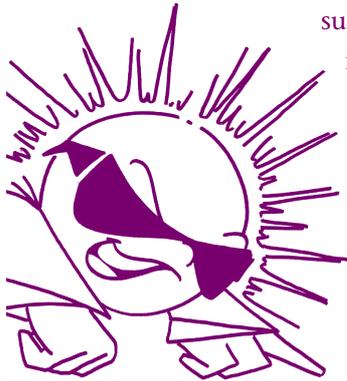




Fact Sheet No. 4

SOURCES OF RENEWABLE AND NON-RENEWABLE ENERGY

Energy resources can be described as renewable and non-renewable. Renewable energy sources are those which are continually being replaced such as energy from the sun (solar) and wind. If an energy resource is being used faster than it can be replaced (for example, coal takes millions of years to form) then it will eventually run out. This is called a non-renewable energy source.



Renewable energy

Solar energy

Solar energy is light and heat energy from the sun. Solar cells convert sunlight into electrical energy. Thermal collectors convert sunlight into heat energy. Solar technologies are used in watches, calculators, water pumps, space satellites, for heating water, and supplying clean electricity to the power grid. There is enough solar radiation striking the surface of the earth to provide all of our energy needs.

Wind energy

Moving air turns the blades of large windmills or generators to make electricity, or to pump water out of the ground. A high wind speed is needed to power wind generators effectively. While wind generators don't produce any greenhouse gas emissions they may cause vibrations, noise and visual pollution.

Tidal energy and wave energy

If a dam or barrage is built across a river mouth or inlet, electricity can be obtained by the flow of water through turbines in the dam as the tide rises and falls. The movement of waves can also drive air turbines to make electricity. Although tidal and wave energy don't produce pollution, they can cause other environmental problems.

Biomass energy

Biomass is plant and animal material that can be used for energy. This includes using wood from trees, waste from other plants (for example, bagasse from sugar cane) and manure from livestock. Biomass can be used to generate electricity, light, heat, motion and fuel. Converting biomass energy into useable energy has many environmental benefits. It uses waste materials that are usually dumped, and uses up methane (a greenhouse gas). Fuels such as ethanol can be made from biomass and used as an alternative to petrol to power motor cars.

Hydroelectric energy

Fast-flowing water released from dams in mountainous areas can turn water turbines to produce electricity.



While it doesn't cause pollution, there are many other environmental impacts to consider. Ecosystems may be destroyed, cultural sites may be flooded and sometimes people need to be resettled. There are also impacts on fish breeding, loss of wildlife habitat and changes in water flow of rivers.

Geothermal energy

Geothermal energy uses heat energy from beneath the surface of the earth. Some of this heat finds its way to the surface in the form of hot springs or geysers. Other schemes tap the heat energy by pumping water through hot dry rocks several kilometres beneath the earth's surface. Geothermal energy is used for the generation of electricity and for space and water heating in a small number of countries.



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Non-renewable energy

Coal

Coal is a fossil fuel formed over millions of years from decomposing plants. Coal is mainly burned in power stations to make electricity and as a source of heat for industry. Most of the electricity generated in Australia comes from burning coal. When coal is burned it produces large amounts of carbon dioxide, one of the gases responsible for the enhanced greenhouse effect (the increase in the world's temperature due to the increased insulating effect of the earth's atmosphere).

Petroleum

Petroleum, or crude oil, is formed in a similar way to coal. But instead of becoming a rock, it became a liquid trapped between layers of rocks. It can be made into gas, petrol, kerosene, diesel fuel, oils and bitumen. These products are used in houses for heating and cooking and in factories as a source of heat energy. They are also used in power stations and to provide fuel for transport. However their use, especially petrol and diesel, produces large amounts of carbon dioxide emissions. It also produces other poisonous gases that may harm the environment and people's health. Another common use for petroleum is in producing petrochemicals such as plastics.



Gas

Gas is made in the same way as petroleum and is also trapped between layers of rock. Natural gas is tapped, compressed and piped into homes to be used in stoves and hot water systems. LPG (Liquefied Petroleum Gas) is made from crude oil. It is used for cooking and heating in homes, industrial heating in boilers, kilns and furnaces, and for camping and caravanning appliances.

LPG can also be used as an alternative to petrol as an engine and transport fuel.

Using LPG reduces greenhouse gas emissions from a vehicle by up to 20 per cent.



Nuclear energy

Nuclear energy is the energy released when atoms are either split or joined together. A mineral called uranium is needed for this process. Heat energy and steam produced can drive an electricity generator in a power station, or provide direct mechanical power in a ship or submarine. At each stage of the process various types of radioactive waste are produced. This waste is poisonous and can cause harm to people and the environment coming into contact with it.