TECHNICAL SCIENCES

INTRODUCTION OF DISTRIBUTED ELECTRICITY SOURCES DURING THEIR IMPLEMENTATION IN THE AIRFIELDS AND AIRPORTS CONDITIONS

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Introductions. The importance of air transport in the world economy is constantly growing, which contributes to both technological development and the latest developments in the aviation industry, as well as globalization and ever closer business and cultural ties between different countries [1].

Air transport has a positive impact on the development of tourism business and international trade. Today, more than 52% of international tourist travel is carried out by air. The developed aviation industry contributes to increasing the investment attractiveness of the country and expanding opportunities for international companies to operate in its territory. Air transport also provides extremely fast delivery of valuable and perishable goods to the destination, which leads to its widespread use by large leading international logistics companies [2, 3].

Aim. Research of possibility of introduction of dispersed sources of electric energy at their introduction in the conditions of aerodromes and airports.

Materials and methods. Due to the relatively small capacity of dispersed power sources, they cannot fully meet the energy needs of powerful aerodrome facilities and airports. Its role is to complement centralized energy, using mainly local energy resources of regions, airfields and airports that may have a different set of small energy sources [4-6].

Cost-effective and more attractive is the option of decentralized power supply to airfields and airports from its own autonomous energy source (AES) with high efficiency and maneuverability. Such a source will provide adjacent enterprises with heat and electricity, the cost of production of which will be lower than the price of the power system, and increase energy security due to the possibility of mine operation even in case of force majeure in the power system. But each such option requires a detailed feasibility study and choice of type and capacity of AES.

Ukraine has powerful wind energy resources: the annual technical wind energy potential is 30 billion kWh. Operation of low-speed multi-bladed wind turbines, with increased torque, are effective, practically, on the whole territory of Ukraine [5].

Average wind speeds of 3–4 m / s are observed in the central parts of the forest-steppe and steppe zone, Chernihiv Polissya, the northern part of the Poltava-Romen forest-steppe region of the Dnieper lowland and the foothills of the Crimean mountains. In Ukraine there is no wind speed less than 3 m / s. In spring, average wind speeds of 4–5 m / s prevail in most parts of Ukraine, and 3–4 m / s in summer. In autumn, wind speeds in the range of 3–4 m / s are observed in almost the entire forest-steppe zone. The steppe zone is characterized by wind speeds of 4–5 m / s.

As you know, a common feature of the relief of Ukraine is the alternation of hills and lowlands. The vast majority of orographic formations in Ukraine (Volyn, Podil, Prydniprovska and Donetsk uplands, Prydniprovska lowland and Ukrainian

Carpathians) are oriented from northwest to southeast according to the direction of the main geostructural elements.

The construction of wind farms should be in these regions, given the significant shortage of its own generating capacity. Preference should be given to the construction of wind farms in the adjacent water areas, which have a particularly high wind energy potential.

The availability of solar energy resources for practical use is determined by the following indicators: a) the amount of solar radiation that reaches the surface of various types of solar energy equipment; b) technical parameters of solar systems that convert the energy of sunlight into electrical and thermal. Based on this, for the needs of solar energy, cartographic atlases of solar energy resources have been developed, which reflect the technical energy potential (values of energy production by different types of solar systems).

Namely, the objects of airfields and airports, which are in Ukraine hundreds of hectares, for all its parameters can and should become a landfill for AES complexes, which in fact should become mini- or micro power plants in the structure of power supply systems of airfields and airports of Ukraine [2].

The proposed scheme of power supply of aerodromes and airports using a neurocontroller includes a sensor unit, a switch, a neurocontroller and two sources of electricity (network and autonomous alternative energy source).

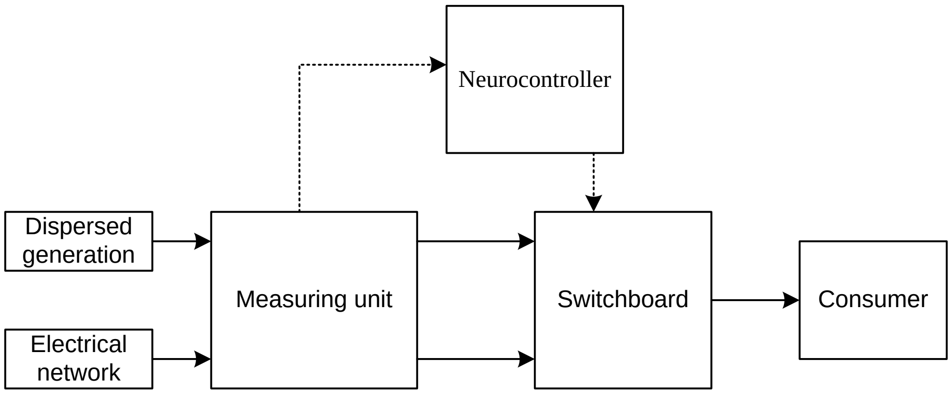

Fig. 1 Block diagram of the power supply system using a neurocontroller

The sensor unit determines the voltage, frequency and current directly in the power supply networks independently of each other, and transmits data to the neurocontroller.

Results and discussion. The neurocontroller analyzes the energy parameters received from the sensor unit and sends a control signal to the switch.

The switch is multi-position and depending on the control signal from the neurocontroller has the ability to connect the consumer to one of the power sources, disconnect the consumer from the power source and perform the function of automatic switching on the reserve.

Conclusions. The advantage of the neurocontroller is that it can simultaneously receive signals from all sensors of the measuring unit and simultaneously analyze them in real time, because when implementing this scheme by conventional controllers, simultaneously analyze signals from sensors of the measuring unit in real time is not possible.

Thus, it is relevant and appropriate to introduce dispersed sources of electricity in their implementation in airfields and airports.

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