

# Physics Knowledge Organiser

## P3 - Energy resources

### Energy Resources

Don't get energy resources and stores of energy mixed up. Energy resources are energy stores that we know how to make use of for our needs, such as electricity. Stores of energy are the ways we find energy in objects or systems – e.g. chemical potential energy, gravitational potential energy, or thermal energy.

The main energy resources on Earth are: fossil fuels (oil, coal and gas); nuclear fuel; biofuel; wind; hydroelectricity; geothermal; tides; the Sun and waves in the sea. These all are stores of energy we can access and transfer usefully, usually to electrical energy. We can also use these energy resources for transport (especially fossil fuels) and heating (especially geothermal – although not in the UK!).

### Using Energy Resources

Some energy resources are more reliable than others. For instance, as you may have noticed, the Sun as an energy resource (using solar panels) is not totally reliable in the UK. So we couldn't totally rely on the Sun as an energy resource. Fossil fuels are reliable for the time being, as the supply is good, but they are non-renewable, so this may change in the future. Fossil fuels are also relied upon for transport. This is changing, but still the vast majority of vehicles use fossil fuels as their energy resource.

Environmental considerations about the use of energy resources should also be made. For instance, the combustion of fossil fuels adds to greenhouse gases in the atmosphere, causing climate change. On the other hand, renewable methods like hydroelectricity involve building dams that may displace people and destroy habitats. There are always ethical factors to weigh up too. Although science can identify issues such as environmental problems, scientists are not politicians and big decisions to deal with issues are out of their hands a lot of the time. Political, social, ethical or economic factors also affect decisions made about the use of Earth's energy resources.

| Key Terms        | Definitions  |
|------------------|--|
| Energy resources | Stores of energy on Earth that we can access and transfer to useful forms, such as electricity.  |
| Nuclear fuel     | Elements that can be used to release massive amounts of energy for generating electricity. Nuclear fuel is based on uranium.   |
| Fossil fuel      | A fuel, made from hydrocarbons, that formed millions of years ago from the bodies of animals and plants. Fossil fuels are a store of chemical potential energy.  |
| Geothermal       | The energy resource found in Earth's crust, due the thermal energy of the rock of the crust is certain places on Earth.  |
| Biofuel          | Any type of fuel made from the bodies of organisms – such as fuels made from plants.   |
| Hydroelectricity | Water stored behind a dam has gravitational potential energy, so it is a store of energy we can make use of.   |
| Tidal energy     | Tides in the sea come in and out twice a day. This is a massive movement of water, whose kinetic energy can be transferred usefully to electrical energy.  |
| Wave energy      | Waves in the ocean have kinetic energy. With the right equipment, this energy can be transferred usefully to electrical energy.  |
| Solar energy     | The Sun is an abundant source of energy. Using solar panels, we can transfer light energy directly into electrical energy. We can also use the thermal energy from the Sun for heating and for generating electricity. |
| Electricity      | A form of energy that we find extremely useful, since it can be used to run so many devices. We use the energy resources described here mainly (but not only) to generate electricity.                                 |
| Renewable        | Describes energy resources that are, or can be, replenished (replaced) as they are used. E.g. biofuels, geothermal.  |
| Non-renewable    | Describes energy resources that cannot be replenished. In other words, they get used up. E.g. fossil fuels, nuclear fuel.  |