INTEGRATED (COMPREHENSIVE) UTILIZATION OF RENEWABLE ENERGY SOURCES AND ENERGY EFFICIENCY IN REMOTE MOUNTAINOUS AREAS

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The benefit of renewable energy sources and the need for their use in the economy of the mountainous countries, where quite often small settlement' families are not secured by sufficient energy for farming and life, is well known.

Cost of connection to the country' public network is an expensive pleasure, due to the high expenses and adverse impact to the natural environment.

On the basis of the above mentioned it is recommended to use small energy resources, which are available on site and meet of the population' needs.

Such settlements are located in the mountainə valleys at a distance of 100-1000 m-s from riverbeds, where climatic characteristics of the area are well known:

1. seasonal and annual average temperature.

2. Solar radiation, the duration and number of exposed energy per unit area.

3. Precipitation, humidity.

4. Air circulation, (wind speed and direction).

Also known the soil and green cover characteristics of local landscape, which together with cartographic information allows the determination of the integrated renewable energy usefulness in a specific area.

In the result of the above-mentioned characteristics analysis, it is possible to identify the type of renewable energy or their aggregation that can be used for a particular case.

The main criterion for their suitability is the overall level of profitability. It is known that the energy generated by solar and wind power converters, is unstable. The energy of the river stable compared with them, although it has seasonal volatility.

If the energy generated by solar, wind and H/P converters combine in one system, the problem of instability will be partially solved.

It should be noted that it is also important to combine solar heaters and biogas plants in one system.

In the Highlands the livestock is a leading sector of local population economic activity. Because of the long winter population less inclined to use herbal products, while a small greenhouse farm would improve their living conditions.

Definitely the greenhouse is desirable, but less effective without the biogas and solar heaters, but combined they complement each other, and their effectiveness in the complex will be relatively high. Here are some facts:

1. For continuous operation of biogas device requires a constant temperature of 25-35 degrees. That's why it requires good packaging and even the heating.

2. If the biogas device is placed in a green-house, the latter one itself is one of heat insulators for biogas and prevents heat dissipation from the tank.

3. The tank in the green-house itself performs the function of a heat accumulator.

4. Handled fertilizer obtained from the biogas plant, which is necessary for green-houses, not less valuable than gas.

It is desirable that the solar heater should be part of this system, which, on the one hand, provides house with warm water, on the other hand- the required temperature in the tank for biogas.

It is also important to use energy efficient systems as a prerequisite for energy saving.

If the task is to find the village (settlement), where integrated use of renewable sources of energy is expedient, then the mountain region has some advantages over other regions.

In addition, as significant benefits should be considered the landscape inclined topography, which in some cases can reduce the process of manual labor.

In this case, the ideal base schema system can be represented as follows.

By height- from the bottom to up:

1. Solar heater.

2. Biogas device.

3. Pen.

4. Accommodation.

So, for the efficient use of renewable energy sources in the mountainous areas, it is necessary:

1. Determination of the minimum amount of energy (seasonally adjusted) needed for farming and therefore normal family life of Highlanders.

2. Identification and analyze each type of alternative energy in accordance with the following characteristics:

1. Average annual energy potential.

2. Seasonal peak deviation.

3. Accessibility at the discretion of the landscape and other circumstances.

4. The number of actually available energy.

5. The cost of basic equipment to 1 Watt.

6. Current expenditures.

7. Indicators of environmental stress (minor, valid, unacceptable).

During the combined usage of different alternative energy resources it is desirable to present above mentioned data in matrix form.

This will allow to group them, according to the level of efficiency, and compare with effectiveness of integrated renewable energy sources.

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