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USE OF PHOTOVOLTAIC POWER PLANTS IN THE KHERSON REGION

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Анотація

На даному етапі науково-дослідної роботи розглянуто основні заходи з післявоєнного відновлення енергетичної системи. За результатами проведеної роботи було зроблено висновки, щодо актуальності розглянутого питання.

Ключові слова: енергозбереження, енергоефективність, економія, відбудова.

Abstract

At this stage of the research work, the main steps for the post-war restoration of the energy system were considered. Based on the results of the work carried out, conclusions were drawn regarding the relevance of the issue under consideration.

Keywords: Energy saving, energy efficiency, economy, restoration.

Introduction

The best environmental programmes tackle two problems at once - that's what India is doing by installing solar panels over its water canals. We can learn from their experience to solve our own problems.

Since the 2015 Paris Agreement, 196 countries have begun to develop clean energy sources - wind and solar power that generates electricity without producing the greenhouse gases that trap heat and warm the Earth.

Results of the study

As a result of significant damage to the energy system of Ukraine in general, and specifically in the Kherson region, and taking into account the possible more serious damage to transformer substations on the left bank of the Kherson region, options were considered to provide a large number of consumers with electricity at the lowest cost. Also, given the fact that the land part of the region will be mined and dangerous for future construction work, it makes sense to raise funds for a pilot project on green electricity generation for Kherson.

Since water from the Kherson canals is used to irrigate large agricultural areas (384,500 hectares), which requires a certain amount of electricity, the nearest canal area can be used for conversion to install photovoltaic panels. Water is supplied from the main canals for irrigation by 351 electrified pumping stations with a total capacity of 405 thousand kWh and a total capacity of 419 m³/sec. With such a large number of pumping stations, we also have a large selection of locations for the initial installation of the panels, i.e. the pilot project.

As a starting point, the experience of energy colleagues in India and the United States can be used: in India, a design, procurement and construction contract was awarded to SunEdison for a value of Rs 177.1 million (US$ 2.2 million). The pilot project was developed on a 750-metre stretch of canal by the Gujarat State Electricity Corporation (GSECL) with the support of Sardar Sarovar Narmada Nigam Ltd (SSNNL), which owns and operates the canal network.

The cost of a megawatt of solar energy in this case was much lower than for conventional solar power plants, as two banks of solar panels will be used to cover the canal, and the government did not have to spend much money on creating the basic infrastructure, including land acquisition. As mentioned earlier, the land would be too dangerous to start building new facilities quickly, and the water surface is safer in terms of mine risk.

Gujarat has about 458 km of open main canal, while the total length of the canal, including branches, is currently about 19,000 km, with a total length of 85,000 km. The length of the Kakhovka main canal is close to 130 km, followed by inter-farm and intra-farm canals, the total length of which is 520 km.

Assuming that only 10% of India's existing 19,000 km canal network is utilised, it is estimated that 2,200 MW of solar power could be installed by covering the canals with solar panels.

US engineers determined that installing solar panels over the canals would make both systems more efficient. The solar panels will reduce evaporation from the canals, especially during the hot Californian summer. And since water heats up more slowly than the ground, the water from the canals flowing under the panels can cool them down by 5.5 degrees Celsius, which will increase electricity production by 3%, a significant boost."[2]

It also means that 45 km2 of land could potentially be saved, along with around 20 billion litres of water per year. According to research by American scientists and engineers.

Conclusions

This project allows the use of existing sites for the safe construction and rapid commissioning of a large number of energy facilities that will be dispersed over a large area, making it impossible to put them out of commission at the same time. Maximum efficiency can be achieved by using a systematic approach as a whole. As these projects have been implemented in other countries, this will allow for more efficient use of limited resources.

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