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Energy exists in different forms in nature but the most important form is the electrical energy. The modern society is so much dependent upon the use of electrical energy that it has become a part and parcel of our life. In this article, we shall focus our attention on the general aspects of electrical energy, its generation, transmission and distribution system which is known as Power System.

A power system is a combination of central generating stations, electric power transmission system, Distribution and utilization system. Each one of these systems is explained in detail in the next sections.

The transmission of electric power from a power station to consumers" premises is known as the electric supply system.

Nowadays, 3-phase, 3-wire ACsystem is universally adopted for generation and transmission of electric power as an economical proposition. However, distribution of electric power is done by 3-phase, 4-wire a.c. system. The underground system is more expensive than the overhead system. Therefore,the overhead system is mostly adopted for transmission and distribution of electric power.

Energy is generated (transformed from one to another) at the generating stations. Generating stations are of different type, for example, thermal, hydel, solar power sations, nuclear. The generated electricity is stepped up through the transformer and then transferred over transmission lines to the load centres.

It may appear advisable to use the highest possible voltage for transmission of electric power to save conductor material and have other advantages. But there is a limit to which this voltage can be increased. It is because the increase in transmission voltage introduces insulation problems as well as the cost of switchgear and transformer equipment is increased. Therefore, the choice of proper transmission voltage is essentially a question of economics. Generally, the primary transmission is carried at 66 kV, 132 kV, 220 kV or 400 kV.

The electric power at 132 kV is transmitted by 3-phase, 3-wire overhead system to the outskirts of the city. This forms the primary transmission.

The primary transmission line terminates at the receiving station (RS) which usually lies at the outskirts of the city. At the receiving station, the voltage is reduced to 33kV by step-down transformers. From this station, electric power is transmitted at 33kV by 3-phase, 3-wire overhead system to various sub-stations (SS) located at the strategic points in the city. This forms the secondary transmission.

The secondary transmission line terminates at the sub-station (SS) where voltage is reduced from 33 kV to 11kV, 3-phase, 3-wire. The 11 kV lines run along the important road sides of the city. This forms the primary distribution. It may be noted that big consumers (having demand more than 50 kW) are generally supplied

power at 11 kV for further handling with their own sub-stations.

Fig. 6 shows the elements of low voltage distribution system. Feeders (SC or SA) radiating from the distribution sub-station (DS) supply power to the distributors (AB, BC, CD and AD). No consumer is given direct connection from the feeders. Instead, the consumers are connected to the distributors through their service mains.

We hope you’ve got the basic idea of the power system, its basic components and their functioning. You may also want to read our articles on theimplementation of protection schemes in ETAPandLoad flow analysis of a power network.

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