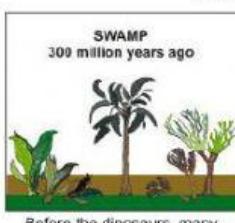
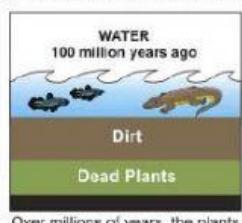
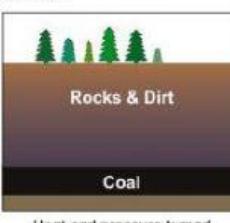


**HOW COAL WAS FORMED**

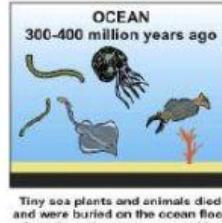
Before the dinosaurs, many giant plants died in swamps.



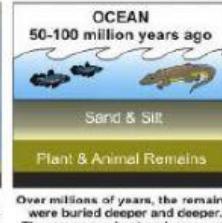
Over millions of years, the plants were buried under water and dirt.



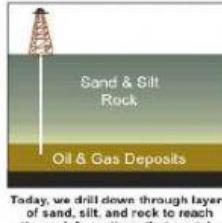
Heat and pressure turned the dead plants into coal.

**PETROLEUM & NATURAL GAS FORMATION**

Tiny sea plants and animals died and were buried on the ocean floor. Over time, they were covered by layers of silt and sand.



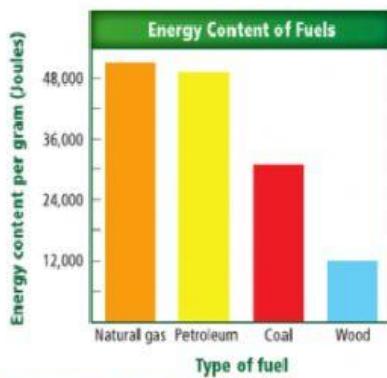
Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.



Today, we drill down through layers of sand, silt, and rock to reach the rock formations that contain oil and gas deposits.

➤ **Fossil Fuel Formation:** Form From the remain of ancient plants and animals that were buried and altered over millions of years.

Fossil Fuel	➤ Petroleum	➤ Natural Gas	➤ Coal
Definition	Is a flammable liquid formed from a decay of ancient organisms, such as microscopic plankton and algae.	Is a gas formed when ancient organisms decayed on the seafloor and found trapped on top of petroleum.	Is a solid fossil fuel can be found in mines formed as swampy plant buried beneath sediments decayed and compacted into peat
Composed mostly of	Mixture of Hydrocarbons	Methane and other gaseous hydrocarbon such as propane and butane.	Mixture of hydrocarbons and other chemical compounds It's contained more impurities such as sulfur dioxide and nitrogen oxides.
Uses	Plastic - Synthetics - Cosmetics Medicines -Lubricants (grease – motor – oil) -Wax -asphalt  <b>✓ Note:</b> Fractional distillation: is process used to separate hydrocarbon compounds found in petroleum in distillation towers. Low boiling point (Vapor) → top of tower High boiling point (liquid) → bottom of tower like asphalt and waxes.	Cooking Heating manufacturing  <b>✓ Note:</b> produces more energy more efficiently than coal and petroleum burns cleaner than the other fossil fuels contains fewer impurities	Produce electricity  <b>✓ Note:</b> The most abundant fossil fuel. Estimated to last for 250 years



From the figure: The fuel with the greatest chemical potential energy per gram releases the greatest amount of energy.

1kg of natural gas → 50,000 joules

1Kg of petroleum → 48,000 joules

1Kg of coal → 30,000 joules

1Kg of wood → 12,000

✓ What happens when fossil fuels are burned?

A combustion reaction occurs

Carbon and hydrogen atoms combine with oxygen to form carbon dioxide and water



This converts Chemical Potential energy stored in the bond between atoms into →

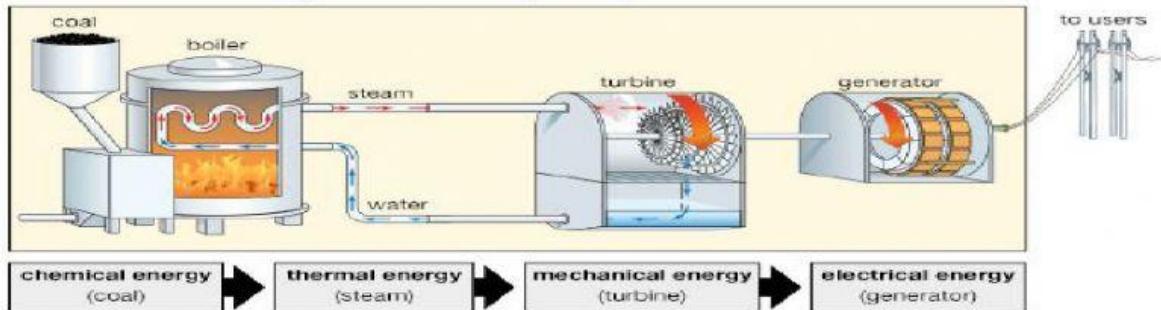
Thermal energy and light.

**How is the chemical potential energy stored in fossil fuels converted to electrical energy?**

➤ **Electricity:** 70% of electrical energy used in US is produced by burning fossil fuels.

**The process is shown below:**

The conversion of energy at a coal-fired power plant



Part of power station	What happens here?	What energy transfer happens here?
boiler combustion chamber	Coal is burned	Chemical energy in the coal → Thermal Energy that heats water and produces pressurized steam
turbine	Steam strikes the blades of the turbine and turns it around. (spin)	Thermal energy → Mechanical energy of the turbine
generator	An electric current is produced	Mechanical energy → electrical energy that is transmitted to homes, schools through power line

➤ **Power plant efficiency:**

35% of energy stored in fossil fuels is transported to homes, schools and business

65% is converted into thermal energy.

Fossil Fuels release carbon dioxide (CO<sub>2</sub>) when they are burned

Scientists think the increase in atmospheric CO<sub>2</sub> concentration causes global warming