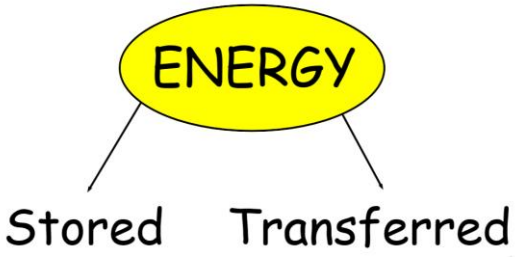
Energy types, resources and transfers

Almost everything around us involves energy in one form or another.

Energy can be stored or it can be transferred from one form to another.



There are many stores of energy, including:

- Magnetic
- thermal
- chemical
- kinetic
- electrostatic
- elastic potential
- gravitational potential
- nuclear

Energy cannot be destroyed but...

Energy can be transferred from one store to another e.g. a car uses petrol (chemical energy store) to make it move (kinetic energy store).

In: Chemical Energy  Out: Kinetic Energy

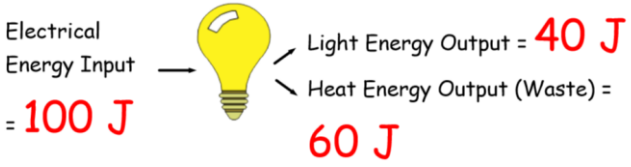
Devices are useful when they transfer energy from one type to another.

The energy that is transferred can be:

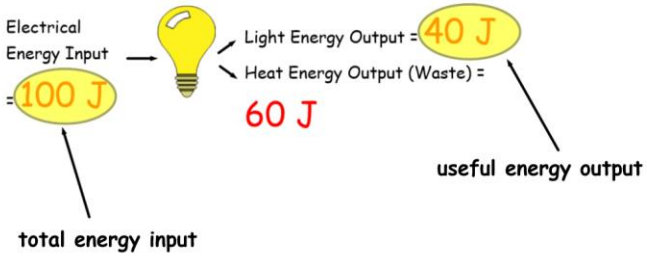
- Useful energy: This is the energy that we want from the device.
- Wasted energy: This is energy that we don't want from the device.

The input energy for this light bulb is electrical energy

The useful output energy for this light bulb is light but the bulb also produces heat. This is wasted energy.



$$\text{efficiency (\%)} = \frac{\text{useful energy output}}{\text{total energy input}} \times 100$$



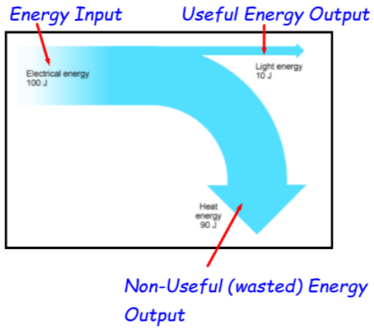
Efficiency = (40 J / 100 J) x 100

Efficiency = 40%

A sankey diagram is an energy transfer diagram that shows the relative amounts of energy transferred by an object.

The width of each arrow shows how much energy is transferred.

The non-useful energy (wasted energy) is always shown pointing downwards.



Formation of fossil fuels

Crude oil, coal and gas are fossil fuels. They were formed over millions of years, from the remains of dead organisms:

- coal was formed from dead trees and other plant material
- crude oil and gas were formed from dead marine organisms

Fossil fuels are **non-renewable**. They took a very long time to form and we are using them up faster than they can be replaced - once they have all been used up, they cannot be replaced.

A **renewable resource** is something that can be replaced quickly. For example, there is a continuous supply of wind which makes it a renewable form of energy