



Daffodil International University
Department of Electrical & Electronic Engineering
Course Code: EEE 450
Course Title: Power Plant Engineering Lab.

Lab Experiment 01: Familiarization with different non-renewable and renewable energy source for Power Plant.

Objective: To be familiar with the various non-renewable and renewable energy sources for power plants.

Theory:

Electrical energy is produced from energy available in various forms in nature; it is desirable to look into the various sources of energy. These sources of energy are:

Renewable Source:

- i) The Sun ii) The Wind iii) Water iv) Biogas

Non-Renewable Source:

- i) Fuels (Gas, Coal, Oil, Diesel etc) ii) Nuclear energy

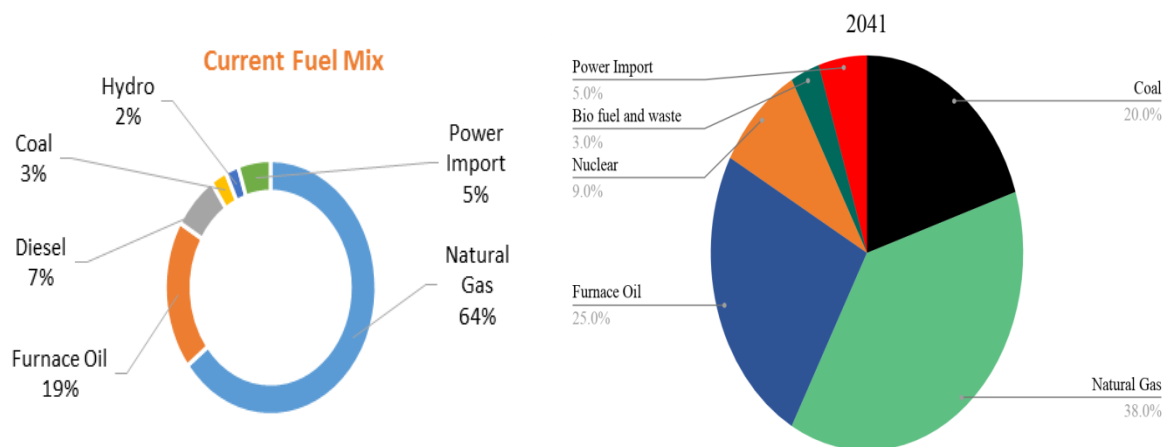
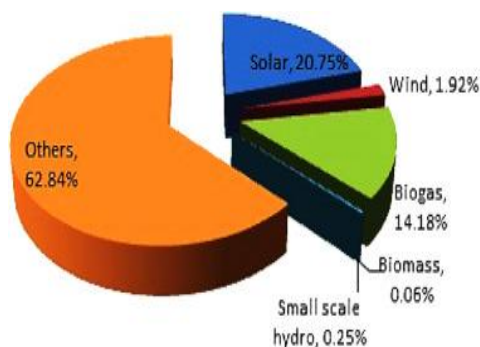


Fig: Energy Sharing Scenario of Bangladesh for Electricity generation.

(i) The Sun. The Sun is the primary source of energy. The heat energy radiated by the Sun can be focused over a small area by means of reflectors. This heat can be used to raise steam and electrical energy can be produced with the help of turbine-alternator combination. However, this method has limited application because:

- (a) it requires a large area for the generation of even a small amount of electric power
- (b) it cannot be used in cloudy days or at night
- (c) it is an uneconomical method.

(ii) The Wind. This method can be used where wind flows for a considerable length of time. The wind energy is used to run the wind mill which drives a small generator. In order to obtain the electrical energy from a wind mill continuously, the generator is arranged to charge the batteries. These batteries supply the energy when the wind stops. This method has the advantages that maintenance and generation costs are negligible. However, the drawbacks of this method are

- (a) variable output
- (b) unreliable because of uncertainty about wind pressure and
- (c) power generated is quite small.

(iii) Water. When water is stored at a suitable place, it possesses potential energy because of the head created. This water energy can be converted into mechanical energy with the help of water turbines. The water turbine drives the alternator which converts mechanical energy into electrical energy. This method of generation of electrical energy has become very popular because it has low production and maintenance costs.

(iv) Fuels. The main sources of energy are fuels *viz.*, solid fuel as coal, liquid fuel as oil and gas fuel as natural gas. The heat energy of these fuels is converted into mechanical energy by suitable prime movers such as steam engines, steam turbines, internal combustion engines etc. The prime mover drives the alternator which converts mechanical energy into electrical energy. Although fuels continue to enjoy the place of chief source for the generation of electrical energy, yet their reserves are diminishing day by day. Therefore, the present trend is to harness water power which is more or less a permanent source of power.

(v) Nuclear energy. Towards the end of Second World War, it was discovered that large amount of heat energy is liberated by the *fission* of uranium and other fissionable materials. It is estimated that heat produced by 1 kg of nuclear fuel is equal to that produced by 4500 tonnes of coal. The heat produced due to nuclear fission can be utilised to raise steam with suitable arrangements. The steam can run the steam turbine which in turn can drive the alternator to produce electrical energy. However, there are some difficulties in the use of nuclear energy. The principal ones are

- (a) high cost of nuclear plant
- (b) problem of disposal of radioactive waste and dearth of trained personnel to handle the plant.

Question:

1. In your opinion, which available energy source needs to emphasize for the future power generation of Bangladesh. Why?