Transmission and distribution of electric power

The supply of electric energy may be divided roughly into three sections:

1. The generating station.
2. The transmission line which links the generating station with other generating stations and one or more substations.
3. The distribution system to which the consumers are connected.

The voltage present in distribution systems is limited to a low value for reasons of safety. However during long-distance transmission for economical and efficient operation high voltages are required.

Electricity produced in power plants is delivered to consumers using high-voltage power lines and electric stations. Generating stations, power lines, electric stations and appliances together form a **power system**.

Distribution of electric energy includes the supply of electric energy, the power grids carrying the energy and electrical wiring. These tasks are accomplished using:

- Overhead lines
- Underground cables
- Building wiring

Transmission line – network of lines carrying very high voltage are used for long distance transmission. These lines connect various sources of energy to transformer stations.

Nuclear power station

Electric lines

Transformer station HV/LV

Domestic appliance

Distribution system

Transformer station converts very high voltage into 110 kV. Portion of this energy is supplied to large heavy-industry factories. The remainder is supplied to cities, villages and other smaller factories where it is transformed to 22 kV. The last transformation to low voltage 230 V (voltage to earth) and 400 V (voltage between lines) happens in small factories, villages and city blocks. Households have access to low voltage which is used for example to power lamps or vacuum cleaners.

For power distribution normalized three phase voltage system with 50 Hz frequency is used in Slovakia. Other countries, such as the United States, use different systems. The power distribution is divided as follows:

MN – ELV - extra low voltage – up to 50 V ac/dc

NN – LV - low voltage – up to 1000 V ac/1500 V dc

VN – HV - high voltage – up to 52 kV

VVN – EHV - extra high voltage – up to 800 kV

UVN – UHV - ultra-high voltage – over 800 kV

VOCABULARY

electric supply – elektrické napájanie
roughly – približne, zhruba
reason of safety – z bezpečnostných dôvodov
satisfactory operation – uspokojivé fungovanie
required – požadovaný
wiring system – (elektro)inštalácia
generating stations – elektrárne
substation – podružná stanica
distribution – distribúcia, rozdeľovanie
transmission line – prenosové vedenie
extra low voltage – malé napätie
voltage to earth – fázové napätie
voltage between lines – združené napätie