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"ENERGY INSTALLATIONS BASED ON RENEWABLE ENERGY SOURCES"

Ikromova Mashhura Asqar qizi
Student Karshi Institute of Irrigation and Agrotechnics at the National Research University "Tashkent Institute of Irrigation and agricultural Mechanization Engineers"

Abstract. While many renewable energy projects are large-scale, renewable technologies are also applicable in rural and remote areas and developing countries, where energy is often crucial in human development. Because most renewable energy technologies provide electricity, renewable energy distribution is often used in conjunction with subsequent electrification, which has several advantages: electricity can be converted to heat, high efficiency can be converted to mechanical energy, and clean point goods can be made. Including in this article, detailed information on renewable energy sources and energy devices.

Keywords: energy, hydropower, geothermal heat, bioenergy, biomass, micro and small hydropower, etc.

Utilization of hydropower, one of the first renewable energy sources in our country, began with the commissioning of the Bozsu hydroelectric power station, built in 1926. In the 1987 of the last century, the world's largest solar furnace, capable of collecting over 30,000 °C of heat, was commissioned. Currently, investments from the Asian Development Bank have been made, and construction has begun, for a 100,000 MW solar power plant on an area of 400 hectares in Samarkand region of our country. Small-scale solar power devices are being used in all corners of our republic. The theory and methods of utilizing wind energy were developed in the 1950s, and the first wind power installations in our Republic were used by livestock breeders in Navoiy region's Tomdi district in 1983. The production and utilization of biogas from cattle manure and agricultural waste residues began to be implemented from the 1987s.

Renewable energy is energy derived from the earth's natural sources that are unlimited or inexhaustible, such as wind and sunlight. Renewable energy is an alternative to traditional energy based on fossil fuels and has very low environmental impact. Solar energy is obtained by capturing the radiant energy from the sun and converting it into heat, electricity, or hot water. Photovoltaic (PV) systems can directly convert sunlight into electrical energy using solar cells. One of the advantages of solar energy is that the source, sunlight, is functionally limitless. With advancements in collection technologies, the virtually unlimited reserves of solar energy, unlike fossil fuels, will not be depleted. In the long term, solar energy has the potential to eliminate

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energy costs and reduce energy bills in a short time. While solar energy can save you money in the long run, the initial investment can be quite high. For private homes, homeowners need sufficient sunlight and available space to install solar panels, which limits the practical adoption of this technology at the individual level.

Here's a summary of the key points from the provided text about wind and hydroelectric power:

Wind Power:

- Wind farms use turbines to capture the energy of wind flows and convert it into electricity.
- There are various commercial-scale wind energy systems that can power different organizations or supplement existing power grids.
- Wind power is a clean energy source that doesn't produce air pollution, greenhouse gases, or other harmful byproducts.
- Wind power investments can create new jobs for turbine maintenance and operations.
- Wind farms are often located in rural or remote areas away from major population centers, requiring transmission infrastructure that adds costs.
- Some communities oppose wind turbines due to their height and noise they produce.

Hydroelectric Power:

- Hydroelectric power can be generated through large dam projects like Hoover Dam as well as smaller turbines in rivers and streams.
- Hydropower is an environmentally-friendly energy source that does not produce air pollution.
- Hydroelectric systems may require the use of fossil fuels to pump and store water in their systems.
- While hydropower itself is clean, it can negatively impact aquatic ecosystems by altering water flows, levels, and migration patterns for fish and other organisms.

Overall, both wind and hydroelectric power are renewable, low-emission energy sources, but they have tradeoffs in terms of infrastructure needs, environmental impacts, and public acceptance that need to be considered.

Geothermal heat - this is the heat that has been stored in the Earth's crust for 4.5 billion years since the formation of the Earth and as a result of radioactive decay. Sometimes this heat escapes in large quantities naturally, but sudden events, such as volcanic eruptions and geysers, occur. This heat can be captured, and geothermal energy can be generated using steam from a submerged pump, which then rises to the top and can be used to drive a turbine. Geothermal energy is not as widely distributed as other renewable energy sources, but it has great potential for energy supply. Since it can be built underground, it leaves a very small footprint on land. Geothermal energy

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is naturally replenished and therefore has no risk of depletion. The main drawback of geothermal energy is the cost. Building the infrastructure is not only expensive, but also a major concern is its vulnerability to earthquakes in some regions of the world.

The oceans can produce two types of energy: thermal and mechanical. The thermal energy of the oceans depends on the temperature difference between the warm surface water and the colder deep water, which can be used to generate energy through various systems. Ocean mechanical energy uses the flow of waves and currents generated by the Earth's rotation and gravitational forces to generate energy. Unlike other renewable energy sources, wave energy can be predicted in advance and the amount of energy produced can be estimated more easily. Wave energy is well suited to relying on various factors such as sun and wind. This type of renewable energy is also very suitable for densely populated cities near the ocean and ports, making it easier for the local population to use this energy. Coastal residents will certainly benefit from wave energy, but landlocked countries may not be ready to use this energy. Another downside of ocean energy is that it can disturb many delicate ocean ecosystems. Although it is a very clean energy source, large machinery is required to harness this energy, which can cause disturbances on the ocean floor and in the marine life that inhabits it. Another factor to consider is the weather. Rough weather changes the interaction of the waves, so stormy weather produces less energy compared to regular waves.

Bioenergetics - this is renewable energy derived from biomass. Biomass - organic matter derived from recently living plants and organisms. The use of wood is a well-known example of biomass. Various methods are used to generate energy from bioenergetics. This can be done by burning biomass or by utilizing the natural decomposition of organic matter in water bodies or even landfills to generate methane gas. The generation of energy from biomass produces carbon dioxide emissions, but the regeneration of plants consumes an equal amount of carbon dioxide, creating a balanced atmosphere. Biomass can be used in various ways in our daily lives, not just for personal use, but also for businesses. Although carbon dioxide is needed for plant growth, it takes time for plants to grow. We don't yet have widely adopted technologies that can use biomass-derived fuels instead of fossil fuels. Solar panels not only reduce energy consumption, but also help improve your life by providing a safe, environmentally friendly energy choice that is not dependent on polluting sources. Alternatives to the "green lifestyle" offered by electricity companies are available.

It is worth noting that in our country, multifaceted work is being carried out in this direction. In particular, the Resolution "On the use of renewable energy sources" adopted by the Legislative Chamber on April 16, 2019 can serve as a vivid example of the above ideas. In particular, Article 2 of this Resolution states that "The legislation on the use of renewable energy sources consists of this Law and other legislative acts.

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If the international treaty of the Republic of Uzbekistan establishes rules other than those provided for in the legislation of the Republic of Uzbekistan on the use of renewable energy sources, the rules of the international treaty shall apply. The following basic concepts are used in this Law:
• local network - an independent electrical, heating, and/or gas network for the transmission (transmission) and/or distribution of electricity, heat, and/or biogas;
• micro and small hydroelectric power plants - run-of-river hydroelectric power plants that use the natural flow of water for electricity generation, with an installed capacity of 0.2 MW and up to 30 MW, respectively;
• renewable energy sources - solar, wind, geothermal energy, natural water flow, biomass energy that are naturally renewable in the environment;
• use of renewable energy sources - scientific research, experimental design, exploration, implementation, design, construction and installation work and operations, as well as activities related to the generation, transmission, accumulation, sale and consumption of energy from renewable energy sources;
• renewable energy producers - legal entities or individuals who generate energy from renewable energy sources;
• renewable energy equipment - a set of technological equipment for the generation, receipt, conversion, accumulation and/or transmission of energy from renewable energy sources, as well as metering equipment;
• manufacturers of renewable energy equipment - legal entities specialized in the production of renewable energy equipment."

"In places intended for living that are completely disconnected from the existing energy resource networks and use renewable energy sources, the property tax on property owned by individuals using renewable energy sources is not levied for a period of three years from the month when the use of renewable energy sources began. In places intended for living that are completely disconnected from the existing energy resource networks and use renewable energy sources, the individuals using renewable energy sources are exempt from land tax for a period of three years from the month when the use of renewable energy sources began. The certificate on the use of renewable energy sources in the complete absence of connections to the existing energy resource networks, issued by the energy supplying organization, serves as the basis for granting the exemptions specified in the third and fourth parts of this article. Information on regulatory legal acts, technical regulations, norms and rules in the field of the use of renewable energy sources, as well as information on innovative ideas, developments and technologies related to the use of renewable energy sources, is published in the media and on the official website of the authorized state body."

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