



**Министерство энергетики
и промышленности
КЫРГЫЗСКОЙ РЕСПУБЛИКИ**

**Ministry of Energy and Industry
of the Kyrgyz Republic**
**Renewable Energy Sources
Development**

Bangkok 2013



Renewable Energy Sources Potential

The Republic of Kyrgyzstan has high renewable energy sources (RES) potential estimated at 840,2 toe. Solar, hydroelectricity of small rivers and streams, wind energy, geothermal waters and biomass are the major types of renewable energy sources in the republic. Still, currently their practical application is insignificant, thus, RES comprise less than 1% of the country's energy mix. This is due to various factors, the key one is the weak economic incentives to RES usage.





Solar Energy

Advantageous geographic location and climatic conditions allow Kyrgyzstan to produce, on the average, 4,64 bln. MWh of radiant energy per year, or 23,4 kWh per square meter, moreover, the average annual sunshine duration varies from 2100 to 2900 hours by area. According to expert estimates, solar energy resources are considerable and have high potential for being used in the fuel and energy complex.





Homemade Solar Ovens



Solar ovens of different types can be produced at home, are easy to operate, cost-efficient and convenient.





Solar Home Heating



Vacuum Collection Systems (6 sq. m. in size)
are purposed for daytime room heating and accumulation of thermal energy in the heating system. Four collectors of this type heat the area of 100 sq. m.





Combined Heat Supply Systems



Sokuluk motor-transport depot



Alamedin «Selhozenergo»





Solar Thermal Collectors for Heating and Hot Water Supply on the Roof of an Apartment Building in Bishkek





Solar energy allows to

- Meet 90% of hot water demand for the period of 8-9 months.
- Cover up to 50% of heating during the heating season.
- Provide energy supplies to all low-power customers in remote areas (foresters, herders, beekeepers).
- Provide up to 30% of countryside population with reserve power supply.
- Save conventional fuels.





Resources of Wind Energy

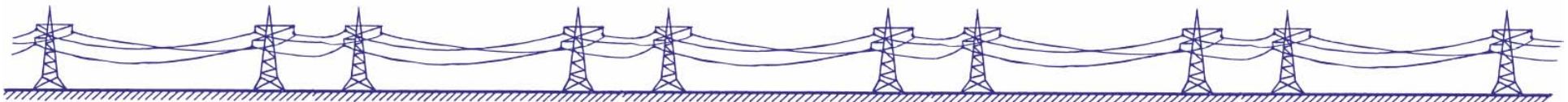
Opposite to solar energy, wind energy resources are scattered across Kyrgyzstan territory. The ridge range area, comprising more than half of the wind energy potential, from the efficiency point of view, is most conducive for wind energy use, particularly, for construction of large wind power plants that might potentially contribute to the energy system. Energy winds annual duration is 5-7 thousand hours, with energy density of the wind flow equal to 2000 kWh per sq. m. Still, this particular area is the most remote and least accessible one, which makes significant challenges for energy resources exploration.





Wind Energy

- Potentially can be used in the following areas: Shamaldisai, the Alatai Plateau, Suusamyr, and Barskounkoe Gorge.
- Meets up to 5-7% of the rural population energy demand.
- Provides additional pump farmland irrigation.
- Provides energy supplies for domestic consumers.





Biomass

In the Kyrgyz Republic, biomass as a source of renewable energy, has considerable potential. Biomass processing, comprising animal and plant waste, as well as other organic material, results in production of 1,61 bln. cu m of combustible methane gas per year.





Examples of Biogas Technology Implication: Biogas Unit in the Village of Petrovka

Type of unit: 1 horizontal (60 cu m) and 3 vertical (25 cu m, 25 cu m, 40 cu m) reactors, total volume capacity equal to 150 cu m with pneumatic loading and raw material mixing.

- Raw material: manure of 35 heads of cattle, 460 pigs, 350 chicken farms, as well as imported manure and human feces.
- Productivity:
 - Fertilizer - 10 t/d
 - Biogas - 500 cu m/day



Utilization of BU products

- Fertilizers are used on the 300 ha of cultivated land for planting crops, corn, lucerne, and pumpkin.
- Distributed to neighboring farms.
- 7 farms are using biogas for household purposes to prepare animal feed, electric generator operation and vehicles fueling.
- There are plans for carbon dioxide production from biogas.





Examples of Biogas Technology Implication

Biogas unit in the village of
Lebedinovka

Reactor volume – 250 cu m

- 17 t/d



Biogas unit in the village of
Pervomayskoe

• Reactor volume – 120 cu m

- 8 t/d





Examples of Biogas Technology Implication

Biogas unit in Naryn
Naryn-Et, LLC

- Reactor volume – 100 cu m
 - 6 t/d



Kant

Kyrgyz Machine Station,
JCS

- Reactor volume – 200 cu m
 - 14 t/d





Examples of Biomass Technology Implication

Village of Tash-Dyube

- Reactor volume – 25 cu m
 - 1,7 t/d



Village of Novo-Pavlovka

- Reactor volume – 100 cu m
 - 7 t/d





Biomass helps

- Provide household gas to 30% of rural population.
- Reduce emissions of CO₂, CH₄ by 100 mln. cu m.
- Increase fields yield by 15-20%.
- Reduce conventional fuels consumption.





Geothermal Energy

Proven reserves of geothermal energy comprising water of varying salinity at the temperature of 40-60 degrees Celsius are estimated at 613 bln. GJ per year, 70% of these deposits are located in the north of the republic. Worldwide these waters are used, as a rule, for heating with heat pumps and peak water heating of various facilities, also for balneology purposes. Ak-Suu, Issyk-Ata, Dzhergalan and others can be considered the most accessible deposits.





Small Hydropower

Technically acceptable from the development point of view is the hydropower potential of small rivers and streams equal, estimated at 5-8 bln. KWh per year.

In terms of location, all the surveyed small rivers belong to the basins of the Chu, the Talas, the Naryn, the Sary-Zhaz, the Karadaria, and the Syrdaria Rivers.

Small rivers hydropower potential of the Kyrgyz Republic provides opportunities for construction in the near future of 90 new small HPS with total capacity of 180 MWt and average annual electricity production of up to 1,0 bln. KWh.

With its considerable potential, small hydropower projects implementation can be viewed as the most prospective collaboration area.





Strategic Planning for the Small Hydropower Development in the Kyrgyz Republic

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European Bank
for Reconstruction and Development



РусГидро

The Ministry of Energy and Industry of the Kyrgyz Republic in collaboration with **EBRD** is carrying out the project entitled “**Strategic Planning of Small Hydropower Development in the Kyrgyz Republic**”. The consortium Mercados EMI (Spain) and JSC “RusHydro” (the Russian Federation) are undertaking the project.

The project frameworks include construction of four small hydroelectric power stations, for which feasibility studies have been undertaken (Orto-Tokoyskaya – 20MW, Oi-Alma – 7,7MW, Solokunskaya-5 – 1,5MW, Tortgulskaya – 3,0MW), data on alignment of small hydropower stations will be offered to investors for consideration and application.





Four Small Hydropower Stations

Sokuluk HPS-5, capacity - 1,5 MWt

Output - 9 090 MWh per year

Sokuluk District, Chuyskaya Region



Oi-Alma HPS-2, capacity - 7,7 MWt

Output - 54 490 MWh per year

Kara-Kul'dzhin District, Osh Region

Tortgul HPS, capacity - 3 MWt

Output - 11 860 MWh per year

Batken District, Batken Region,

on the territory of Tortgul

Water Reservoir



Orto-Tokoy HPS, capacity - 20 MWt,

Output - 80 940 MWh per year

Tonsk District, Issyk-Kul Region





Renewable energy sources are aimed at

- Environmental development due to reduction of atmospheric emissions.
- Enhancement of energy security.
- Improvement of socio-economic living standards of the rural population.
- Decrease of conventional fuels consumption (coal, oil, and gas).





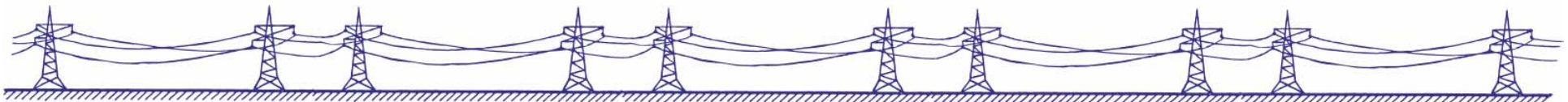
Barriers to Renewable Energy Sources Use

1. Institutional barriers:

- Need for a public institution (an agency on RES) specializing in the area.
- Insufficient regulatory frameworks in the field of RES.
- Lack of highly qualified RES specialists.

2. Financial barriers (insufficient mechanisms of financial support).

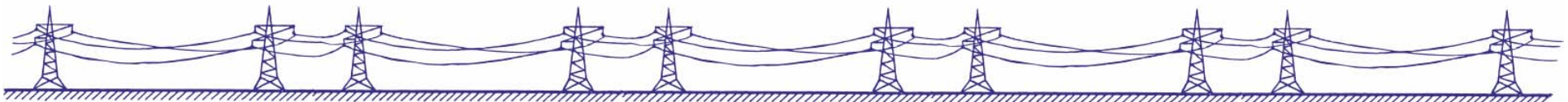
3. Lack of awareness on RES promotion. Low informedness level of people, government bodies, organizations and institutions on RES usage advantages.





Regulatory Frameworks on RES Development

- Law of RK «On Renewable Energy Sources»
- Law of RK «On Energy»
- Law of RK «On Electricity»
- Law of RK «On Energy Saving»
- National Energy Program of the Republic of Kyrgyzstan for 2008 – 2010 and Strategy of Fuel and Energy Complex Development until 2015.
- Decree of the Government of the Kyrgyz Republic of 28 July 2009 of «On Approval of the Procedure of Construction, Acceptance and Grid Connection of Small Hydropower Plants to Power Grids».





Main Regulatory Challenges

- Lack of programme documents setting the priority of introduction and use of small-scale renewable energy systems.
- Regulatory frameworks are not comprehensive and do not adequately reflect the market environment for RES introduction and use.
- Regulatory documents often lack coverage of implication mechanisms.





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БЛАГОДАРЮ ЗА ВНИМАНИЕ!

**Thank you for your
attention!**