

## 1.2. Substation

### 1.2.1. High Voltage Direct Current (HVDC) Converter Station

A facility that functions as an electrical rectifier (ac-dc) or an inverter (dc-ac) to control and transmit power in a high voltage network. There are two types of HVDC valves — the mercury arc valve and the present-day technology solid state thyristor valve. Both types of valves present a fire risk due to high voltage equipment that consists of oil-filled converter transformers, wall bushings, and capacitors in addition to various polymeric components.

### 1.2.2. Substation

A substation is used to change AC voltages from one level to another (Step-up or step-down), and/or change alternating current to direct current or direct current to alternating current. It is used to switch generators, equipment, and circuits or lines in and out of a system. Some substations are small with little more than a transformer and associated switches. Others are very large with several transformers and dozens of switches and other equipment.

### 1.2.3. Transformer (Power Transformer)

A transformer is used to raise (Step-up) or lower (Step-down) the voltage as required to serve through distribution or transmission lines/circuits.

### 1.2.4. Capacitor Bank

Capacitance of conductors and dielectrics that permits the storage of electricity when potential difference exists between the conductors. Its value is expressed as the ratio of quantity of electricity to a potential difference. A capacitance value is always positive. An array of capacitors connected into a circuit. Capacitors are used to control voltages supplied to the customer by eliminating the voltage drop in the system caused by inductive reactive loads.

### 1.2.5. Current Transformer

can be used to supply information for measuring power flows and the electrical inputs for the operation of protective relays associated with the transmission and distribution circuits or for power transformers. These current transformers have the primary winding connected in series with the conductor carrying the current to be measured or controlled. The secondary winding is thus insulated from the high voltage and can then be connected to low-voltage metering circuits.

### 1.2.6. High Voltage Underground Cables

High Voltage Underground Cables are constructed in many different ways, but are usually shielded cables. They are made with a conductor, conductor-strand shielding, insulation, semi-conducting insulation shielding, metallic insulation shielding, and a sheath. The sheath can be metallic and may then serve as the metallic insulation shielding and be covered with a nonmetallic jacket to protect the sheath. This sheath helps to reduce or eliminate inductive reactance. Such cables are commonly used in circuits operating at 2400 volts or higher