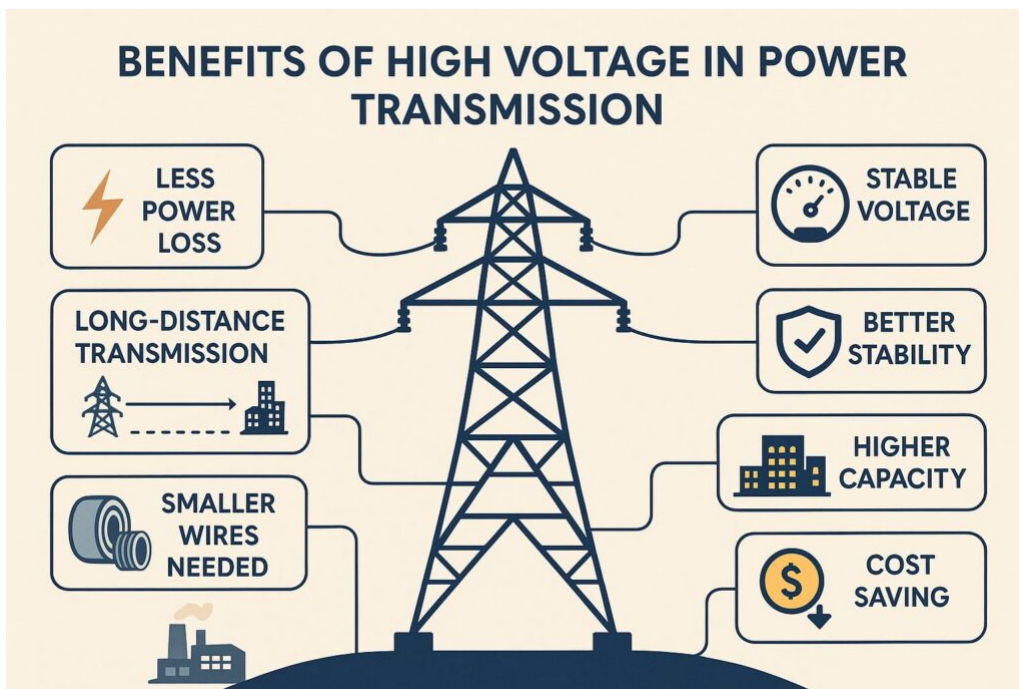




Using high voltage for transmitting electricity has many important advantages. Characteristics of high voltage in power transmission lines include saving energy, reducing costs, and improving the overall reliability of the power system. It helps reduce power loss, makes long-distance transmission more efficient, and ensures stable voltage levels throughout the grid. Let's look at some key benefits in simple words.



#### 1. **Less Power Loss**

When electricity is transmitted at high voltage, the current in the wire becomes lower. Lower current means less energy is lost as heat in the wires. This helps in saving a large amount of electricity during transmission.

#### 2. **Efficient for Long Distances**

High voltage allows electricity to travel very far without losing much energy. That's why high voltage lines are used to send power from power stations to faraway towns, cities, and villages.

#### 3. **Thinner and Lighter Wires**

Since high voltage reduces the current, we can use thinner and lighter wires. These wires are cheaper and easier to install. This also saves materials like copper or aluminum.

#### 4. **Stable Voltage Levels**



High voltage transmission helps in maintaining steady voltage from the power plant to the user end. This means the electricity you get is more reliable and less likely to fluctuate or cause damage to appliances.

#### 5. **Improved System Stability**

High voltage systems are better at handling sudden changes in electricity demand or unexpected faults. This makes the power grid more stable and less likely to have blackouts or other problems.

#### 6. **Carries More Power**

High voltage lines can carry a larger amount of electricity at once. This is helpful in supplying power to big cities, industries, and wide areas where the demand is very high.

#### 7. **Reduces Overall Cost**

Because high voltage lines are more efficient, fewer lines are needed to deliver the same amount of electricity. This reduces the cost of setting up and maintaining transmission systems.

## **FAQs on Characteristics of High Voltage for Power Transmission Lines**

### **Q1. What is meant by high voltage in power transmission?**

High voltage means the use of very large electrical potential (typically above 33 kV) to transmit power over long distances.

### **Q2. Why is high voltage used for power transmission?**

High voltage is used to reduce current for the same amount of power. This helps to minimise power loss and improve transmission efficiency.

### **Q3. How does high voltage reduce power loss?**

Power loss ( $I^2R$  loss) depends on current. When voltage is high, current becomes low for the same power, so the loss is less.

### **Q4. What are the typical voltages used in transmission lines?**

Common transmission voltages are 66 kV, 132 kV, 220 kV, 400 kV, and even 765 kV



in extra-high voltage (EHV) systems.