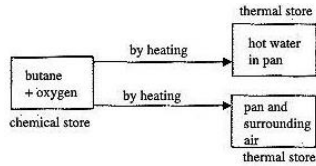


# Knowledge Organiser – Year 7 Energy

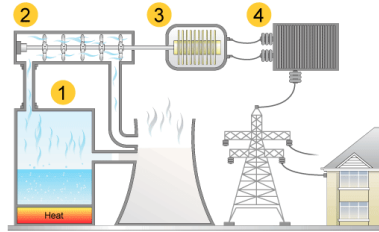
## Energy stores and transfers

Energy store	Energy transfers
<ul style="list-style-type: none"> <li><b>chemical</b> (e.g. fuel + oxygen)</li> <li><b>kinetic</b> (in a moving object)</li> <li><b>gravitational</b> (due to the position of an object in a gravitational field)</li> <li><b>elastic</b> (e.g. in a stretched or compressed spring)</li> <li><b>thermal</b> (in a warm object)</li> <li><b>magnetic</b> (in two separated magnets that are attracting, or repelling)</li> <li><b>electrostatic</b> (in two separated electric charges that are attracting, or repelling)</li> <li><b>nuclear</b> (released through radioactive decay, fission or fusion)</li> </ul>	<ul style="list-style-type: none"> <li><b>mechanically</b> (when a force moves through a distance)</li> <li><b>electrically</b> (when a charge moves through a potential difference)</li> <li><b>by heating</b> (because of a temperature difference)</li> <li><b>by radiation</b> (e.g. light, microwaves, sound)</li> </ul>



## Generating electricity

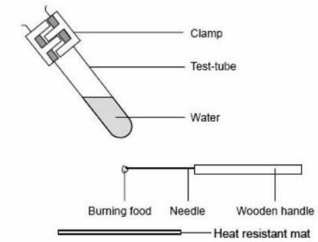
Most electrical energy is generated in the same way. Electrical energy is a secondary source of energy as it requires other forms to generate it.



- Fuel (natural gas, biomass, nuclear) is used to heat a liquid (usually water) which evaporates.
- The steam turns the turbine (in cases such as hydroelectric power or tidal energy sources the movement of these can turn the turbine without heating).
- The turbine turns the generator which is a magnet inside a coil of wire.
- This generates electricity and is sent to the national grid to go to homes and industries.

## Measuring the energy in food

We can measure the amount of energy in food to see how burning it changes the chemical energy to thermal energy in the test tube (shown below)



There are several problems with this experiment such as not all the energy from the food going into the water – it is dissipated to the surroundings. The volume of water must remain the same throughout the experiment without evaporation. The mass of the food should be equal each time the food is tested.

## Key words

<b>Energy</b>	The ability to do work
<b>Energy source</b>	Something that can be consumed to produce power e.g. coal
<b>Fossil Fuel</b>	The fossil fuels are coal, oil and natural gas. They are fuels because they release heat energy when they are burned. They are fossil fuels because they were formed from the remains of living organisms millions of years ago
<b>Non-renewable</b>	Materials that will one day run out; they are finite (have an end)
<b>Renewable</b>	sustainable ways of generating energy. The quickly replenish themselves and can be used again and again – although you do not use the same bit of energy energy
<b>Wasted energy</b>	Energy that is lost from a system and is not transferred or changed into the type of energy desired
<b>Watt</b>	The unit used to measure power
<b>Power</b>	A measure of how quickly energy is transferred
<b>Efficiency</b>	How much energy is transferred or changed into the type of energy you want
<b>Kilowatt hour</b>	The unit used to measure the amount of mains electrical energy transferred
<b>Joule</b>	The unit used to measure energy
<b>Conservation of Energy</b>	Energy can't be created or destroyed only changed from one type into another
<b>Work done</b>	The energy transferred when completing a task
<b>Dissipate</b>	The loss of energy from a system (energy wasted)

## Advantages and Disadvantages of different Energy Sources

Energy Source	Advantages	Disadvantages
Fossil Fuels	Cheap to set up, power stations already present	Limited (will run out), causes pollution – greenhouse gases and gases that make acid rain, running costs
Nuclear	Does not produce carbon dioxide or sulphur dioxide	Finite (will run out) danger from radioactive material
Wind power	Infinite, cheap to run, no pollution, cheap to run	Costly to build, only works when windy, noisy and ugly
Tidal power	Good for islands, potential to generate lots of energy, reliable – tide will always go in and out, doesn't release pollution	Costs a lot to build, hard to find suitable locations, could damage environment
Solar power	Infinite, building can have their own power supply, doesn't release pollution, cheap to run	Expensive to set up, only works when sunny
Geothermal power	Doesn't create any pollution, potentially infinite	Expensive to set up, only works in volcanic areas, volcanic activity may stop making station useless
Hydroelectric power	Doesn't create pollution, creates water reserves	Costly to build, can cause flooding, can have major ecological impacts
Biomass	Cheap, if replaced can be sustainable	Burning releases atmospheric pollution, replanting required

## Back to the sun.

All sources of energy on Earth can be linked back to the sun directly such as solar panels or indirectly such as the food we eat, nuclear and wind energy.

## Fossil fuels.

Fossil fuels are were once fossils. Coal is the remains of trees millions of years ago that got covered in something like a mudslide and fossilised. Natural gas and oil are from the remains of tiny sea creatures.