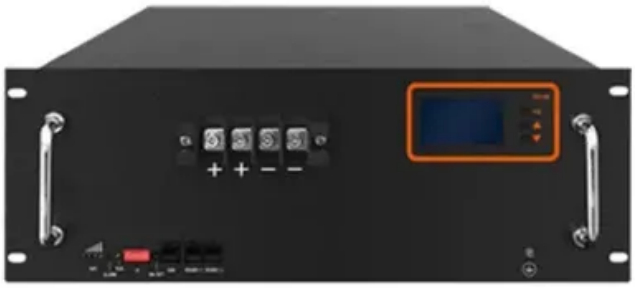
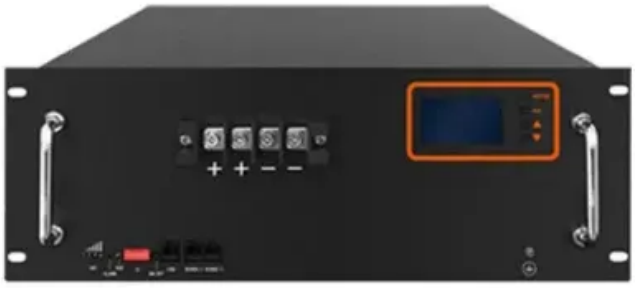
SolarInnovate Energy Solutions

Transmission voltage between power base stations





Overview

From the very beginning of power generation to the user end transmission linesare broadly classified based on different voltage levels.

What voltage does a transmission line use?

Transmission line voltages range from 230 thousand volts (kV) to 765 kV, though lower voltages can be used as well. The higher the voltage, the more power can move through the line. Approximately 98% of the U.S. transmission system uses alternating current (AC) power, in which the direction of electrical charge changes 60 times per second.

What is a high voltage transmission?

The transmission at higher voltages but the same power can transfer less current compared to lower level which helps to reduce energy losses on lines due to Joule heat. 115 kV, 230 kV, and 400 kV are common transmission voltage levels (may vary by region and power grid needs).

What is a typical transmission voltage?

Typical transmission voltages include 115 kV, 138 kV, 230 kV, 345 kV, 500 kV, and 765 kV. Sub-transmission networks, used to transmit power over shorter distances, use 34 kV, 46 kV, or 69 kV. Before reaching the distribution network, “step down” substations are needed to reduce voltage.

How is high-voltage power distributed in a substation?

The high-voltage power needs to be stepped down to levels for distribution to homes and businesses once it reaches its destination. This is performed at substations using transformers. The primary distribution consists of voltages from 11 kV to 33 kV whereas the secondary distribution is near the utilization voltage i.e.,415 V/240 V.

What is a power transmission network?

Electricity transmission networks are designed to minimize power loss over long distances by transmitting power at high voltage. Power plants generally

produce electricity at low voltages (5– 34.5 kilovolts (kV)). “Step up” substations are used to increase the voltage of generated power to allow for transmission over long distances.

How does a power station work?

In power stations, electrical power is generated at medium voltage levels, typically between 11 kV and 25 kV. This generated power is sent to a step-up transformer to increase the voltage. From here to the user end, the voltage varies at different stages. Let’s explore these steps.

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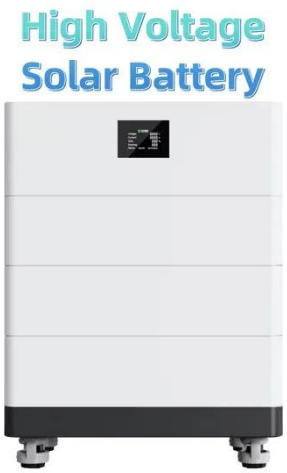

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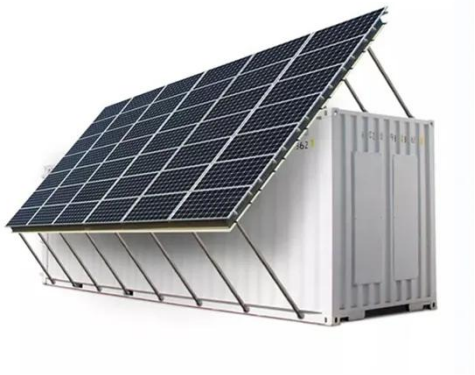

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