

1.1 STRUCTURE OF POWER SYSTEM

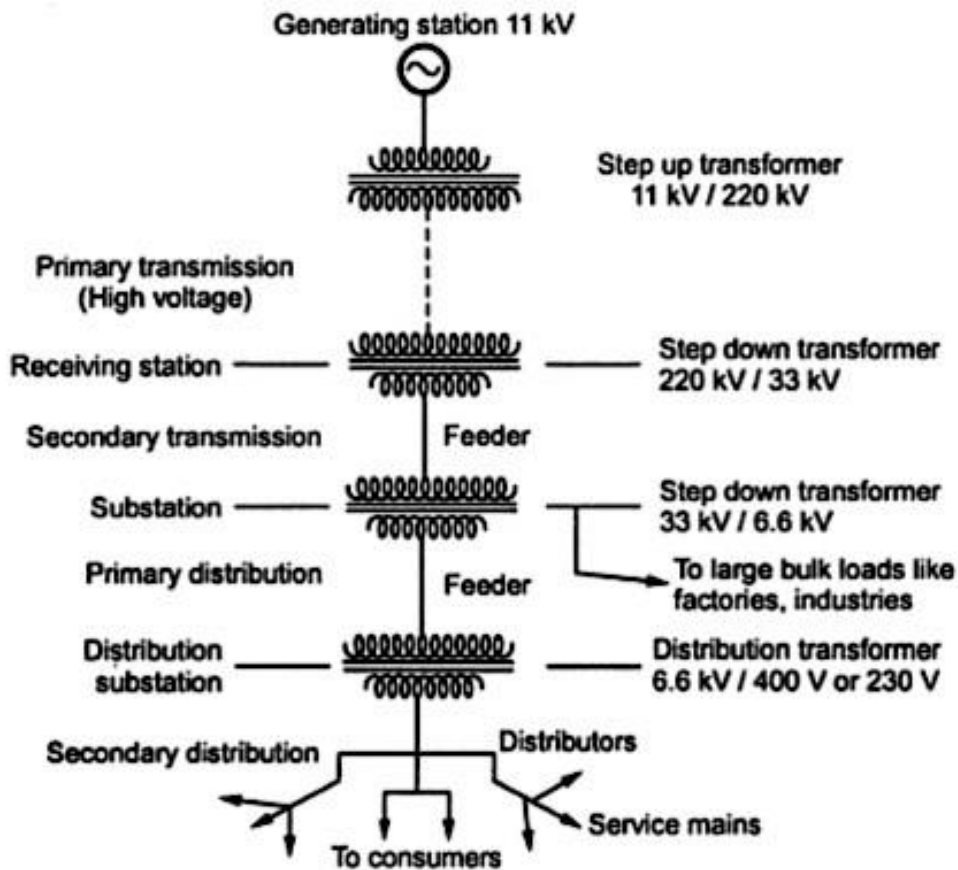


Figure 1.1 Structure of Power System

[Source: "Principles of Power System" by V.K.Mehta Page: 128]

COMPONENTS OF POWER SYSTEM

Power transformers:

Power transformers are used generation and transmission network for stepping-up the voltage at generating station and stepping-down the voltage for distribution. Auxiliary transformers supply power to auxiliary equipments at the substations.

Current transformers: (CT):

The lines in substations carry currents in the order of thousands of amperes. The measuring instruments are designed for low value of currents. Current transformers are connected in lines to supply measuring instruments and protective relays.

Potential transformers (PT):

The lines in substations operate at high voltages. The measuring instruments are designed for low value of voltages. Potential transformers are connected in lines to supply measuring instruments and protective relays. These transformers make the low voltage instruments suitable for measurement of high voltages. For example a 11kV/110V PT is connected to a power line and the line voltage is 11kV then the secondary voltage will be 110V.

Circuit breaker (CB):

Circuit breakers are used for opening or closing a circuit under normal as well as abnormal (faulty) conditions. Different types of CBs which are generally used are oil circuit breaker, air-blast circuit breaker, and vacuum circuit breaker and SF6 circuit breaker.

Isolators or Isolating switches:

Isolators are employed in substations to isolate a part of the system for general maintenance. Isolator switches are operated only under no load condition. They are provided on each side of every circuit breaker Bus-bar: When number of lines operating at the same voltage levels needs to be connected electrically, bus-bars are used. Bus-bars are conductors made of copper or aluminum, with very low impedance and high current carrying capacity. Different types of bus-bar arrangements are single bus bar arrangements, single bus-bar with double bus-bar arrangements, sectionalized double bus-bar arrangement, double main and auxiliary bus-bar arrangement, breaker and a half scheme/1.5 Breaker scheme, and ring bus-bar scheme

