Renewable and Non-renewable Energy Resources

Carbon-based organic materials such as coal, oil and natural gas are called fossil fuels. Fossil fuels take many millions of years to form. They are described as non-renewable energy resources as their use is unsustainable. When used to generate electricity they produce greenhouse gas, pollutants.

Renewable energy resources are from sources that are constantly replenished by nature. Except for bioenergy they are not based on carbon materials so they do not produce greenhouse gases when used to generate electricity. Consequently, they are described as clean and sustainable.

Renewable energy sources used in Australia

- **Solar**: Photovoltaic technology converts sunlight energy into electricity and solar thermal panels converts solar energy to heat.
- **Wind**: Wind energy can turn the blades of a turbine to generate electricity.
- **Hydropower**: Moving (falling or flowing) water energy is used in hydroelectric plants to turn turbines and generate electricity.
- **Geothermal**: Heat energy from underground is used to power steam turbines and generate electricity.
- **Marine Energy**: Tidal and wave energy is used to turn turbines and generate electricity.
- **Bioenergy**: Decaying plant or animal matter produce gases that can be used to power turbines to generate electricity. Biomass includes: wood waste, manure, landfill wastes and crop by-products such as sugarcane. Biomass is a carbon-neutral energy source.
Generating Electricity in Australia

Figure 1 shows the percentage of Australia and Western Australia’s electricity generation by the energy source used to generate the electricity. From the pie chart’s you can see that coal provides most of our electricity.

Electricity Generation by Energy Source

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Australia %</th>
<th>Western Australia %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal (73%)</td>
<td></td>
<td>Coal (50%)</td>
</tr>
<tr>
<td>Natural Gas (13%)</td>
<td></td>
<td>Natural Gas (42%)</td>
</tr>
<tr>
<td>Wind (4%)</td>
<td></td>
<td>Wind (6.3%)</td>
</tr>
<tr>
<td>Rooftop Solar (2%)</td>
<td></td>
<td>Solar/other (1.7%)</td>
</tr>
<tr>
<td>Hydroelectricity (7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bionenergy (1%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Electricity Generation by Energy Source (Jan 2018)

Use the information on renewable energy resources and Figure 1 to complete the following questions.

1. Complete the following table by listing the energy sources as renewable or non-renewable.

<table>
<thead>
<tr>
<th>Australia’s Electricity Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable energy sources</td>
</tr>
<tr>
<td>Non-renewable sources</td>
</tr>
</tbody>
</table>

2. Calculate the percentage of Australia’s Electricity Generation from renewable and non-renewable sources and record the values in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Australia %</th>
<th>Western Australia %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-renewable sources</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Describe and explain differences between Western Australia’s Energy resources and the rest of Australia’s.