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CONSTRUCTION OF EFFICIENT SOLAR POWER PLANTS ON THE TERRITORY OF INDUSTRIAL ENTERPRISES

The construction of solar power plants by industrial enterprises to improve energy efficiency is currently a highly relevant issue. Given the large number of buildings with solar panels on their roofs, they could generate additional electricity, reducing the consumption of electricity from the general grid. Finding out about such opportunities and determining the feasibility of this measure requires a number of steps.

First of all, it is necessary to determine the availability of locations for solar panels, estimate their number, energy capacity of each in terms of size and intensity of solar radiation. It is also necessary to find out what actual types of these panels can be used in such an application, their quantity and availability on the energy market. In addition, the configuration of the roof or the presence of shading effects limit the choice of the best orientation of the solar panels to maximise their exposure. In addition, additional climatic conditions, such as possible wind, rain and snow loads on the panels, will also need to be taken into account when choosing appropriate mounting systems and ensuring their durability.

Calculations for the placement of solar panels on allocated areas of industrial enterprises are complicated by the fact that they are different in size, and therefore the number of photovoltaic cells installed on each of them will be different. In addition, the panels also have different rated capacities and their dependence on solar radiation. This means that the algorithms for the necessary calculations when designing a particular SPP become more complex.

The purpose of study [1] is to develop a methodology and algorithm for determining the compatibility of all possible options for placing selected types of solar panels in the designated areas on the territory of industrial enterprises.

The criteria for the optimal location of solar panels can be the maximum amount of generation of a solar power plant, minimum fluctuations in its power during the day, the cost of generated electricity, etc. In order to solve such optimisation problems, it is proposed to first determine the set of all acceptable options for the location of selected types of solar panels at the allocated locations. Such a set can be represented as a branched graph, each branch of which is one of the possible options for the location of the panels. For this purpose, it is proposed

to use an algorithm based on a recursive function (Fig. 1), which is best suited for working with such structures. As a result of the proposed algorithm, a matrix of sets of panel types and their locations is formed. The proposed methodology and algorithm for determining the array of all possible combinations of solar panel locations can significantly simplify the process of implementing a SPP at an industrial enterprise and significantly increase its efficiency.

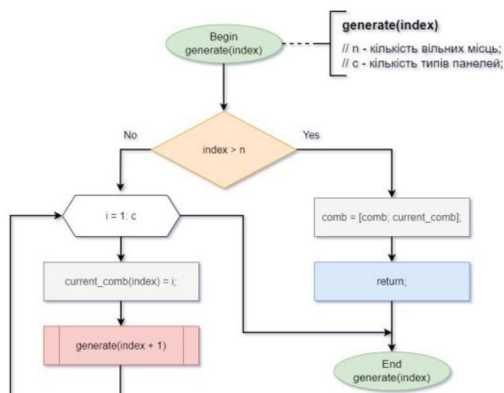


Figure 1 – Block diagram of the recursive function generate (index) [1].

REFERENCES

1. Kachan Y., Shram O. On the possibility of creating efficient solar power plants on the territory of industrial enterprises. *Vidnovluyana Energetika*. 2024. Vol. 1(76). C. 22-31. DOI: [https://doi.org/10.36296/1819-8058.2024.1\(76\).22-31](https://doi.org/10.36296/1819-8058.2024.1(76).22-31).