PowerPoint Series on Geography of China (6) – The energy resources of China

Teacher Version

Personal, Social and Humanities Education Section, Curriculum Development Institute, Education Bureau
Notes to Teachers – The learning & teaching of energy resources of China and its linkages with the junior secondary geography curriculum

When teaching the module – “Scramble for Energy” in the *Geography Curriculum Guide (Secondary 1-3) (2011)*, teachers can teach the information in this PowerPoint as an example to give students a basic understanding of China's energy resources.
Types of energy resources in China

China's energy resources are rich and diverse. Examples include:

- coal
- oil & natural gas
- oil shale
- geothermal
- hydroelectric power
- wind energy
Examples of non-renewable energy resources in China

1) Coal:

China's known coal-bearing area accounts for about 5.7% of the country's land area. It is estimated that China's total coal reserves within 2,000 meters of depth rank third in the world after Russia and the United States. Of the proven reserves, bituminous coal accounts for 75%, anthracite coal accounts for 12%, and lignite coal accounts for 13%. According to the current mining speed, coal mining in China can continue for about 500 years.
Figure 1  The distribution of coal resources in China
(Source: P.172 of the book “Learning the Geography of China through Reading (Part 1): The physical environment” published by the Education Bureau (Hong Kong) in 2013.)
In terms of the overall distribution of coal in China, there is more in the north and less in the south (Figure 1). If Chang Jiang is set as the boundary, the area north of Chang Jiang accounts for more than 90% of the reserves, of which Shanxi, Shaanxi and Nei Mongol account for 64%. On the contrary, most provinces in the south are short of coal.

2) Oil & natural gas:
Although China's oil and gas resources are abundant, its per capita reserves are only 1/9 of the world's per capita. China has changed from a net oil exporter to a net importer since the 1990s.
About 340 oil and gas basins have been discovered in China, and more than 440 oil and gas fields have been discovered in the 145 proven basins. New oil and gas resources are expected to be discovered continuously.

China's oil resources are mainly concentrated in the following three regions in North China (“Three-North” regions) (Figure 2):

- Northeastern region (e.g. Daqing Oil Field in Songliao Basin)
- Northern China (e.g. Shengli Oil Field)
- Northwestern China (e.g. Tarim Basin, Qaidam Basin and Zungar Basin)
Figure 2  The distribution of oil & natural gas resources in China

(Source: P.173 of the book “Learning the Geography of China through Reading (Part 1): The physical environment” published by the Education Bureau (Hong Kong) in 2013.)

*No data for Nan Hai Islands
Examples of renewable energy resources in China

❖ Examples of renewable energy which have developed relatively mature in China include hydroelectric power, solar energy and wind energy.

❖ 1) Hydroelectric power:

- In terms of amount of river flows, China is one of the countries in the world richest in water resources.

- The distribution of China's water energy is the most abundant in rivers of the southwestern regions and Chang Jiang, but the demand for electricity is mainly concentrated in the eastern coastal regions.
Table 1 Examples of the distribution of hydroelectric power resources in China

<table>
<thead>
<tr>
<th>River system</th>
<th>Theoretical annual power generation (billion kWh)</th>
<th>Actual annual power generation (billion kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivers in South China</td>
<td>293.3</td>
<td>112.5</td>
</tr>
<tr>
<td>Rivers in Southwest China</td>
<td>2,248.2</td>
<td>506.8</td>
</tr>
<tr>
<td>Chang Jiang</td>
<td>2,347.8</td>
<td>1,027.5</td>
</tr>
<tr>
<td>Huang He</td>
<td>355.2</td>
<td>117.0</td>
</tr>
<tr>
<td>Huaihe</td>
<td>12.7</td>
<td>1.9</td>
</tr>
</tbody>
</table>
The power of generating hydroelectricity of a river depends on two factors: amount of runoff and whether a large drop in elevation is present. The topography of China is high in the west and low in the east, showing a pattern of tiers. Many rivers in China have a large drop in elevation when flowing through the junctions of the tiers and turbulent water flows are found at such junctions, so the water power reserves are huge (Figure 3).

China's hydroelectric power reserves reach 680 million kilowatts, ranking first in the world, of which the Chang Jiang river system, and the upper and middle courses of Huang He and Zhujiang are particularly rich.

Most of the hydroelectric power stations that have been developed in China are mainly found in the upper courses of Chang Jiang, Huang He and Zhujiang.

Overall, there are more hydroelectric power resources 1) in South China than North China and 2) in West China than East China.
Figure 3  A map showing the three-tier pattern of relief & major rivers of China (& related information)

<table>
<thead>
<tr>
<th>River</th>
<th>Length of the river (Source of data: 《China Statistical Yearbook 2019》)</th>
<th>Annual runoff (Source of data: 《China Statistical Yearbook 2019》)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huang He</td>
<td>5,464 km</td>
<td>59.2 billion cubic meters</td>
</tr>
<tr>
<td>Chang Jiang</td>
<td>6,300 km</td>
<td>985.7 billion cubic meters</td>
</tr>
</tbody>
</table>
2) Solar energy:

- China is one of the countries rich in solar energy resources, and about 2/3 of the country has more than 2,000 hours of sunlight per year.

- The total solar radiation in China is the highest in Xizang, while regions with relatively high total solar radiation include Qinghai, Xinjiang, Gansu, Ningxia and parts of Sichuan (Figure 4).
Figure 4  The distribution of solar energy resources in China

(Source: P.176 of the book “Learning the Geography of China through Reading (Part 1): The physical environment” published by the Education Bureau (Hong Kong) in 2013.)

*No data for Nan Hai Islands
Figure 5  Solar energy facilities on Chongming Island in Shanghai
3) **Wind energy**:

- China is rich in wind energy resources, including inland and offshore wind energy (Figures 6 and 7).
- In terms of distribution, the regions with the most abundant wind energy resources in China are the northeastern, northern and northwestern parts of China (Figure 8).
Figure 6  Wind power facilities on Chongming Island in Shanghai
Figure 7  Wind power facilities at the sea near Chongming Island in Shanghai
Figure 8  The distribution of wind resources in China
(Source: P.176 of the book “Learning the Geography of China through Reading (Part 1): The physical environment” published by the Education Bureau (Hong Kong) in 2013.)

*No data for Nan Hai Islands
Reference:
❖ ‘Chapter 4  Rivers & Lakes (CHEN Yongqin)’ and ‘Chapter 5  Natural Resources (NG Sai-leung)’ in the educational package “Learning the Geography of China through Reading (Part 1): The physical environment” published by the Education Bureau (Hong Kong) in 2013.

Further reading:
After teaching this PowerPoint, teachers may encourage their students to read the above reference materials. Teachers and students can use their Hong Kong Education City (HKEdCity) accounts to download the e-book version of the above materials for free from the “Hong Kong Reading City" of the HKEdCity website.