ENERGY GENERATION

Key Revision Facts: GCSE Technology

Energy can be generated from a range of different sources

Fossil Fuels

Fossil fuel is a fuel formed by natural processes. They were created from the fossilized, buried remains of plants and animals that lived millions of years ago. Fossil fuels have a high carbon content. Burning fossil fuels releases heat energy. The carbon emissions caused by the burning of fossil fuels are the main contributor to global warming. Fossil fuels are a form of non-renewable energy source. i.e., when it's gone, it's gone.

Coal

Coal is a combustible black or brownish-black sedimentary rock. Coal power stations burn coal to generate electricity. The furnace heat converts boiler water to steam, which is then used to spin turbines that turn generators. The turbine turns the magnets in the generator to create electricity.

Gas

Natural gas is a colorless, odorless, flammable gas that usually contains about 90% methane. Gas-fired power stations burn natural gas to produce electricity. There are two main ways they do this – open cycle and combined cycle.

Open-cycle production is the most common method. Natural gas is burned to create a pressurized gas, which powers a turbine connected to a generator. The turbine turns the magnets in the generator to produce electricity.

Combined-Cycle Gas & Steam Turbine plant generates energy using two different types of turbines in combination: a gas turbine and a steam turbine. In essence, it recycles its fuel to maximize its electricity output.

Oil

Oil is a naturally occurring, unrefined petroleum product composed of hydrocarbons. Most oil-fired generators are either turbines or internal combustion engines used to supply power only at times of peak electric power demand because of the high price of petroleum relative to other fuels, air pollution restrictions, and lower efficiencies.

Nuclear

Nuclear power uses atomic reactions that release nuclear energy to generate heat, which is most frequently used in steam turbines to produce electricity in a nuclear power plant. A primary environmental concern related to nuclear power is the creation of radioactive wastes. Waste is radioactive and safe disposal is complicated and expensive.

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Renewable Energy

Renewable energy is valuable energy that is collected from renewable natural sources or processes that are constantly replenished.

Wind

Wind power uses wind to provide mechanical power through wind turbines to turn electric generators for electrical power.

Solar

The sun creates two main types of energy – light and heat. Solar power is the conversion of energy from sunlight into electricity using Solar Panels (photovoltaics). Solar water heaters use a rooftop cell to absorb the sun's heat and transfer it to the water tank. The disadvantage of solar power is that when the sun is not shining, there is no energy generation.

Tidal

Tidal power is harnessed by converting energy from the ocean's tidal action is converted to electric power.

Hydro-electric

Hydroelectric energy is a form of energy that harnesses the power of water in motion, such as water flowing over a waterfall, water wheel, or dam to generate electricity.

Biomass

Biomass power is carbon-neutral electricity generated from renewable organic waste that would otherwise be dumped in landfills, openly burned. Examples are wood, energy crops, and waste from forests, yards, or farms. When burned, the energy in biomass is released as heat.

Geothermal

Geothermal power is a form of renewable energy that taps into the heat emanating from the earth's core. It can be used for many energy uses:

Directly: By bringing geothermal spring water up to the earth's surface and using it to heat homes and buildings, district water, and so on

For electricity: High-temperature geothermal water or steam located within a mile or two of the earth's surface is used in geothermal power plants to generate clean electricity

In heat pumps: These use the stable temperatures found in subsurface soils or water near the earth's surface to control building temperatures by providing cool or warm air

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VERSION INFORMATION

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