

Use of Renewable Energy in Tajikistan

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The potential of renewable energies in Tajikistan is very high. Use of renewable energies would help to solve many environmental problems, including GHG emissions abatement, prevention of forest cuttings, waste utilization etc.

Solar energy. Due to its geographical positioning, Tajikistan is one of the most appropriate regions for applying solar energy. There are 280-330 sunny days a year. The intensity of total solar radiation varies within a year from 280 to 925 MJ/sq.m in piedmont regions, and from 360 to 1120 MJ/sq.m in highlands. According to expert estimates, a typical solar station in Tajikistan's conditions can potentially avoid 0.30-0.35 tonnes of Co₂ a year. Utilization of solar energy available in Tajikistan could satisfy national energy demands by 10-20%.

Wind energy. Mean annual wind speed in Tajikistan varies from 0.8m/sec to 6.0 m/sec at 10 meters above ground. Wind direction and speed greatly depends on the atmospheric circulation and peculiarities of the landscape. The strongest winds blow in highland areas (Fedchenko, Anzob etc) and in the areas where landscape favor to convergence of air flows (Khujand, Fayzabad etc). Mean annual wind speed in these areas reaches 5-6 m/sec. In the open lowlands and wide valleys wind speed reaches 3-4 m/sec. In the locked lowlands mean annual wind speed does not exceed 1-2 m/sec. Although hydropower prevails, application of wind power as a supplementary source of energy is justifiable in certain regions of Tajikistan.

Biogas. Agricultural wastes are potential energy sources. The most promising option of biomass utilization in Tajikistan's conditions is biogas generation by means of anaerobic fermentation of manure. Now, a few experimental biogas generators operate in Tajikistan. In addition, there is the potential opportunity to produce energy by thermo-chemical method of biomass conversion using cotton residues.

Hydropower. Potential hydropower resources of Tajikistan are estimated at around 527 billion kWh a year (not including small mountain rivers). At present, only 5% of this potential is being used. Hydropower plants produce more than 95% of all electricity in Tajikistan (14-15 billion kWh a year). For Tajikistan, in the context of climate change mitigation, small hydropower engineering represents the greatest interest. Opportunities for developing such are available in most of the mountain regions, in particular Central Tajikistan and the Pamirs. Development of small hydropower engineering is an important factor for the improvement of socio-economic conditions and the prevention of forest cuttings, thus reducing wood fuel use for meeting energy demands. Now, there are 20 small hydropower plants in operation. Present generating costs for hydropower are the lowest in comparison with other renewable energies.

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