

of diesel generators, the share of renewable energy sources in the total balance will be only 54%. The problem is that during this period the pumped storage system has a large negative balance. Electricity is spent on water injection more than returned. In general, the efficiency of the pumping system of the Gorona del Viento power station was less than 30%.

Such a low efficiency of the entire power plant as a whole is associated with sharp fluctuations in the load in the electrical network, which ultimately results in large energy losses.

4. Conclusion

1. The main objective of this study is to analyze the operating experience of the hybrid power plant Gorona del Viento as a whole and its individual elements. The data obtained as a result of this analysis allow us to outline the main ways to improve this project.

2. First of all, it should be stated that an increase in the number of wind generators or other installations using renewable energy sources as part of the Gorona del Viento power station is not appropriate at this stage in the implementation of this project. The higher the excess capacity of renewable energy sources, the higher the losses in the pumped storage system. As a result, this will lead to the fact that most of the electrical energy produced by additional wind turbines will be lost in the pumped storage system.

3. The technology of hydroaccumulation of energy has tremendous advantages over other currently existing energy storage technologies. However, this technology is rather inertial and has significant energy losses due to sharp fluctuations in the load in the electrical network, especially at high power. First of all, this applies to projects with a large length of pipelines for supplying water to the turbines.

4. To equalize the load fluctuations in the electrical network, it is advisable to create virtual power plants or a system of "smart" consumers on the island of El Hierro, which can be switched on and off depending on the specific situation in the electrical network. The introduction of this technology does not require significant financial costs, but will significantly increase the efficiency of the Gorona del Viento power station. Moreover, for the implementation of this project, subsidies can be used, which are currently allocated by the Island Government.

5. To equalize the operating modes of all generators of the Gorona del Viento power plant, it is advisable to use additional energy storage devices at the power plant itself, which would quickly and without significant expenses compensate for oscillations. At the same time, the power of these additional energy storage devices can be relatively small, within 1 MW, which will ensure a smooth transition of the main hydroelectric station from one power level to another.

6. A sufficiently large effect on reducing CO₂ emissions into the atmosphere can be achieved using a utilization circuit of diesel generators. This will allow simultaneously solving several problems of the Gorona del Viento power station. First, it is to increase the efficiency and reduce the fuel consumption of diesel

generators by 10-15%. Accordingly, this will reduce CO₂ emissions into the atmosphere. Secondly, the turbo-generator of the utilization circuit will allow to quickly regulate the generation of the electrical load.

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