
<td>Transport (TJ)</td>
<td>51,782</td>
<td>57,377</td>
</tr>
<tr>
<td>Households (TJ)</td>
<td>125,019</td>
<td>156,797</td>
</tr>
<tr>
<td>Other (TJ)</td>
<td>136,326</td>
<td>165,930</td>
</tr>
</tbody>
</table>

### Renewable TFEC trend

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

### Renewable energy consumption in 2019

- **Geothermal**: 15%
- **Solar direct**: 85%
- **Industry**: 26%
- **Transport**: 39%
- **Households**: 25%
- **Other**: 9%

### Installed capacity trend

- **Fossil fuels**
- **Hydro/marine**
- **Wind**
- **Solar**
- **Bioenergy**
- **Other Non-RE**

### Renewable capacity in 2021

- **Hydro/marine**: 93%
- **Solar**: 2%
- **Wind**: 0%
- **Bioenergy**: 0%
- **Geothermal**: 0%

### Net capacity change (GW)

- **Fossil fuels**: 6.8 GW increase
- **Renewable**: 20 GW increase

### Capacity utilisation in 2020 (%)

- **Fossil fuels**: 39%
- **Nuclear**: 83%
- **Hydro/Marine**: 47%
- **Solar**: 13%
- **Wind**: 31%
- **Bioenergy**: 3%
- **Geothermal**: 62%
ELECTRICITY GENERATION

<table>
<thead>
<tr>
<th>Non-renewable</th>
<th>GWh</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable</td>
<td>GWh</td>
<td>%</td>
</tr>
<tr>
<td>Hydro and marine</td>
<td>216 051</td>
<td>20</td>
</tr>
<tr>
<td>Solar</td>
<td>1249</td>
<td>0</td>
</tr>
<tr>
<td>Wind</td>
<td>1401</td>
<td>0</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>393</td>
<td>0</td>
</tr>
<tr>
<td>Geothermal</td>
<td>421</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1 088 753</td>
<td>100</td>
</tr>
</tbody>
</table>

Per capita electricity generation (kWh)

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

LATEST POLICIES, PROGRAMMES AND LEGISLATION

1. National Low-Carbon Strategy
2. Technical Regulations of the Eurasian Economic Union on the requirements for main pipelines for the transportation of liquid and gaseous hydrocarbons
3. UAE and Russia agreement to collaborate on hydrogen development
4. Energy Strategy of the Russian Federation for the period up to 2035

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**

CO₂ emission factor for elec. & heat generation

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

### Distribution of solar potential

- **World**
- **Russian Fed**

### Distribution of wind potential

- **World**
- **Russian Fed**

### Biomass potential: net primary production

- **3.5 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 (kW/h/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