

FOSSIL FUELS

Fossil fuels are the major energy source of the world nowadays used in transportation, power generation, among others. Fossil energy molecules are composed primarily of carbon and hydrogen atoms.

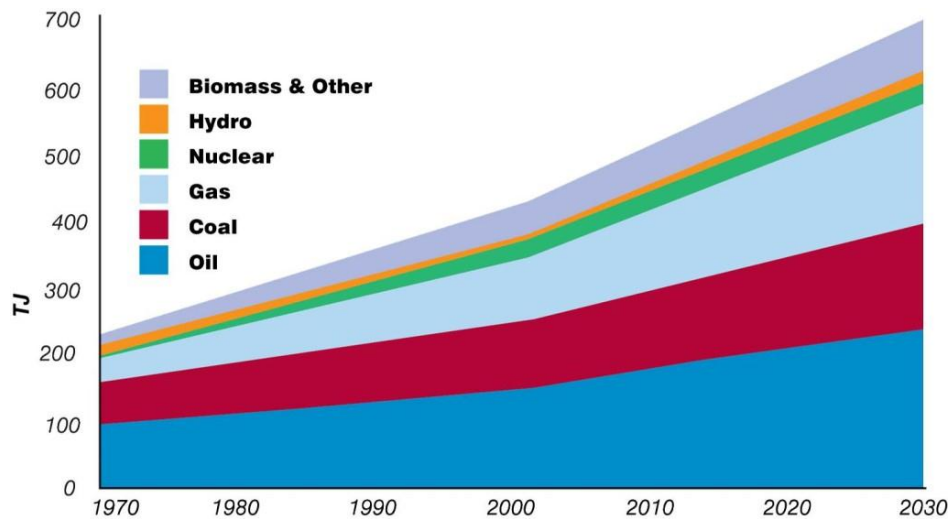
Fossil fuels are called “non-renewable energy” because its production process is too long compared to its rate of consumption.

Its advantages are that they can be used by a direct combustion process; they are relatively cheap and easy to carry.

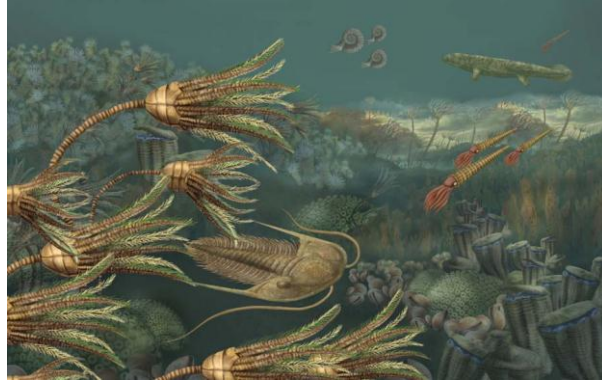
On the other hand, its disadvantage is that many people think they are the main cause of global warming, cause acid rain, and are not sustainable in the long term as well as the existence of political and economic interests that can cause major price increase.

The use of fossil fuels makes modern life possible and is the major energy sources used to generate steam, electricity and transportation systems. Its use makes possible to produce hundreds of thousands of commercial goods.

Fossil fuels are the most used energy source into the world, accounting for 84% of the energy demands into the world, with oil accounting for 36%, coal 27%, natural gas 23% of global consumption.



A theory establishes that their molecules were fixed mainly as glucose (sugar) in the processes of photosynthesis that occurred in prehistoric plant chloroplasts with light from the Sun that was stored into molecules of plant biomass, animals and other organisms from the remote past, mainly from the Paleozoic in the “Carboniferous period” before the era of dominance of large reptiles, mainly formed from 400 million years ago to 280 million years ago (although some fossil fuels were formed at the time of the dinosaurs).



At that time the weather in the Earth was warmer, the lithosphere of the Earth was full of swamps with huge trees, ferns, ancient plants and animals. The sea was filled with algae and plankton.

Fossil fuels come in three basic forms: coal (solid state), hydrocarbons (oil and derivatives in liquid) and natural gas (gaseous).

When these ancient life forms died in large numbers, they were flooded and partially decomposed by bacteria in the absence of oxygen.

These huge amounts of organic material is called “peat”, which settled in the bottom of the sea or marsh and eventually with the geological processes of the earth were buried by enormous layers of rock, mud (with almost 80% of water) and sand to hundreds and thousands of meters deep underground.



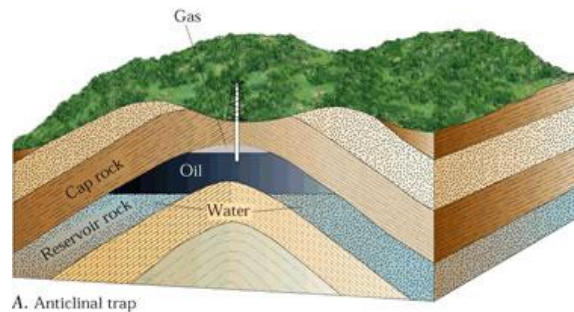
This process is called “Diagenesis” because it initiates the change of organic compounds with carbohydrates, sugars, protein, fat and lignins.

While more rocks were piled on each other, increasing the weight, pressure and temperature on the “peat” until finally the oxygen, nitrogen, sulfur and water were expelled leaving molecules of the substance with a high concentration of carbon and hydrogen, in smaller and more stable particles, with a large amount of energy stored in their chemical bonds. This process took hundreds and millions of years.

Resulting levels of heat and pressure caused organic matter be chemically altered to first form “peat”, then a waxy material called “kerogen” found into oil shale, and then with more heat into liquid and gaseous hydrocarbons in a process called

“catagenesis” beginning at a depth of 1 to 2 kilometers and reaching its maximum generation to 3 kilometers deep in oil and 3.5 kilometers in natural gas.

Depending on the combination of plants and animals that formed it, the presence of other elements within the rock through the geological processes, the quantity of the buried material and the conditions of temperature and pressure will decompose upon the type and characteristics of the fossil fuel. Each specific mixture of hydrocarbons gives a special property as boiling point, melting point, density, viscosity, etc.

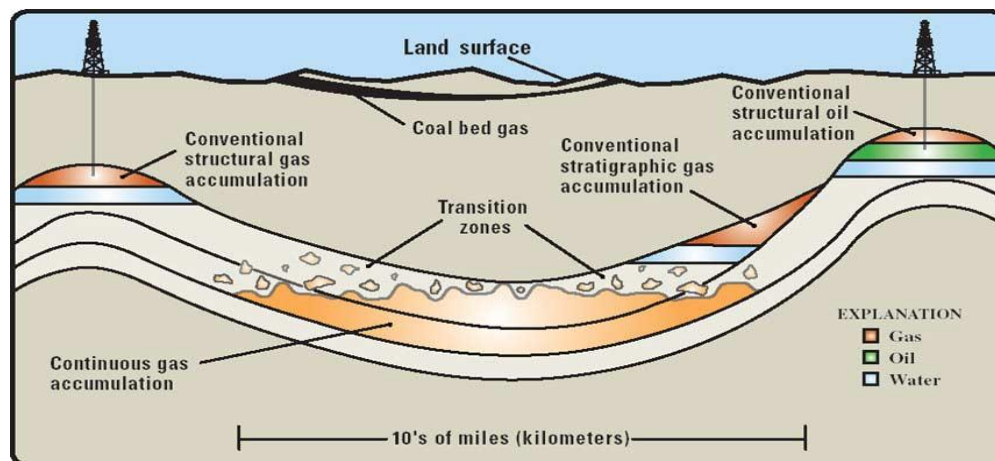


Over time, these substances began to seek a way out through the earth’s crust up to the surface through porous rocks, shales or silty muds. Some rocks were dense enough to prevent leakage to the surface, so that the fuel was trapped or reserved in them, these rocks were called “caprocks”.

Coal comes from marshy areas on Earth (with fresh or sea water with sulphides)



Oil comes mostly from large masses of marine plankton accumulated in the bottom of the sea or river and lake sediments that were covered under large layers of silt.



Natural gas is formed into deeper subterranean regions where there was more pressure and temperature during formation of the oil. In some areas, these processes occurred into ancient seas which dried away.

Source: <http://www.artinaid.com/2013/04/fossil-fuels/>