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## **Energy Sources**

Primary energy sources take many forms, including nuclear energy, fossil energy - like oil, coal and natural gas - and renewable sources like wind, solar, geothermal and hydropower. These primary sources are converted to electricity, a secondary energy source, which flows through power lines and other transmission infrastructure to your home and business.

Coal is a combustible black or brownish-black sedimentary rock usually occurring in rock strata in layers or veins called coal beds or coal seams. The harder forms, such as anthracite coal, can be regarded as metamorphic rock because of later exposure to elevated temperature and pressure. Coal is composed primarily of carbon, along with variable quantities of other elements, chiefly hydrogen, sulfur, oxygen, and nitrogen. Coal is a fossil fuel that forms when dead plant matter is converted into peat, which in turn is converted into lignite, then sub-bituminous coal, after that bituminous coal, and lastly anthracite. This involves biological and geological processes. The geological processes take place over millions of years.

Oil, otherwise known as ‘petroleum or crude oil’, is a thick black liquid composed primarily of hydrogen and carbon. Oil also contains trace elements of sulphur, nitrogen and oxygen.

Today’s oil deposits were formed millions of years ago, when dead marine organisms sunk to the bottom of the ocean and were buried under deposits of sedimentary rock. Subject to intense heat and pressure, these organisms underwent a transformation in which they were converted to oil over millions of years. This process is similar to the process of natural gas formation, however oil forms under a limited range of temperatures while natural gas forms under a wider range. This limited range of temperatures is called the ‘oil window’.

Oil is found in specific underground rocks called reservoirs. The rocks have tiny spaces in them that allow them to hold water, natural gas and/or oil. Impermeable rocks called cap rocks surround the reservoir and trap oil in its place.

Through exploratory activities such as seismic, well sampling, and subsurface mapping, geoscientists locate sites for oil drilling.

Oil is extracted from the reservoir by drilling a well and pumping it up the well. Once recovered, oil is transported by pipeline, ship, rail, or truck to a refinery where it undergoes a complex process that produces petroleum products such as gasoline, diesel, jet-fuel, home-heating fuel, lubricating oil and asphalt along with petrochemicals that are used to make common products such as plastic, drugs, synthetic fiber, soap and paint. Approximately 71 percent of global oil consumption is used to produce fuel to power transportation systems.

Oil and gas. Texas, Saudi Arabia, Kuwait, and Venezuela: these are only a few of the places where oil has been found. Today, big oil companies still spend millions of dollars looking for oil, and when they find it, a new oil well is started and the company makes even more millions. Sometimes they don't find oil underneath the earth. They find gas. But gas, too, can be used for energy. It is a good energy source for heating and cooking.

Nuclear or atomic energy. It is incredible to think that from the nucleus of the atom — one of the smallest things in the world — can come enormous amounts of energy. This energy, which is called nuclear or atomic energy, can either be controlled in nuclear power stations to create electricity for millions of homes, or it can be used in war to destroy millions of homes.

Hydropower is produced in 150 countries, with the Asia-Pacific region generating 33 percent of global hydropower in 2013. China is the largest hydroelectricity producer, with 920 TWh of production in 2013, representing 16.9 percent of domestic electricity use.

The cost of hydroelectricity is relatively low, making it a competitive source of renewable electricity. The hydro station consumes no water, unlike coal or gas plants. The average cost of electricity from a hydro station larger than 10 megawatts is 3 to 5

U.S. cents per kilowatt-hour With a dam and reservoir it is also a flexible source of electricity since the amount produced by the station can be changed up or down very quickly to adapt to changing energy demands. Once a hydroelectric complex is constructed, the project produces no direct waste, and has a considerably lower output level of greenhouse gases than fossil fuel powered energy plants.

Geothermal energy is heat energy generated and stored in the Earth. Thermal energy is the energy that determines the temperature of matter. The geothermal energy of the Earth's crust originates from the original formation of the planet and from radioactive decay of materials. The geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface.

In the future the energy of the sun, wind, sea and the heat of underground waters will be used on a large scale. These are the so-called “free” energy sources. They will be utilized only when they are more profitable than the traditional ones, because their exploitation is usually much more expensive than energy supply from large electric power stations which run on coal or nuclear fuel.

The utilization of the biomass – agricultural wastes and city runoff– can be found very effective: they can be employed in obtaining gas.

In addition it may happen that new energy sources will be discovered. What if, for example, the vacuum is a boundless ocean of matter in some specific state? Perhaps in the future man will discover some ways of getting energy from this matter? Or, for example, the undiscovered cosmic forces or the annihilation energy which arises from the fusion of matter and anti-matter.

Now this is fantasy which may become a reality. Unknown and undiscovered phenomena can be found more effective, than familiar ones.

#### Literature:

- 1.<https://energy.gov>
- 2.<https://en.wikipedia.org>
- 3."Coal Mining Industry Report" IBISWorld, 2009
- 4.<https://studfiles.net>