

## Section 4 d) Energy resources and electricity generation research project.

### Syllabus

4.16 describe the energy transfers involved in generating electricity using:

- Wind
- Water (include hydroelectric power, tidal and waves)
- geothermal resources
- solar heating systems
- solar cells
- fossil fuels (include coal, oil and natural gas)
- nuclear power

**4.17 describe the advantages and disadvantages of methods of large-scale electricity production from various renewable and non-renewable resources.**

Consider the different types of electricity generation listed in the table below and complete the boxes. The one for Wind is done for you as an example.

Make sure you consider:

- **the energy transfers involved in generating electricity for each energy resource**
- **the advantages and disadvantages of each renewable and non-renewable resources e.g.**
- **Renewable or non-renewable?**
- **Greenhouse gas emissions - CO<sub>2</sub>?**
- **Environmental impact - pollution?**
- **Suitable locations?**
- **Supply and demand - reliability?**
- **Cost - set-up and running?**
- **Efficiency?**
- **Other?**

You can research this activity online or in the text-book – Edexcel Chapter 18 – Energy resources and electricity generation pg150-9

The <http://theworldaccordingtohughes.wikispaces.com/Energy+resources+%26+electricity+generation> also has many useful links.

You can also find good statistics about energy sources on Wikipedia.

There are several Brainpops on this topic worth watching.

<b>Means of generating electricity</b> <b>(plus a picture or diagram)</b>	<b>How it works.</b> <b>Energy transfers involved in generating the electricity?</b>	<b>Renewable or non-renewable?</b> <b>Advantages or disadvantages?</b>	<b>Is it used in China?</b>
<p>WIND</p> 	<p>Moving air rotates wind turbine which is attached to a generator.</p> <p>KINETIC (wind turbine)</p> <p>ELECTRIC (generator)</p>	<p>Renewable resource</p> <p>Approx. efficiency: 30%</p> <p>No carbon dioxide emitted</p> <p>Does not work when no wind</p> <p>Noisy</p> <p>Ugly (some say)</p> <p>Uses a lot of space</p> <p>Expensive to install</p>	<p>42 GW IN 2010</p> <p>Yes, in places where there is a lot of wind, for example off-shore. China is world's largest producer of wind power.</p>
<p>TIDAL</p>			
<p>WAVE</p>			

GEOTHERMAL

SOLAR HEATING

SOLAR CELLS

SOLAR POWER PLANTS  
(PHOTOVOLTAIC AND THERMAL)

FOSSIL FUELS

NUCLEAR POWER

