Substation 101

A Brief Overview of Substation Operations

What is a substation?

A substation is an important part of the electric power system. It helps move electricity from power plants to homes and businesses by controlling power flow, changing voltage levels, and switching between power sources to deliver electricity safely and reliably.

How big is a substation?

The size of a substation depends on what it does.

Transmission substations can cover several acres of land.

Distribution substations are usually smaller, ranging from less than half an acre to more than one acre.

The site is large enough to meet safety requirements, protect equipment, and allow workers to safely perform maintenance and respond to emergencies.

Types of substations:

- **Transmission Substations** – These substations move large amounts of electricity over long distances using high-voltage power lines (typically 69 kilovolts or higher). They deliver power to sub-transmission or distribution substations.
- **Sub-transmission Substations** – These substations move electricity over medium distances using lower voltages (often around 23 or 34.5 kilovolts, depending on the system). They supply power to distribution substations or large businesses.
- **Distribution Substations** – These substations reduce voltage to distribution levels suitable for delivery to homes and businesses (typically less than 23 kilovolts). The electricity is then stepped down further by local transformers before being delivered to residential, commercial, and industrial customers.