

Support material #4:

Glossary

This glossary explains in detail those terms that are used throughout the Home Energy Project.

Active standby

Active standby is when the appliance is on but not performing its main function. For example, the VCR may be on but is not playing or recording. This mode also applies to power supplies for battery operated equipment (portable appliances) when the appliance is being charged (various sub-modes).

Amino acid

Proteins are made up of amino acids.

Ampere or Amp

A measure of electrical current flow.

Animal

Animals eat other organisms for their energy source.

Appliance

An instrument or device designed for use in completing a particular task. Examples include an iron, toaster, microwave, freezer, refrigerator, hair dryer and musical instruments. Energy efficient appliances cost less to run and have less environmental impact than similar appliances that are less energy efficient. Using energy efficient appliances can save you hundreds of dollars in running costs each year.

Audience

A group selected to listen to and/or watch presentations developed during **Communicate**. Can include parents, other students, families, community organisations and senior citizens.

Bacteria

A micro-organism with only one cell. Most bacteria are harmless or beneficial, but a few can cause disease.

Biodiversity

Biological diversity (biodiversity) is the term that describes the richness and variety of all living things in the world.

Biological process

A process which occurs in living organisms, by which chemical reactions lead to a transformation of the organism. A biological process could be a process which leads to cell growth, or makes a cell change its state.

Biomass

Organic matter (e.g. canola, sugarcane) which can be converted to fuel and used as an energy source.

Blood

A fluid that carries oxygen and nutrients to different parts of the body, as well as taking away waste products such as CO₂.

Breathing

The act or process by which an organism with lungs exchanges gases with its environment.

Carbohydrate

Molecule that stores chemical energy. Consists of the elements carbon, hydrogen and oxygen.

Carbon dioxide (CO₂)

A tasteless, colourless, odourless, non-flammable gas that is formed when fossil fuels are burnt. It is the most common of the greenhouse gases.

Cellular Respiration

A process where the chemical energy of large molecules is converted to smaller parcels of energy that can be used by cells.

CFC (chlorofluorocarbon)

A chemical compound once used a great deal as a refrigerant and as a propellant in aerosol cans. When released into the air, these compounds break down and release chlorine, which causes damage to the Earth's ozone layer.

Commercial premises (economy)

The part of the economy responsible for the buying and selling of goods and services. The commercial sector is made up of merchants and businesses.

Conservation

The wise and efficient use of resources (for example energy resources such as fossil fuels).

Conversion factors

A number which translates units of one measurement system into corresponding values of another measurement system.

Delay start

Appliances which have delay starts are those that can be programmed to begin functioning at a later time, in some cases up to 24 hours later. Appliances left in this mode are in neither active nor passive standby.

Demand

This is the rate at which energy is consumed e.g. consumption = demand x time.

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Earth's atmosphere

The mixture of gases that surround the Earth and absorb ultraviolet radiation from the sun. The atmosphere contains approximately 79 per cent nitrogen, 20 per cent oxygen and 1 per cent other gases including carbon dioxide, argon and methane.

Electrical energy

The movement of charged particles (electrons).

Electrical power

The rate at which electrical energy is used. See *Watt* for a definition of the unit of measurement.

Electricity consumption

Also known as 'usage' or 'energy'. It is often, but not always, divided between peak energy and off-peak energy and is measured in kWh (see *Support material #7: Sample Origin energy bills*).

Electricity tariff

This is the price you pay for electricity. It is charged in cents per kilowatt hour. The tariff price consists of a charge for the electricity, which may include peak or off-peak use, and a charge for supply, which will vary on a domestic or commercial property (see *Support material #7: Sample Origin energy bills*).

Energy

The ability of an object to do work (see *Work*). Energy is measured in joules (J) and megajoules (MJ).

Energy efficiency

The use of less energy to achieve the same or greater levels of output. Examples: in winter, wear a heavier jumper while studying. In summer, keep your house cool by using blinds and curtains effectively to keep out the heat during the day, then open all blinds, curtains and windows at night to allow cool air in.

Energy ratings

This is a star system applied to electrical appliances based on the amount of energy they consume when in use. Ratings help consumers choose the most energy efficient appliance. The star rating system has a minimum of one star and a maximum of six. To be awarded one star, an appliance must meet the minimum Australian Standards performance level. The more stars, the greater the energy efficiency, the lower the running costs and the less greenhouse emissions there are.

Sample of an Australian Energy label for room air conditioners



Energy rating labels supplied by the Australian Greenhouse Office, www.greenhouse.gov.au

Enhanced greenhouse effect

Also called global warming. The greenhouse effect is enhanced due to human activities, especially the burning of fossil fuels.

Fat

A high energy molecule which is often stored. Can be used for cellular respiration.

Fossil fuels

Some examples of fossil fuels are coal, natural gas and liquefied petroleum gas. They are called fossil fuels because they have been formed over very long periods of time from ancient fossilised organic matter, such as trees and leaves.

Fungi

A fungus (the plural is fungi), an organism with complex cells, uses cellular respiration to produce nutrients. Common types of fungus include yeast, mould and mushrooms.

Gas consumption

Also known as 'usage' or 'energy', gas consumption is measured in joules (J) or megajoules (MJ).

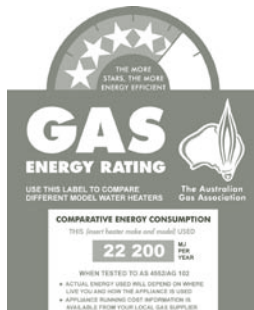
Gas energy ratings

The gas energy efficiency rating system uses stars to show the energy efficiency level of a gas appliance. To be awarded one star, the appliance must meet the minimum performance level set by the Australian Gas Association. For gas heaters, each extra star represents a 10 per cent improvement in efficiency; for gas hot water systems each additional star represents a 7 per cent efficiency increase. The more stars, the greater the energy efficiency, the lower the running costs and the less greenhouse emissions. Printed in the centre of a gas energy efficiency rating label is the amount of gas an average family may use in a year to run the appliance.

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Sample of a gas appliance energy label



Energy rating labels supplied by the Australian Greenhouse Office, www.greenhouse.gov.au

Gas tariff

The price you pay for gas. It is charged as cents per megajoule. The tariff price consists of a charge for the gas and a charge for supply (see the sample Origin gas bill, *Support material #7: Sample Origin energy bills*).

Geothermal energy

Heat energy produced naturally inside the earth. It can be taken from hot springs, reservoirs of hot water deep below the ground, or by breaking open the rock itself.

Global warming

See enhanced greenhouse effect.

Glycerol

A colourless, odourless, viscous liquid that organisms convert into sugars, which they can then use for energy.

Green energy

Using or having supplied energy from renewable sources, such as solar, wind, hydropower, biomass and geothermal.

Greenhouse gas

Gases that contribute to the greenhouse effect, such as carbon dioxide, methane, nitrous oxide, water vapour and ozone. Greenhouse gas emission levels vary for different types of fossil fuels used to generate electricity and natural gas supplied.

Joule

A unit of electrical energy. A joule is equivalent of one ampere current passing through a resistance of one ohm for one second.

Kinetic energy (movement)

The energy of motion, or the energy an object possesses when it is moving. Kinetic energy travels in waves, electrons, atoms, molecules, substances, or objects.

LP gas (liquefied petroleum gas)

Consists of propane (C_3H_8) or butane (C_4H_{10}) or a mixture of both. These gases are obtained as by-products from the processing of raw natural gas or from oil refining. The power ratings of LP Gas appliances are stated in MJ of energy.

Lungs

An essential organ in the body that is fundamental for breathing. The lungs transport oxygen into the blood and expel CO_2 .

Megajoule (MJ)

Unit of energy equivalent to 1 million joules (J). One MJ is equivalent to 0.278 kWh, or 3.6 MJ is equivalent to 1 kW.

Metabolism

Metabolism is the complete set of chemical reactions that cells use to grow and reproduce, maintain their structures and respond to changes in their environments.

Methane

A chemical compound with the symbol CH_4 , produced by such things as natural gas fields and cattle. It contributes significantly to the greenhouse effect. It burns in air to produce CO_2 .

Natural gas

Natural gas is a fossil fuel, which means it comes from organic material deposited and buried in the earth millions of years ago. The main component of natural gas is methane. Methane is a non-toxic gas that can be used as fuel to generate electricity. The power rating of gas is stated in MJ/hr.

Natural process

Any process which exists in nature and is independent of human activity, for example the tides of the sea, weather patterns, or photosynthesis.

Nitrous oxide

A chemical compound with the chemical symbol N_2O . It is a colourless, non-flammable gas with a slightly sweet odour and taste which contributes to the greenhouse effect.

Non-renewable energy

A resource that is used faster than it can replace itself, for example, coal, oil and other fossil fuels. Non-renewable resources will eventually run out.

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Off-peak energy

This is energy used, for example, for lights, television, heating the hot water during the period when people are using the least amount of energy, that is, when most factories, schools and offices are closed for the night, most often between 11.00 pm and 7.00 am and on weekends. Off-peak energy use is less expensive because the demand for energy is lower.

Offsetting emissions

Donating to energy efficiency or renewable energy projects. Projects might focus on planting trees (which absorb CO₂), investing in renewable energy projects or capturing methane from rotting garbage in tips or collecting animal waste products (poo) and putting it in a digester to rot and turn it into methane. These projects can help to offset the carbon we can't avoid producing even when we have reduced our emissions through behavioural change.

Organism

A living thing, that is, a complex system of organs that all work together in such a way to enable it to function as a whole.

Oxygen (O₂)

An element that exists in its free form as a colourless, odourless gas and makes up about 21 per cent of the Earth's atmosphere. It is required for combustion and is essential for life in most organisms.

Ozone (O₃)

Ozone is a form of oxygen. It is a colourless gas that has a very pungent odour. It exists naturally at low concentrations in the stratosphere where it absorbs ultraviolet radiation. In the troposphere it exists naturally at extremely low concentrations.

These concentrations increase when sunlight acts on various gases, coming mainly from vehicle exhausts, and ozone then becomes a pollutant in the troposphere.

Ozone is a highly corrosive gas and is poisonous to most organisms. At concentrations as low as 0.00001 per cent (or 10 parts per hundred million) it can irritate the membranes lining the nose, throat and airways and can trigger or exacerbate asthma attacks.

Ozone 'hole'

The ozone 'hole' does not refer to a complete absence of ozone molecules but a general decrease in the number of ozone molecules scattered throughout a band of the stratosphere above some regions of the Earth. The phenomenon is more like a carpet thinning.

Ozone depletion

The reduction of ozone in the upper atmosphere is a result of human-produced chemicals, such as CFCs. Recent evidence suggests that ozone depletion in the upper atmosphere may affect climatic patterns on the Earth's surface.

Passive standby

When a product or appliance is not performing its main function but it is ready to be switched on (in most cases with a remote control) or is performing some secondary function (e.g. has a display or clock). This name also applies to power supplies for battery operated equipment (portable appliances which are intended to be used when disconnected from the base station) when the appliance is not being charged.

Peak energy

This is energy consumed during the time when most offices, schools, factories and homes are using energy, most often between 7.00 am and 11.00 pm, Monday to Friday. Peak energy use is more expensive than off-peak energy because of the higher energy demand.

Photosynthesis

The process that plants use to convert light, water and carbon dioxide into glucose, which it uses for growth. Oxygen is given off during photosynthesis.

Plant

A plant uses photosynthesis to make energy available to its cells.

Potential energy (stored or hidden)

Energy which is stored, with the potential to be utilised later.

Power

The rate of doing work or, more generally, the rate of converting energy from one form to another (see *Energy*). Measured in watts (W).

Power rating

Power ratings for electric appliances are stated in watts/hour. The power ratings for gas appliances are stated in megajoules per hour (MJ/h). Power ratings for gas appliances can also be referred to as MJ ratings.

Presentation

Communicating findings, data and stories to an audience.

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Presentation ideas

There is a wide variety of ways to present results from **Calculate**, including multimedia, speech, developing a poster and writing a song. For a list of presentation ideas, see *Support material #18: Creative presentation ideas*.

Primary energy source

Energy in its raw form, such as coal and crude oil, before it is processed into forms suitable for end use, such as electricity.

Protein

Large compounds that organisms breakdown into amino acids and used for cell processes.

Prototype

An original, full-scale, and usually working model of a new product or new version of an existing product.

Renewable energy

Energy sources, for example, wind and sunlight, that are constantly replenished.

Replenished

To fill or make full again.

Standby

Appliances and equipment with a 'standby mode' may include any household product that consumes power while not performing its primary function. 'Standby' is when an appliance is at its lowest power consumption when connected to mains power, even if the appliance is turned off (lowest power mode that can be influenced by the user).

Sustainable

An ecosystem condition in which biodiversity, renewability, and resource productivity are maintained over time. Also means meeting the needs of the present without compromising the ability of future generations to meet their needs.

Sustainable energy

Sustainable energy is the production or use of energy in a way that meets current energy needs but doesn't compromise the energy supply for future generations.

Switched "Off"

When a product or appliance is connected to a power source but does not produce any sound or picture, transmit or receive information or is waiting to be switched 'on' by the consumer. If the product has a remote control, it cannot be woken by the remote control from off mode. While the

product may be doing some internal functions in off mode (e.g. memory functions) these are not obvious to the user.

Transfer of energy

When energy is transferred from one place to another. There are two main types of energy transfer: work process and heat flow e.g. a pan of water on the stove gets hot when the gas jet is turned on. The energy in the gas is burned to create heat, which is transferred to the water in the pan through heat flow.

Transformation of energy

When energy is converted from one form to another, e.g. electrical energy to heat energy in a bar radiator.

Ultraviolet rays

Light that has a wavelength shorter than that of visible light. It is damaging to human skin cells and eyes.

Volts

The unit of electrical pressure. High voltage requires more insulation and clearances than low voltage.

Watt

This is the rate at which energy use is measured. A watt is defined as the number of joules per second, that is, $1\text{ W} = 1\text{ J/s}$.

Watt-hours, kilowatt-hours

Electricity consumption is measured in units of watt-hours (Wh) or, more typically, kilowatt-hours (kWh) and megawatt-hours (MWh), where $1\text{ MWh} = 1000\text{ kWh}$. 1 kWh means 1 kW of power being used for 1 hour.

Work

The transfer of force from one body or system to another. Work is measured in joules (J).