

## Using the Energy of Small Water Currents With the Help of Small Hydropower Plants.

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**Abstract:** *The article examines the use of energy from small streams with small hydroelectric power - one of the major advantages of small hydropower is that it may be put in remote regions where power lines are difficult and expensive to establish.*

*Natural and manmade streams, small and medium-sized rivers, streams, ditches, reservoir spillways, artificial ponds, and other sources of modest hydroelectricity can be used.*

*It is necessary to introduce innovative technologies, scientific and technical developments in the development of renewable energy and energy efficiency, expanding the production and localization of energy-saving equipment and devices, including through technology transfer and the creation of engineering centers, in order to use energy efficiently and increase the share of renewable resources.*

**Keywords:** *small hydroelectricity, renewable resources, electricity, river, streams, small communities, energy sources, irrigation canals, transmission lines, water quality, cheap electricity, planning.*

The electric power sector in Uzbekistan is the fundamental industry that determines the Republic's economic development. The level of modern and prospective economic development, energy efficiency, and energy conservation impact the demand for electric power among the republic's economic sectors and population.

It is necessary to identify the main important directions for further development of hydroelectricity and rational use of the republic's available hydroelectric energy potential in order to expand the use of the republic's available hydropower potential of natural and man-made watercourses and renewable energy sources in electricity generation, and to develop capacities for the production of new environmentally clean energy on this basis.

One of the most effective routes of alternative energy development is to use the energy of small streams through small hydroelectric power.

Electricity shortages are particularly obvious in tiny towns far from major industrial areas. The difficulty in electrifying such facilities stems from their remote geographic position, which has a significant impact on the cost of connecting them to the power grid. Even the most remote and poorly populated locations require economic reasons for

electrification. Connecting isolated communities to the general power system is not always practicable, both technically and financially.

Energy supply shows the need to use the hydropower potential of 650 rivers, irrigation canals, and reservoirs to improve living conditions in rural areas of the Republic of Uzbekistan, especially in hard-to-reach and remote areas due to the influence of a number of factors, which will contribute to the energy sector's sustainability.

Creating autonomous power plants based on renewable energy sources (RES) accessible in the region is one option to address these issues. The development of autonomous power plants has received a lot of attention in recent years, both in our nation and around the world (APP). In general, depending on the region, wind, solar, and small watercourse energy are considered as energy sources in the APP, but in order to assure their effectiveness, a number of issues must be resolved.

Small hydroelectric power (HEP) plays a crucial role in supplying electricity to off-grid customers who are located distant from transmission lines.

Small hydropower has the advantage of being able to be built in remote regions where power lines are difficult and expensive to establish. And such installations enable the uninterrupted supply of energy, the establishment of new businesses, the improvement of farm work, and the improvement of people's life.

Advantages of small HEP:

- there is no disturbance of the natural landscape and the environment during the construction and operation phases;
- there is no negative impact on water quality: it does not lose its original natural properties and can be used for public water supply
- virtually no dependence on weather conditions
- Ensures a stable supply of cheap electricity to the consumer at any time of the year.

The energy source for small hydropower can be:

- small rivers, streams, natural elevation differences at lake spillways and irrigation canals of irrigation systems,
- technological watercourses (industrial and sewage discharges), height differences of drinking and other pipelines, designed for pumping various types of liquid products.

There is no unified global classification of the capacity of small HEP. Every country has a different.

For example, Belarus is now attempting to recreate the 179 small HEP that used to provide electricity to agriculture.

In Russia, there are about 100 small hydropower plants with capacity up to 6 MW,

with a total capacity of 90 MW and production of about 200 million kW•h/year, most of the small HPPs under construction in the country are located in the North Caucasus. kWh/year, most of the small HEPs under construction in the country are located in the North Caucasus.

There are 94 small HEP in Armenia, 65 more are planned to be built, etc.

It is planned to amend the legislation of the republic to include hydroelectric power plants with an installed capacity of up to 0.5 MW in the classification of micro hydroelectric power, hydroelectric power plants with an installed capacity of up to 5 MW - small, hydroelectric power plants with an installed capacity of up to 30 MW - medium, hydroelectric power plants with an installed capacity of more than 30 MW - large hydroelectric power plants. These hydroelectric power plants will be considered as renewable energy sources.

Micro HEPs are in most cases used to supply small isolated consumers remote from centralized power supply networks. Sources of resources for micro HEPs can be natural and artificial streams, small and medium-sized rivers, streams, spillways from reservoirs, artificial ponds, etc.

According to the Decree of the President of Uzbekistan from December 10 "On additional measures for further development of hydropower" (PP-44). It is planned to increase the capacity of hydropower plants in the Republic by 2030 from the current 2051.9 MW to 3416 MW (+66.5%) through a consistent acceleration of the creation of new and a phased modernization of existing production capacity in the power sector through the widespread use of renewable clean energy sources.;

In the republic this year it was planned to implement 7 small HEP with a total capacity of 170 MW, in 2023-2024 - 12 projects with a capacity of 150 MW and in 2025-2026 - 2 projects with a capacity of 420 MW.

The possibility of installing compact hydro power plants with a capacity of up to 500 kW to supply electricity to villages located along rivers and canals, such as Naryn, Sokh, Tankhoz, Akbulak, and Ugam, has been considered.

Realizing the need for change, Uzbekistan's energy policy is shifting toward increasing the efficiency of energy use and expanding the share of renewable resources. introduction of innovative technologies, scientific and technical developments in the development of renewable energy and energy efficiency, expanding the production and localization of energy-saving equipment and devices, including through technology transfer and the creation of engineering centers.

The ultimate goal of the current strategy is to double the share of renewable energy in the energy production mix by 2030.

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