Development of the Renewable Energy Sector in the Kyrgyz Republic

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Power Sector of the Kyrgyz Republic

- **Installed Capacity:** 3,666 MW
  - Hydropower: 2,950 MW (80%)
  - Thermal: 716 MW (20%)

- **Annual Energy:** 10,961 GWh (2009)
  - Hydropower: 9,997 GWh (91%)
  - Thermal: 964 GWh (9%)

- **Resources**
  - Hydropower: 18,500 MW
  - Coal (recoverable): 1,3 billion tons
  - Hydrocarbons (gas, oil): 145-260 million tons
Power Plants of the Kyrgyz Republic

- Toktogul HPP (1 200 MW)
- Kurpsay HPP (800 MW)
- Tashkumyr HPP (450 MW)
- Shamaldysai HPP (240 MW)
- Uchkurgan HPP (180 MW)
- Atbashy HPP (40 MW)
- Small HPP – 10 ps. (40 MW)

- Bishkek city TPP (666 MW)
- Osh city TPP (50 MW)
Central Asian Power System (CAPS)

- Largest Exporter
Electricity production and exports in 2007-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Exports</th>
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<tbody>
<tr>
<td>2007</td>
<td>14.6 млрд кВтч</td>
<td>2.38 млрд кВтч</td>
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<tr>
<td>2008</td>
<td>11.6 млрд кВтч</td>
<td>0.543 млрд кВтч</td>
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<tr>
<td>2009</td>
<td>10.9 млрд кВтч</td>
<td>0.864 млрд кВтч</td>
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<tr>
<td>2010</td>
<td>11.9 млрд кВтч</td>
<td>1.5 млрд кВтч</td>
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Expected
Participants in the electricity market and electricity suppliers

- **Generation Company** - JSC "Electric Power Plants" (6 HPP and 2 TPP)

- **Hydroelectric Power Plants** till 30 MW (10 SHPP)

- **Transmission Company** - JSC "National Electric Network of Kyrgyzstan"

- **Distribution Energy companies:**
  - JSC “Severelectro“
  - JSC “Vostokelectro“
  - JSC “Jalalabatelectro“
  - JSC “Oshelectro“
The potential of renewable energy in the Kyrgyz Republic

1. Solar energy (heat) - 490000 MWh
2. Solar energy (electric) - 22500 MWh
3. Wind energy - 44560 MWh
4. Small streams - 8 billion kWh
5. Biomass - 1300000 MWh

Practical use of renewable energy in the Kyrgyz Republic is less than 1%
Solar energy

- Sunshine duration in Kyrgyzstan exceeds 2800 hours
- Annual sum of solar radiation on horizontal surface 1000 – 1700 kWh/m²/year
- More than 50% direct solar radiation
What could the wind

- Possibilities of windmills in the central network (Shamaldysay, Alai plateau, Susamyr, Barskoun Gorge)
- Cover up to 5-7% of energy needs of rural population
- Provide additional irrigation of farmland (wind turbines as pumps)
- To provide electricity to domestic consumers
Wind Power - General

- No wind power development yet.
- Only limited resource data.
- 4 - 5 m/s (30 m)
- Wind potential reported highest in winter when:
  - demand is high
  - river flow is low.

Source: Master Plan of Wind Power Development of the USSR till 2010”, 1989
Biomass

- Production of 1.6 bln.m3 of Biogas
- Demand covering with gas up to 30% of rural population
- Fertilizing of 1.3 mln. Hectare of arable fields
- Reduction of CO2, CH4 emissions for 100 mln. m3
- Increasing the crop capacity of the field for 15-20 %
- Consumption decreasing of traditional fuel
The energy potential of 172 rivers and water-currents exceeds 80 billion kWh in year

Technically feasible potential 5-8 billion kWh in year

Construction 92 SHPP capacity 178 MW and produce up to 1.0 billion kWh is possible

To restore 39 SHPP capacity 22 MW and produce up to 100 million kWh

Construction 7 HPP on irrigational water basins capacity 75 MW will give generation about 220 million kWh
Climate Change

- KGZ has little contribution to climate change
- 12 million t-CO₂ equivalent (2005)
- 2005 emission 250% below 1990

Source: Climate Change in Central Asia – A Visual Synthesis, Zoï Environment Network, 2009
Climate Change

- Climate change affects KGZ

Climate Change

Source: Climate Change in Central Asia – A Visual Synthesis, Zoë Environment Network, 2009
Climate Change

- Inflow reduction to Toktogul Reservoir already experienced.
- Further reduction expected in long-term.

Source: Climate Change in Central Asia – A Visual Synthesis, Zoï Environment Network, 2009
The legal framework for the development of renewable energy

- Law "On Energy"
- Law "On Electric Power Industry"
- Law "On Energy Saving"
- National Energy Program of the Kyrgyz Republic for 2008-2010 and development strategy of fuel and energy sector until 2025
The main problems of legislation in the field of renewable energy

- Lack of policy documents setting out priorities for implementation and use of small-scale renewable energy systems;

- Lack of completeness and adapting the regulatory framework to market conditions governing the introduction and use of renewable energy;

- In regulatory documents often lack enforcement mechanisms.
Barriers to the use of renewable energy

1. Institutional barriers:
   - Imperfect legislation in the field of renewable energy;
   - Lack of qualified specialists in the field of renewable energy.

2. Financial barriers (weak mechanisms for financial support).

3. Poor information support for renewable energy. Low awareness of population, government agencies, organizations and agencies about the benefits of using renewable energy.
The Law «On Renewable Energy» adopted December 31, 2008;

Decree of the President of the Kyrgyz Republic in October 14, 2008 has approved the Program for Development of Small and Medium Energy in the Kyrgyz Republic until the year 2012;

Resolution of the Government of the Kyrgyz Republic in July 28, 2009, has approved the Regulation on Procedure for Construction, Acceptance, and Technological Connection of Small Hydro Power Plants to Electrical Networks;

Finalized the draft Law "On amendments and additions to the Law" On renewable energy”, in terms of premiums to the tariff for each type of renewable energy.
Ongoing projects in the field of renewable energy

- The project is funded by the EBRD "Strategic planning for development of small hydropower of Kyrgyz Republic". Completed the first phase of the project and launched the second phase in which the 4 pilot will develop a feasibility study, which will be offered to investors for implementation.

- Medium-sized project "Development of small HPP" implemented jointly with UNDP. Which provides for the development of the regulatory framework in the field of renewable energy and small hydropower plants, capacity building specialists from the Ministry of Energy, as well as feasibility studies for 5 projects for small hydroelectric power plants.
Featured 4 pilot project on the project "Strategic planning for the development of Small Hydropower of the Kyrgyz Republic"

1. Sokuluk-5 SHPP - 1,5 MW, Chui region, river Sokuluk
2. Oialma SHPP – 7,7 MW, Osh region, river Karakuldja
3. Orto-Tokoi SHPP – 20 MW, Ysyk-kul region, reservoir Orto-Tokoi;
4. Tortgul SHPP – 3 MW, Batken region, reservoir Tortgul
Thank you for your attention!