

greater control over energy costs and a more reliable energy supply for consumers. Environmental benefits of a smarter grid include reduced peak demand, integration of more renewable power sources, and reduced CO₂ emissions and other pollutants.

Smart grid is the future for electrical systems, as it is designed to meet the four major electricity requirements of our global society: capacity, reliability, efficiency and sustainability.

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Chistikhin, A., Balastov, A.V. Extensive transmission of power

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Introduction.

In this article I will tell you about main concepts of power transmission theory, transmissions on the direct and alternating current, I will tell you about advantages of power transmission on the super high voltage and about interrelation between voltage and efficiency in power transmissions.

Transmission of power as creator of power systems

Super high voltage transmissions have a great part in contemporary energetic because they improve reliability of power systems and make them economically beneficial. Humanity has been trying to increase the voltage in power transmission since it was discovered because the increasing of the voltage increases the efficiency of transmission. Moreover the process of developing of energetic in the whole world is characterized with merger of power system in bigger and bigger unions. Of course, it wouldn't happen without strong connection between these power systems. That is why the main goal of power transmission isn't just transportation of electrical power from point «a» to point «b» or spreading around the power from big electric station but creating of large power systems that are considered to be one of the most important parts in contemporary energetics. So power transmissions unite power systems to increase their reliability and provide the most efficiency method of functioning for them.

Constructive properties of transmission lines

Phase splitting of wire is the most important feature of high voltage lines. Every phase is made as special construction from several wires that are located in angles of polygon on the equal distance from each other. There are 2-10 wires in each phase, this amount depend on the voltage of the lines. For example, there are 2 wires in one phase with the voltage of 330 kV and 10 wires in case of 1150 kV. There are several reasons for splitting of phases: 1) increasing of transmission efficiency 2) decreasing intensity for decreasing interferences of electric transmission.

Types of power system

Power system is the connection of power stations by transmission lines for stronger transportation of electricity for consumers. Power systems have some differences from each other in terms of power of stations and types of their functions. Thereby there are 5 types of power stations:

- 1) Hydro power system that includes more than 50% of Hydro power plants.
- 2) Heat oriented with more than 50% Combined Heat and Power Plant.
- 3) Nuclear oriented with more than 50% of nuclear power plant.
- 4) Systems with equal amount of 3 types of plants.
- 5) Systems that are consisted only from.

But on the other hand there are systems with mobile structure. So uniting of power systems can be happened due to sectioning of power plants which have big units that can function in several systems that lead to the system of mobile structure, in other words with changing of external impacts that can affect transmission of power, system can change its structure for keeping producing of power on a normal level.

Direct or alternating current?

As you know, the power can be transported by 2 methods: on alternating or direct current. After considering of all factors power engineers chose the most efficiency and beneficial way of power transmission. The main advantage of direct current is that the allowed electric field strength for wires with direct current is much higher than for wires with alternating current. For example, wires that are supposed to function with voltage of 35 kV on alternating current can be used on direct current with 200 kV voltage. That is why despite of its expensive cost, transmissions of direct current is more beneficial in case of extensive transmissions (more than 30 km). But if direct current allows us to increase efficiency of electric transmissions why do we even need transmissions on alternating current? The main answer is in expensiveness of transforming stations that change direct current into alternating current that people use in their electrical appliances and devices. That is why nowadays, there is a great interest in increasing of capacity of transmission on alternating current. Thus, direct current is more beneficial in case of extensive transmission while alternating current is better in local one.

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Davaa, A.V., Tarasova, E.S. Synthesis of TiC nanopowder

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In recent years, nanopowders have attracted much attention due to their unique properties and suitability for practical applications in various fields of science and technology. Titanium carbide refers to such compounds. It has at least two unique characteristics. Firstly, it is superhard, about 30 GPa: this material is promising for use as superhard abrasives and coat reinforcing polishing materials. Secondly, it is high heat resistant. Titanium carbide is promising for use as a refractory compound in high technology. Titanium carbide still has good