Chapter- 5 Coal and Petroleum

Natural resources

<u>Coal</u>

Petroleum

Natural Gas

Some Natural Resources are Limited



Natural resources

Natural resources are materials and components that can be found within the environment. Natural resources are naturally occurring substances that are considered valuable in their relatively unmodified (natural) form. A natural resource's value rests in the amount of the material available and the demand for it.

Classification of Natural Resources

Inexhaustible Natural Resources

These resources are present in unlimited quantity in nature and are not likely to be exhausted by human activities. Examples are: sunlight, air.

Exhaustible Natural Resources

The amount of these resources in nature is limited. They can be exhausted by human activities. Examples of these resources are forests, wildlife, minerals, coal, petroleum, natural gas etc.

Coal, petroleum and natural gas are exhaustible natural resources. These were formed from the dead remains of living organisms (fossils). So, these are all known as fossil fuels.



Coal

Coal is a combustible, sedimentary, organic rock, which is composed mainly of carbon, hydrogen and oxygen. It is formed from vegetation, which has been consolidated between other rock strata and altered by the combined effects of pressure and heat over millions of years to form coal steams.

The different amounts of conversion result in different types of coal. There are four main categories of coal: anthracite, bituminous, sub bituminous, and lignite.



Coal

These different varieties are rated upon the percentage of carbon in the coal and on their heating value (amount of energy released when burned), which are related to the heat and pressure that the coal underwent in being formed.

Coal is processed in industry to get some useful products such as coke, coal tar and coal gas.

Coal tar is a thick black liquid that is a byproduct of coke production. It works as an insulating agent, working with the wall insulation to help maintain a comfortable temperature inside the building, regardless of the outside weather.

Another use of this liquid has to do with fabric production. In order to create fabrics that will hold up to constant sunlight exposure and retain their colour, coal tar is added to the dye treatments that are administered to the fabrics.





Coke, solid residue remaining after certain types of bituminous coals are heated to a high temperature out of contact with air until substantially all of the volatile constituents have been driven off. The residue is chiefly carbon, with minor amounts of hydrogen, nitrogen, sulfur, and oxygen. Also present in coke is the mineral matter in the original coal, chemically altered and decomposed during the coking process.



Coal gas, gaseous mixture—mainly hydrogen, methane, and carbon monoxide—formed by the destructive distillation (*i.e.*, heating in the absence of air) of bituminous coal and used as a fuel.





Petroleum

Petrol is used as a fuel in light automobiles such as motor cycles/ scooters and cars. Heavy motor vehicles like trucks and tractors run on diesel. Petrol and diesel are obtained from a natural resource called petroleum.



Petroleum was formed from organisms living in the sea. As these organisms died, their bodies settled at the bottom of the sea and got covered with layers of sand and clay. Over millions of years, absence of air, high temperature and high pressure transformed the dead organisms into petroleum and natural gas.

Refining of Petroleum

Petroleum is a dark oily liquid. It has an unpleasant odour. It is a mixture of various constituents such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax, etc. The process of separating the various constituents/ fractions of petroleum is known as refining. It is carried out in a petroleum refinery.

S.	Constituents of petroleum	Uses
No		
1	Petroleum Gas in Liquid	Fuel for home and industry
	form	
	(LPG)	
2	Petrol	Motor fuel, aviation fuel, solvent for
		dry cleaning
3	Kerosene	Fuel for stoves, lamps and for jet aircrafts
4	Diesel	Fuel for heavy motor vehicles, electric
		generators
5	Lubricating oil	Lubrication
6	Paraffin wax	Ointments, candles, Vaseline etc.
7	Bitumen	Paints, road surfacing

Various constituents of petroleum and their uses



Natural Gas

Natural gas is a very important fossil Fuel. Natural gas is stored under high pressure as

compressed natural gas (CNG). CNG is used for power generation. It is now being used as a fuel for transport vehicles because it is less polluting. It is a cleaner fuel.

The great advantage of CNG is that it can be used directly for burning in homes and factories where it can be supplied through pipes. Natural gas is also used as a starting material for the manufacture of a number of chemicals and fertilizers.

Uses of natural gas

- For cooking.
- To run central heating and cooling systems, and cloth dryers.
- For electricity generation through the use of gas turbines and steam turbines.
- In the manufacture of fabrics, glass, steel, plastics, paint and other products.





Some Natural Resources are Limited

Some natural resources are exhaustible like fossil fuels, forests, minerals etc. Coal and petroleum are fossil fuels. It required millions of years for the dead organisms to get converted into these fuels. On the other hand, the known reserves of these will last almost a few hundred years. Moreover, burning of these fuels is a major cause of air pollution. Their use is also linked to global warming.



Petrol

It is therefore necessary that we use these fuels only when absolutely necessary. This will result in better environment, smaller risk of global warming and their availability for a longer period of time.

In India, the Petroleum Conservation Research Association (PCRA) advises people how to save petrol/diesel while driving. Their tips are:

- Drive at a constant and moderate speed as far as possible
- Switch off the engine at traffic lights or at a place where you have to wait,
- Ensure correct tyre pressure, and
- Ensure regular maintenance of vehicle.

