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UNINTERRUPTED POWER SUPPLY SYSTEM WITH MINIHES AS A PRIMARY POWER SUPPLY

Annotation

This article discusses the use of Mini-HES, which are the portable HES in use today, which could be a perfect alternative to centralized power supply, or used to replace a traditional power source in power outages in networks. Information is provided on how to solve the problem of power outages, which allows to determine the optimal level of energy consumption for the consumer.

Key words: Mini-HES, micro-hydroelectric power station, uninterruptible power supply system,

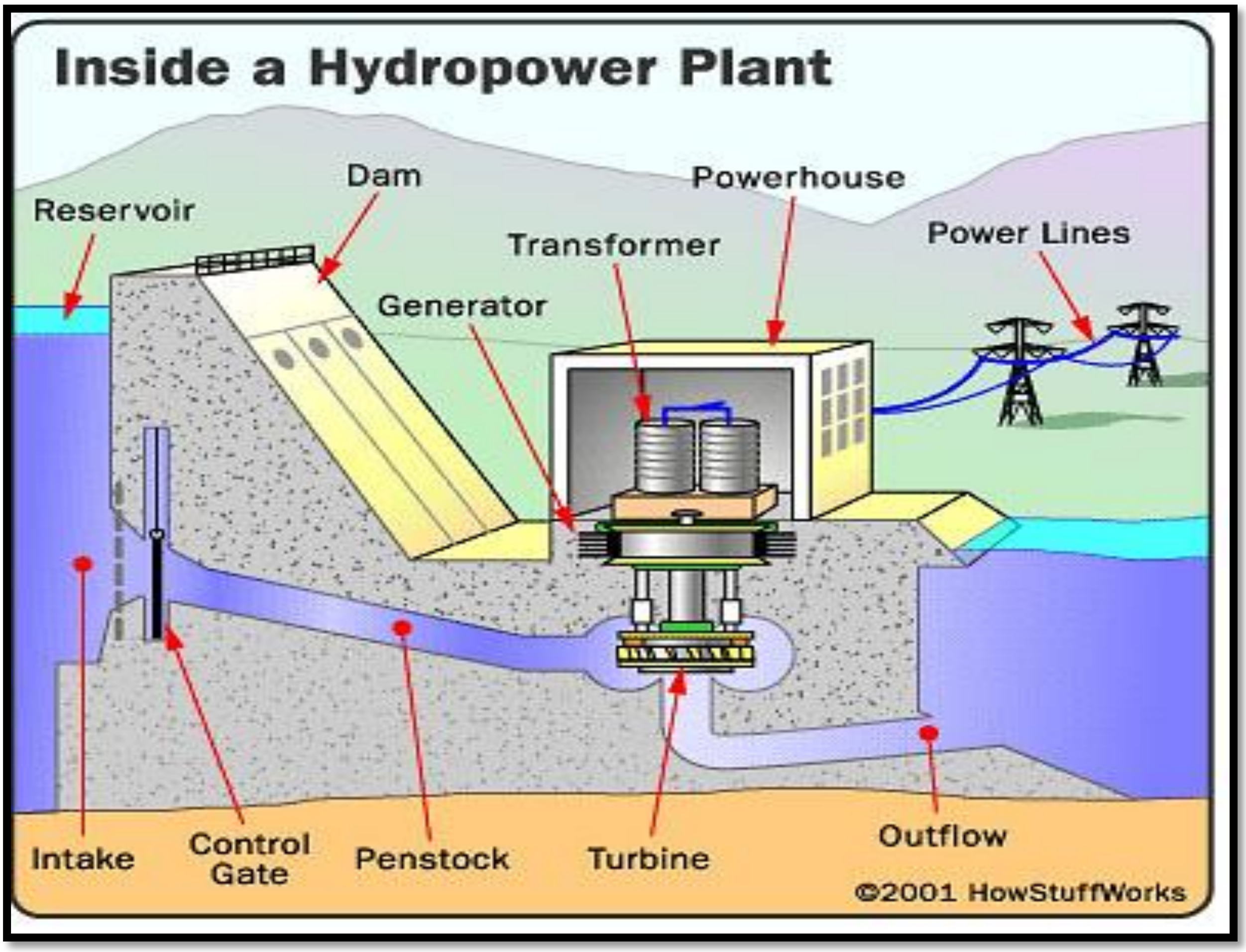
In recent decades, the development of small and medium-sized businesses in the Republic of Uzbekistan and the creation of many facilities for the production of products and processing of raw materials in rural areas urgently requires an increase in energy supply in rural areas, farms, etc. In addition, it is necessary to solve the problem of energy supply to remote settlements. The solution to these problems requires the creation of energy sources of relatively small power 1 ÷ 10 kW, including those based on renewable energy sources: solar, wind, hydraulic, biogas and in order to increase the reliability of installations based on renewable energy sources. [1]

An uninterruptible power supply system with a micro-hydroelectric power station as a primary power source was developed and studied in the heliopolygon of the Instrument Engineering and Instrumentation Research Laboratory, specifically for supplying energy to low-power consumers in rural areas, farms and others. In fig. 1.1. depicts the simplest two-blade design of a mini-hydroelectric power station with a vertical axis of rotation. The design consists of the main shaft-1, mini blades in the closed working positions -2, and in the non-working vane positions -3.

When watching a river roll by, it's hard to imagine the force it's carrying. If you have ever been white-water rafting, then you've felt a small part of the river's power. White-water rapids are created as a river, carrying a large amount of water downhill, bottlenecks through a narrow passageway. As the river is forced through this opening, its flow quickens. Floods are another example of how much force a tremendous volume of water can have.

Hydropower plants harness water's energy and use simple mechanics to convert that energy into electricity. Hydropower plants are actually based on a rather simple concept - water flowing through a dam turns a turbine, which turns a generator.

The principle of operation of the proposed design is as follows, under the action of the water flow vector - 4, mini blades - 2 located on the left side of the blades, closing will form a wall (sail), and on the right -3 side, they will take vane positions when opening. As a result, a torque is generated and the vertical axis begins to rotate clockwise. If required, you can make a rotation in the opposite direction. The rise of



environmental

Fig. 1. Diagram of a Small Hydro Generator installation.

awareness as well as the unstable global fossil fuel market has brought about government initiatives to increase electricity generation from renewable energy sources.

These resources tend to be geographically and electrically remote from load centers. Consequently many Distributed Generators (DGs) are expected to be connected to the existing Distribution Networks (MINI-HYDROELECTRIC POWER STATIONSs), which have high impedance and low X/R ratios [2]. Intermittence and unpredictability of the various types of renewable energy sources can be of time scales of days (hydro) down to seconds (wind, wave). As the time scale becomes smaller, the output of the DG becomes more difficult to accommodate in the MINI-HYDROELECTRIC POWER STATIONS. With the DGs operating in constant power factor mode, intermittence of the output of the generator combined with the high impedance and low X/R ratios of the MINI-HYDROELECTRIC POWER STATIONS will cause voltage variations above the statutory limits for quality of supply.

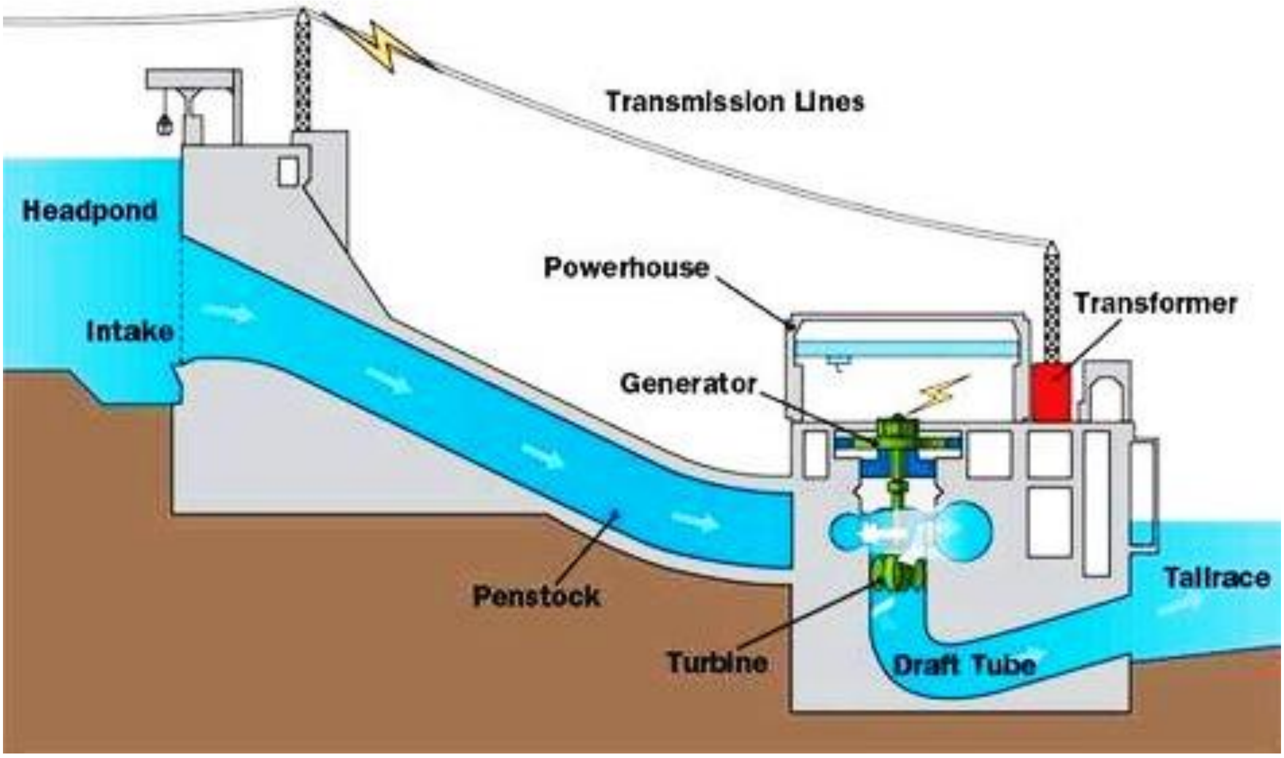


Fig. 2. Micro Hydro-power Plant idea.

This is traditionally mitigated by accepting increased operation of automated network control or network reinforcement. However, due to the distributed nature of RES, automating or reinforcing the MINI-HYDROELECTRIC POWER STATIONS can be expensive and difficult solutions to implement.

The Thesis proposed was that new methods of controlling DG voltage could enable the connection of increased capacities of plant to existing MINI-HYDROELECTRIC POWER STATIONSs without the need for network management or reinforcement. [3] The work reported here discusses the implications of the increasing capacity of DG in rural distribution networks on steady-state voltage profiles.

Two methods of voltage compensation are proposed. The first is a deterministic system that uses a set of rules to intelligently switch between voltage and power factor control modes. This new control algorithm is shown to be able to respond well to slow voltage variations due to load or generation changes.

The second method is a fuzzy inference system that adjusts the set point of the power factor controller in response to the local voltage. [4] This system can be set to respond to any steady-state voltage variations that will be experienced. Further, control of real power is developed as a supplementary means for voltage regulation in weak rural networks.

The algorithms developed in the study are shown to operate with any synchronous or asynchronous generation wherein real and reactive power can be separately controlled. Extensive simulations of typical and real rural systems using synchronous generators (small hydro) and doubly-fed induction generators (wind turbines) have verified that the proposed approaches improve the voltage profile of the distribution network. This demonstrated that the original Thesis was true and that the techniques proposed allow wider operation of greater capacities of DG within the statutory voltage limits.

In conclusion, I can say that in the article I studied in the field and in the experimental processes, a computer model was developed to calculate and optimize the combined operating modes of geothermal micro electric power plants and geothermal waterworks.

References:

1. Рустамов У.С. Система бесперебойного электропитания с минигэс в качестве первичного источника питания. Научно-технический журнал ФерПИ спец.вып №1.Часть 2. 165-168 ст. 2018 г.
2. Sirojiddin Fayazovich Ergashev, Abbosjon Khakimovich Quldashev. Microhydroelectric power station installed in hydrotechnical structures of the Fergana region. Scientific Bulletin of Namangan State University. 144-147 pages. 2019 y.
3. Obidov J. G., Alixonov E. J. Organization of the education process based on a credit system, advantages and prospects //ACADEMICIA: An International Multidisciplinary Research Journal. – 2021. – Т. 11. – №. 4. – С. 1149-1155.
4. Obidov J. G. O. About safety technique and issues of supplying electricity of the textile industry //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 9. – С. 123-127.
5. Obidov J. G., Ibrohimov J. M. Application and research of energy-saving lighting devices in engineering networks //ACADEMICIA: An International Multidisciplinary Research Journal. – 2021. – Т. 11. – №. 4. – С. 1370-1375.
6. Khurshidjon, Y., Abdumalikovna, A. Z., Muminovna, U. G., & Mirzasharifovna, Q. G. (2020). The study of photoelectric and photographic characteristics of semiconductor photographic system ionisation type. ACADEMICIA: An International Multidisciplinary Research Journal, 10(5), 72-82.
7. Xabibulloogli E. A., Abdukarimovna M. U. Assesment of metrological reliability of measurements using the method of producing functions //Academicia: An International Multidisciplinary Research Journal. – 2021. – Т. 11. – №. 8. – С. 520-528.

8. Ergashov K. M., Madmarova U. A. Technics of the infra-red drying of farm products //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 11. – С. 1351-1355.
9. Ergashov K. M., Madmarova U. A. Research of metrological characteristics optoelectronic of devices for control of humidity of installations //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 11. – С. 1337-1341.
10. Эргашев К. М., Мадмарова У. КОМПЬЮТЕРНАЯ МОДЕЛЬ МИКРО-ГЭС С ИСПОЛЬЗОВАНИЕМ ПОТЕНЦИАЛЬНОЙ ЭНЕРГИИ ГЕОТЕРМАЛЬНЫХ ВОД //Современные технологии в нефтегазовом деле-2018. – 2018. – С. 376-379.
11. Ibrokhimov J. M., Madmarova U. A. Process automatic control system on the basis intellectualop to electronic the sensor control //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 11. – С. 1318-1322.
12. Nishonov I. U., Iborkhimov J. M., Madmarova U. A. Process modernization on the basis microprocessor technics //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 11. – С. 1323-1327.