**Electric Power Consumers and Power Systems**

**1. Read and learn the words:**

to achieve - достигать

to belong (to) - принадлежать, относиться (к)

to feed - снабжать, питать

to determine - определять

to relate - относиться (к), быть связанным (с)

predominant - ] преобладающий

graph - кривая, график

national economy - народное хозяйство

**Read and translate the text.**

**Electric Power Consumers and Power Systems**

An electric power consumer is an enterprise utilizing electric power. Its operating characteristics vary during the hours of day, days and nights, days of week and seasons.

All electric power consumers are divided into groups with common load characteristics. To the first group belong municipal consumers with a predominant lighting load: dwelling houses, hospitals, theatres, street lighting systems, mines etc.

To the second group belong industrial consumers with a predominant power load (electric motors): industrial plants, mines, etc. To the third group belongs transport, for example, electrified railways. The fourth consists of agricultural consumers, for example, electrotractors.

The operating load conditions of each group are determined by the load graph. The load graph shows the consumption of power during different periods of day, month, and year. On the load graph the time of the maximum loads and minimum loads is given.

Large industrial areas with cities are supplied from electric networks fed by electric power plants. These plants are interconnected for operation in parallel and located in different parts of the given area. They may include some large thermal and hydroelectric power plants.

The sum total of the electric power plants, the networks that interconnect them and the power utilizing devices of the consumers, is called a power system. All the components of a power system are interrelated by the common processes of protection, distribution, and consumption of both electric and heat power. In a power system, all the paralleliy operating plants carry the total load of all the consumers supplied by the given system.

The building up o f a power system is of great importance for the national economy. An economical utilization of the power plant installations and of the sources of power is achieved by interconnected operation of a series of power plants in a common power distribution system.

**3. Answer these questions:**

1. What enterprises are called electric power consumers?

2. When do their operating characteristics vary?

3. What consumers belong to the four different groups?

4. What conditions does the load graph determine?

5. What type of system is called a power system?

6. What processes interconnect the components of a power system?

7. In what way is an economical utilization of power installations

achieved?

**Describe a power system and its operation.**

**5. Complete the sentences translating'the words in brackets:**

1. Water-turbine (заводы) are called hydroturbines.

2. Load graph (определяет) the operating load (условия).

3. Economical (потребление) of electric power (достигается) by interconnected

operation of power plants.

**Lesson 27. Substations**

**1. Read and learn the words:**

auxiliary - вспомогательный, добавочный

breaker - выключатель, прерыватель

busbar - собирательная шина

feeder - фидер

flexible - гибкий

to comprise - включать в себя

to distribute - распределять

as ... to - что касается

as well as - так же, как и

**Read and translate the text.**

**Substations**

A substation is designed to receive energy from a power system, convert it and distribute it to the feeders. Thus a substation serves as a distribution centre. Substations feed (supply) various consumers provided that their basic load characteristics are similar. Therefore the energy is distributed without transformation o f the voltage supplied.

Common substations comprise isolators, switchgear buses, oil circuit breakers, fuses, power and instrument transformers and reactors. Substations are classed into step up and step down ones. The step up substation includes transformers that increase the voltage. Connected to the busbars of the substation are the power transmission lines of power plants of the system.

As to step down substations, they reduce the voltage to 10 or 6 kV. At this voltage the power is supplied to the distribution centres and to the transformer substations of power consumers.

A transformer substation serves for transmitting and distributing electric power. It comprises a storage battery, control devices and auxiliary structures. Transformer substations are classed into indoor and outdoor; both types are used for feeding industrial enterprises. Compared to other types of substations, transformer  substations have certain advantages.

They have flexible construction and easy and reliable operation. In case of a fault in the left-hand section, the main circuit breaker opens while the normally open section circuit breaker closes and puts the voltage of the section to normal. Power from a substation is delivered to distribution centres.

**3. Complete the sentences using the correct variant:**

1. A substation serves

a) to consume energy

b) to distribute energy

c) to convert energy

2. A substation feeds consumers

a) with various load characteristics

b) with similar load characteristics

3. The lines of power plants are

a) connected to the busbars

b) connected to the switchgear

4. A substation comprises

a) the main elements

b) the main and auxiliary elements

5. Flexible construction is

a) an advantage

b) a disadvantage

**Pair work. Put these questions to your groupmate, and ask him/her to**

**Answer them.**

1. What does a substation serve for?

2. What type of consumers does a substation feed?

3. What parts are the power transmission lines connected to?

4. What components does a substation comprise?

5. What types are substations classed into?

6. What are advantages of a transformer substation?