**Teacher content information:**

Energy is the ability to make changes or the capacity to do work. Energy appears in many different forms including kinetic (movement), potential (stored energy), gravitational, light, heat, chemical, elastic and electrical. The Sun is the source of all energy on Earth. The energy from the sun comes in the form of light and heat. Plants are able to convert the light energy from the sun into a form of energy they can use to grow, move, repair their cells and reproduce. The basic unit of energy is the joule. To give you an idea of this unit, one joule is enough energy to lift a 1 kg weight to a height of 10 cm. Power is the rate at which energy is used and the unit is a watt.

Energy can change from one form to another: this process is called energy transformation. No energy transformation is 100% efficient and often heat energy is produced as the by-product. For example, a light globe transforms electrical energy into light energy (useful) and heat energy (by-product).

Humans focus a lot on electrical energy because we require it so frequently in our everyday lives. In Australia, we make most of our electrical energy from coal. There are many problems associated with the generation of electricity in a coal power plant. One problem is that when coal is combusted it produces a large amount of the greenhouse gas carbon dioxide. Another problem is that coal power plants are not very energy efficient and on average only 30 - 40% of the chemical energy in coal is converted to useful energy - the rest is lost as heat in the conversion process. Coal is also a fossil fuel, meaning that it is formed from 'dead things' over millions and millions of years. It is non-renewable, meaning that we will eventually run out!

Renewable energy is derived from sources that can be replenished within the time of human civilisation. Some of these sources include: solar, wind, hydro-electric, geothermal and biogas. A combination of these sources needs to be part of our energy plan to ensure a sustainable future.

[**Cool Australia Energy Years 7 & 8 presentation** from **Cool Australia**](https://docs.google.com/presentation/d/1AcxdPm4vyYg7YDgdEDmKysAxkJS9Sfh4vp3Zso8d7hU/copy)