ELECTRIC POWER TRANSMISSION

Electrical transmission facilities are used to deliver power generated at remote or distant sites to the centers of use. Transmission facilities also connect major load centers and generating plants to each other in order to provide a highly reliable supply of power.

Transmission lines normally carry power over long distances and so operate at very high voltages in order to maximize efficiency. As larger generating plants are built, and at further distances from the users, the voltage can be 69 kV, 115 kV, 230 kV and even 345 kV in Colorado. Higher voltages are used in other regions. These high voltages are used because equivalent amounts of power can be delivered with substantially lower electrical losses than at lower voltages.

Most power is transmitted as 60 Hertz (cycles per second) alternating current (AC) power. AC power readily changed in voltage by transformers and is easily used in home appliances and motors. Some very specialized transmission uses direct current (DC) power, but there are very few such facilities in the U. S. Although power can be transmitted through underground lines, the costs of underground facilities are very much higher than open air, overhead lines. In addition, the electrical losses are much higher because the heat around the conductors is much more confined.

These transmission lines in the U. S. have been connected together into a very complex network. This network provides for a great deal of reliability since power can flow over multiple paths to get from every generating source to every load. Most systems are planned, designed, and constructed so that any single transmission line can be out of service without any loss of power to any customers.

These multiple path transmission lines are normally connected together at substations. Here, each line goes through a circuit breaker, or switch, which allows the line to be safely switched out of service for routine maintenance or emergencies such as storms, accidents, and lightning strikes. Also, any changes in voltage by transformers is normally done at these substations.

Source: Colorado Association of Municipal Utilities (CAMU)