The disadvantage of Myra's formula is that all the variety of weather conditions is reduced to two weather groups: «good» weather (k = 44; Eк = 17 kV/cm) and «bad» weather (k = 31,5; Eк = 11 kV/cm).

Considering the popular formulas for calculating the corona discharge, it is obvious that the formulas have shortcomings and this is why they need adjustments to obtain more accurate values of the corona discharge.

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ANALYSIS OF HYDROPOWER PLANTS OPERATION PECULIARITIES IN THE ELECTRIC POWER SYSTEM OF TAJIKISTAN

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An analysis of global energy trends shows that energy security, reliability of supply, energy efficiency and environmental friendliness are major factors in its development. Under these conditions, the role of hydropower, which uses renewable, environmentally friendly hydropower resources, will increase. Hydropower is the most technologically mastered method of generating electricity, which is widely used around the world and is a guaranteed energy resource. Today, hydroelectric power plants (HPPs) operate in 159 countries and generate 16.3% of the world's electricity. Hydropower provides the most efficient process for generating electricity with low operating costs and a long operating life [1].

Tajikistan has the world's eighth-largest reserves of hydropower, of which it currently uses less than 5% (about 16-17 billion kWh out of a potential 527 billion kWh). The country's electricity supply is mainly provided by electricity generated by HPPs. The capacity of Tajikistan's power system is 5757 MW, with HPPs accounting for 87.6% of the total installed capacity. The share of thermal power plants is 718 MW, i.e. only about 12.4% [2].

The main hydropower potential of the region is concentrated in the Vakhsh and Panj river basins. The largest HPPs in the Tajikistan are Nurek, Baypazin, Sangtuda-1 and Sangtuda-2. The Vakhsh and Varzob HPPs cascades are operating successfully. A distinctive feature of Tajikistan's energy sector is the enormous hydropower potential of small rivers, which number over 947 rivers with a total length of 28,000 km. The development of small hydropower will contribute to the decentralisation of the energy system, which will make it possible to solve the problems of energy supply in hard-to-reach rural areas and solve a set of their economic, environmental and social problems.

The main advantage of using HPPs as a source of generation is the low cost of electricity produced, due to both low operating costs and the low consumption of electricity for own needs.

HPPs have operational features that have a significant impact on power system regimes. HPPs are highly manoeuvrable, capable of operating in peak load schedules, responding quickly to sudden power imbalances, and providing load reserves in the power system. HPPs are characterised by considerable uncertainty in their planned energy balances, due to the poor predictability and high variability of hydrological conditions, which makes it very difficult to predict the amount of electricity generation from such sources.

Controlling the operating regime of a power system involving HPPs requires the constant solution of optimisation problems with a large number of parameters considered under conditions of uncertainty. The operation of HPPs in the peak and semi-peak part of the load schedule is characterised by frequent changes in the regime requirements on power generation and the need for constant adaptation of the operating mode to new conditions. In such environments, the search for optimal control options requires consideration of a large number of third-party factors such as: operational reliability, efficiency, electricity quality, power system requirements, etc. These constraints greatly complicate the search for optimal operating conditions for HPPs and also introduce uncertainty in their mode control issues.

An important feature of power system operation involving HPPs is that most HPPs can be involved in two control systems at the same time:

- the first of these is the energy sector and is involved in the task of determining the value of generation and consumption capacity;

- the second is water-related and has a significant constraint imposed by water consumers, which significantly changes the requirements for the planning of hydropower generation at the HPPs.

The management of HPPs regimes under severe water constraints leads to additional difficulties. Particularly for the Tajikistan energy system, all of the HPPs capacity is concentrated on the Vakhsh River, which leads to the need to consider the flow relatedness of the HPPs capacity output modes when forming their optimal operation modes.

In addition, the capacity of the Nurek HPP, which has an annual (seasonal) regulation reservoir, is 80% of the capacity of the entire Vakhsh cascade. This dominance leads to the fact that water flows received by other HPPs in the cascade, which have reservoirs that are usually daily regulated, are mainly determined by the transit flow of the Nurek HPP. With this ratio, the regulating capacity of these HPPs in the energy system is extremely small.

Therefore, in winter, the limited flow of water in the rivers results in a electricity deficit in covering the load demand. Thus, at present, the magnitude of this winter deficit for the Tajikistan energy system is 2 - 4 billion kWh [2]. The Tajikistan energy system has a surplus of 3 to 7.5 billion kWh of electricity in summer, depending on the water availability of the year. Due to the isolated operation of Tajikistan's energy system, this surplus is not exported to neighbouring countries, so huge amounts of water are wasted.

Due to the aforementioned characteristics of HPPs operation, there are a number of peculiarities in the operation of the Tajikistan energy system, which includes a large number of such generating sources. As HPPs are currently the only renewable energy source in Tajikistan's energy system capable of generating electricity on an industrial scale, there is a need to make the best possible use of their hydrological potential. In order to achieve this objective, it is necessary to clearly plan electricity generation, optimise planned electrical and hydraulic regimes, and solve the issue of correct control of the power system, incorporating both stand-alone and cascade operation of HPPs.

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APPLICATION OF DIGSILENT POWERFACTORY SOFTWARE AND COMPUTING COMPLEX FOR RELIABILITY ANALYSIS OF ELECTRICAL NETWORKS

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The reliability of any power supply company and the quality of the power supply to consumers depend on the technical condition of the equipment that ensures the transmission of electrical energy. Every year, the percentage of equipment in the world that has a working life that is reaching the end of its useful life increases, but it