



Ministry of Energy of the Kyrgyz Republic



Development of renewable energy sector in the Kyrgyz Republic

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Energy sector of the KR

- Established capacity: 3 788 MW
 - Hydropower: 3 072 MW (80%)
 - Thermal power: 716 MW (20%)
- Annual output: 15,154 billion. KWh (2012)
 - Hydropower : 14,184 billion. KWh (94%)
 - Thermal power: 970 billion. KWh (6%)
- Resources:
 - Hydropower : 18,500 MW
 - Coal: 1,3 billion. ton
 - Carbon (gas, oil): 145-260 billion. ton

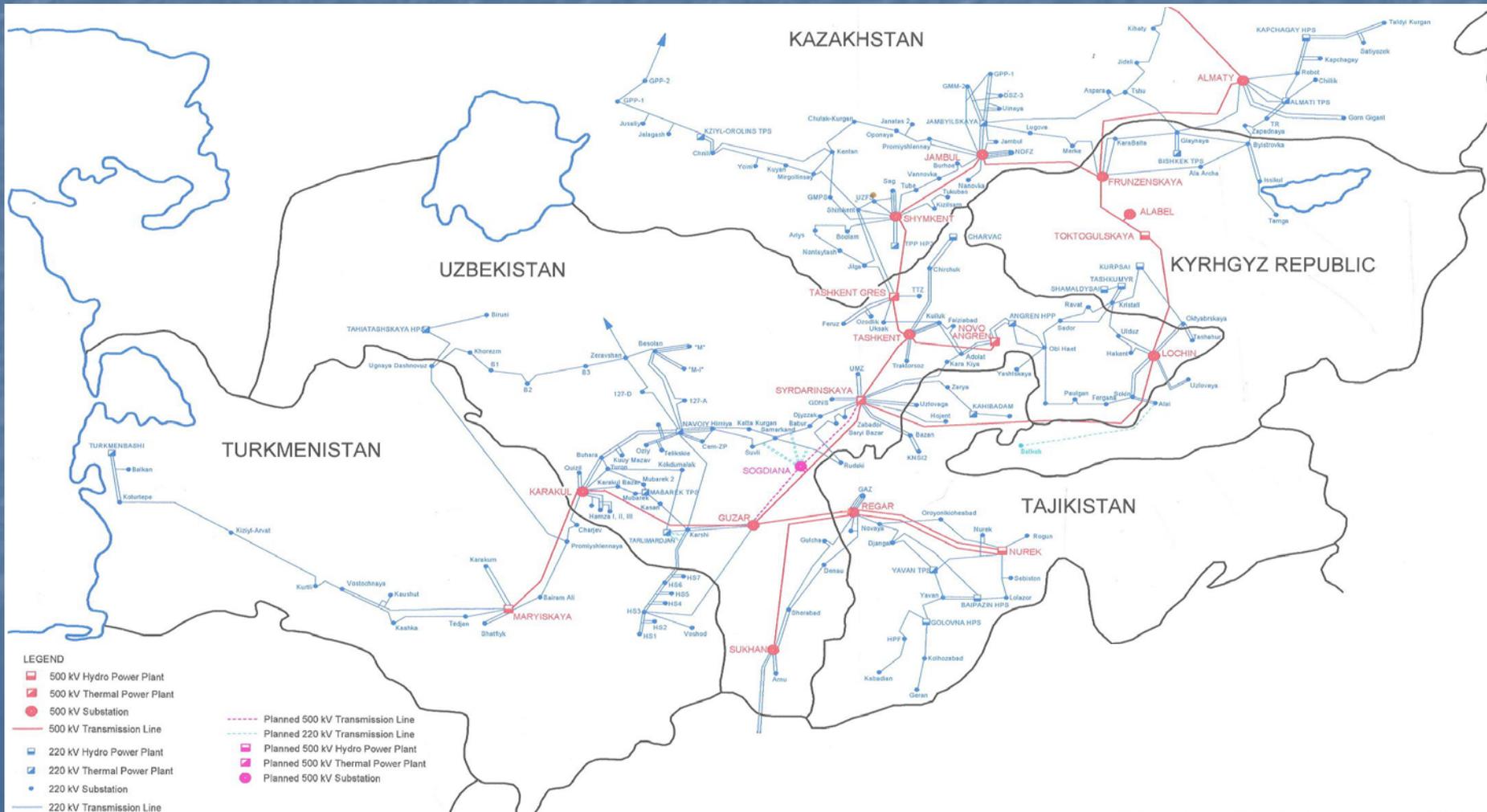
Power plants of the Kyrgyz Republic

- Toktogl PP (1 200 MW)
- Kurpsai PP (800 MW)
- Tash-Kumyr PP (450 MW)
- Shamaldy-Sai PP (240 MW)
- Uch-Kurgan PP (180 MW)
- Kambarata PP-2 (120 MW)
- At-Bashi PP (40 MW)
- Small PPs – 12 units (41,5 MW)

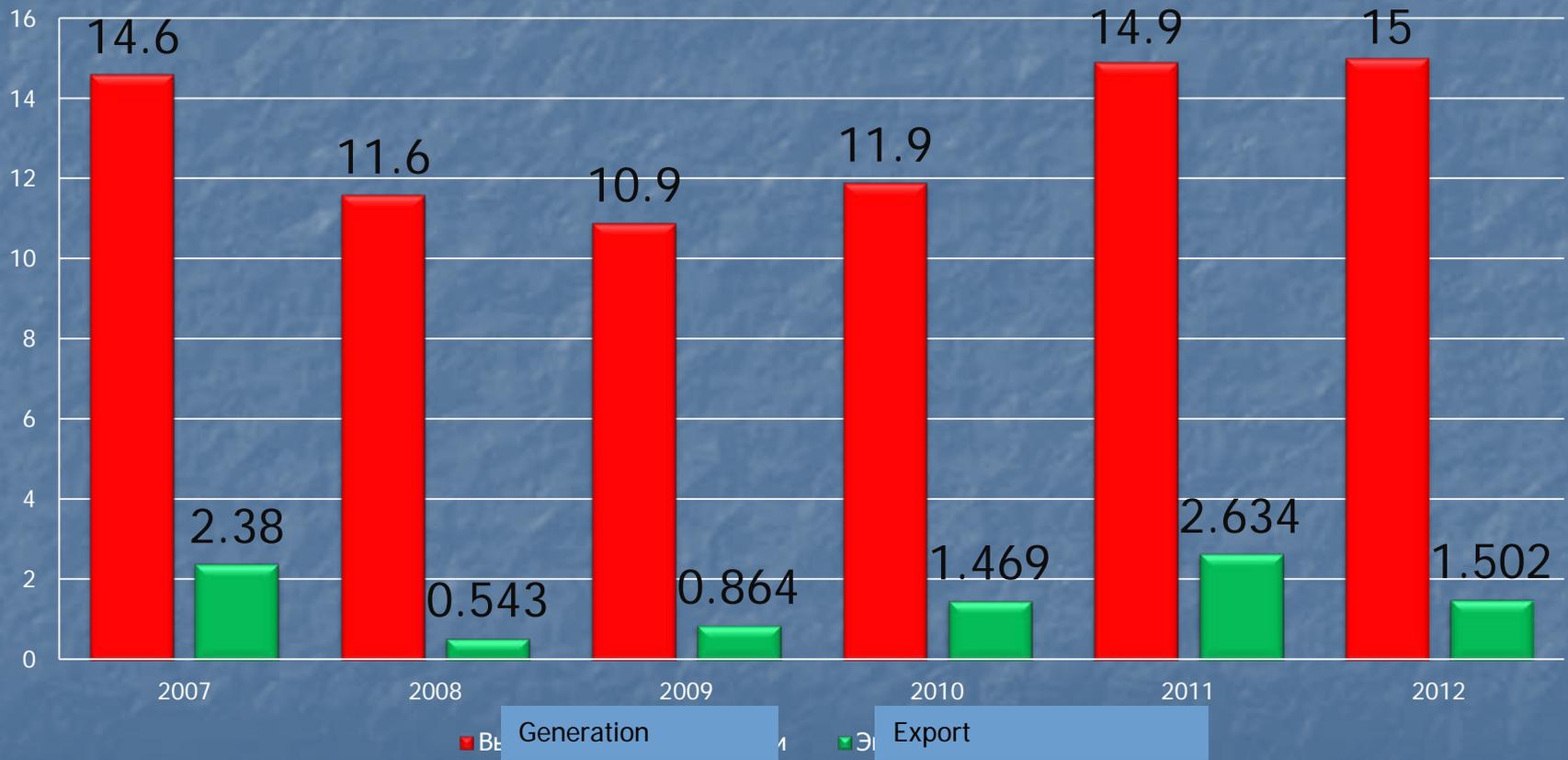
- TPP Bishkek (666 MW)
- TPP Osh (50 MW)

Energy system of Central Asia (CA ES)

■ The largest exporter



Generation and export of electric power in 2007-2012 billion. KWh



Participants of the electricity market and electricity suppliers

- Generating company – JSC "Power Stations" (7 PPs and 2 TPSs)
- Hydropower plants up to 30 MW (12 PPs)
- Transmitting company- JSC "NES Kyrgyzstan"
- Distribution power companies – JSC "REC"

Potential resources of renewable energy sources in the Kyrgyz Republic

1. Solar energy (heating) - 490,0 mln. KWh
 2. Solar energy (power) – 22,5 mln. KWh
 3. Wind energy – 44,6 mln. KWh
 4. Small rivers - 8 billion. KWh
 5. Biomass – 1,3 billion. KWh
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- Practical use of renewable energy in the Kyrgyz Republic is less than 1%

Solar energy

In Kyrgyzstan the duration of sunshine exceeds 2800 hours

The annual amount of solar radiation at horizontal surface is 1000 - 1700 kWh/m²

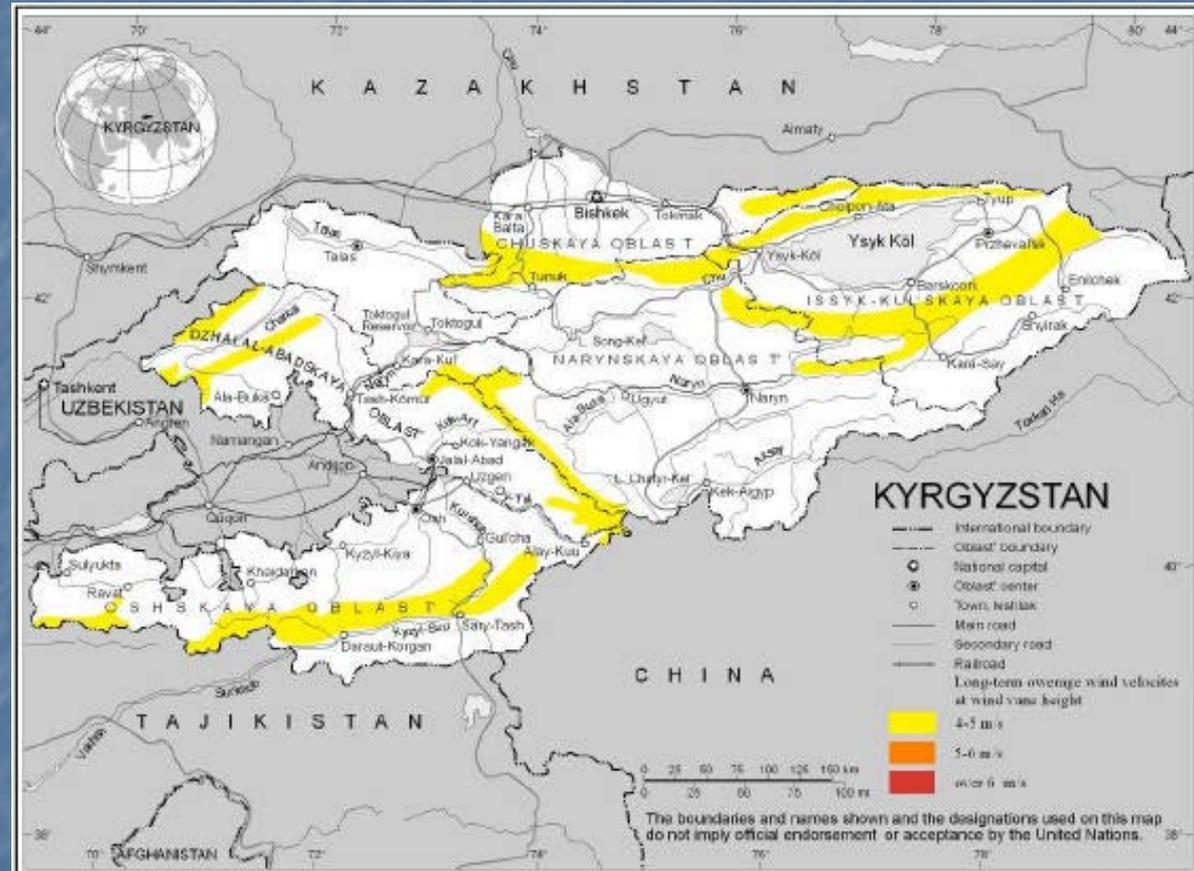
More than 50% is direct solar radiation

What can be obtained from the wind energy

- Potential of wind turbines in the central grid (Shamaldysai, Alai, Susamyr, gorge Barskaun)
- Covers up to 5-7% of energy needs of the rural population
- Provides supplemental irrigation of agricultural land (wind turbine pumps)
- Provides electricity to domestic consumers

Wind energy – background information

- Wind energy is not generated yet
- Only limited data about the resource
- 4 - 5 m/s (30 m)
- According to available information, the highest wind energy potential is there in the winter when:
 - Demand is high
 - River flow is low.



- Source: "Master plan for the development of wind power industry of the USSR by 2010", 1989.

What can be obtained from biomass

- Every year, about 1.6 billion cubic meters of combustible gas methane, per year
Provide 30% of rural residents with gas for domestic use
- Fertilize 1 mln. 300 thousand hectares of arable land
- Reduce CO₂ CH₄ emissions by 100 mln m³.
Raise the productivity of fields by 15-20%
- Reduce the consumption of traditional fuels

Small hydropower sector

- Hydropower potential of 172 rivers and streams is more than 80 billion. KWh per year.
Technically feasible potential is 5-8 billion. kWh per year

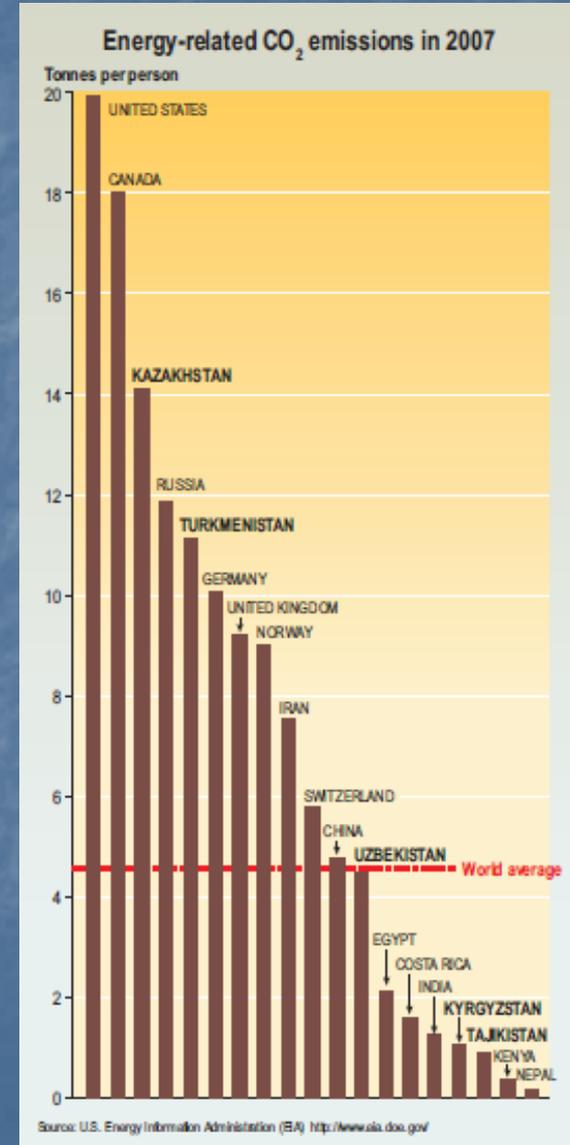
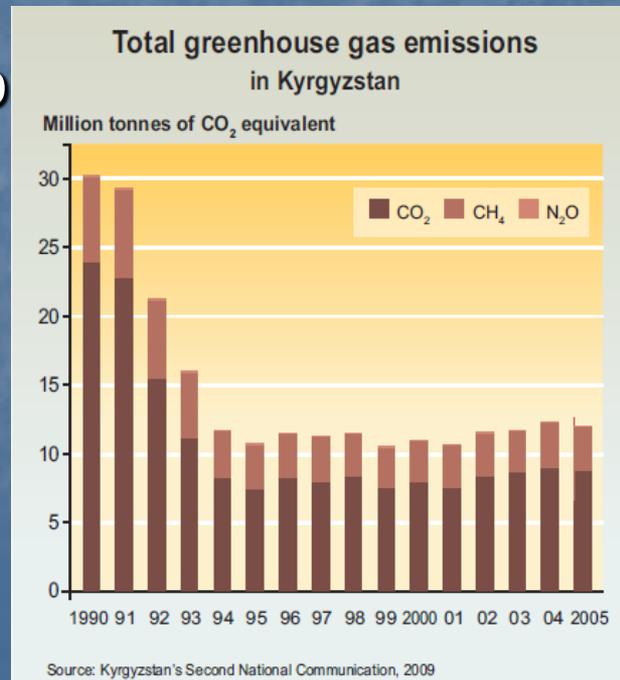
It is now possible:

- Construction of 92 SPPs of 178 MW capacity and output of up to 1.0 billion. KWh
- Restore 39 SPPs of 22 MW capacity and output of up to 100 mln. KWh.
- Building of 7 SPPs at the irrigation reservoirs with capacity of 75 MW would provide generation of about 220 mln. KWh.

Climate change

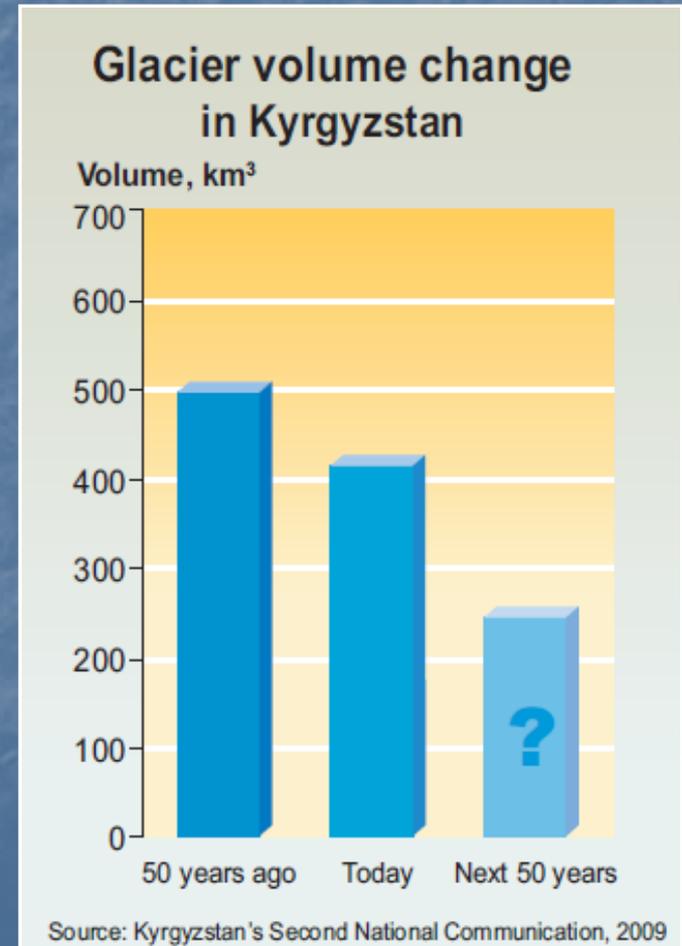
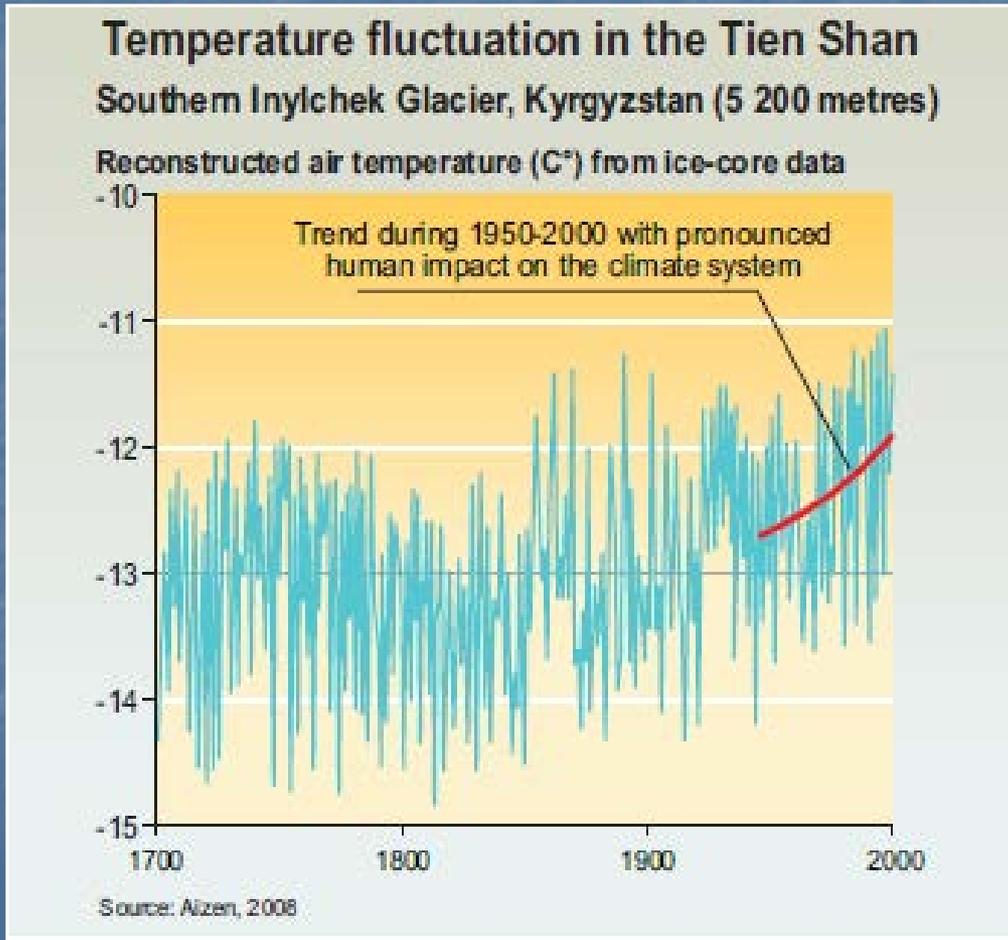
- KR does not contribute much to climate change
- 12 mln. ton of CO₂ equivalent (2005)
- Emission in 2005 were 250% lower compared to 1990.

Source: Climate Change in Central Asia - the visual synthesis, Network for Environment , 2009

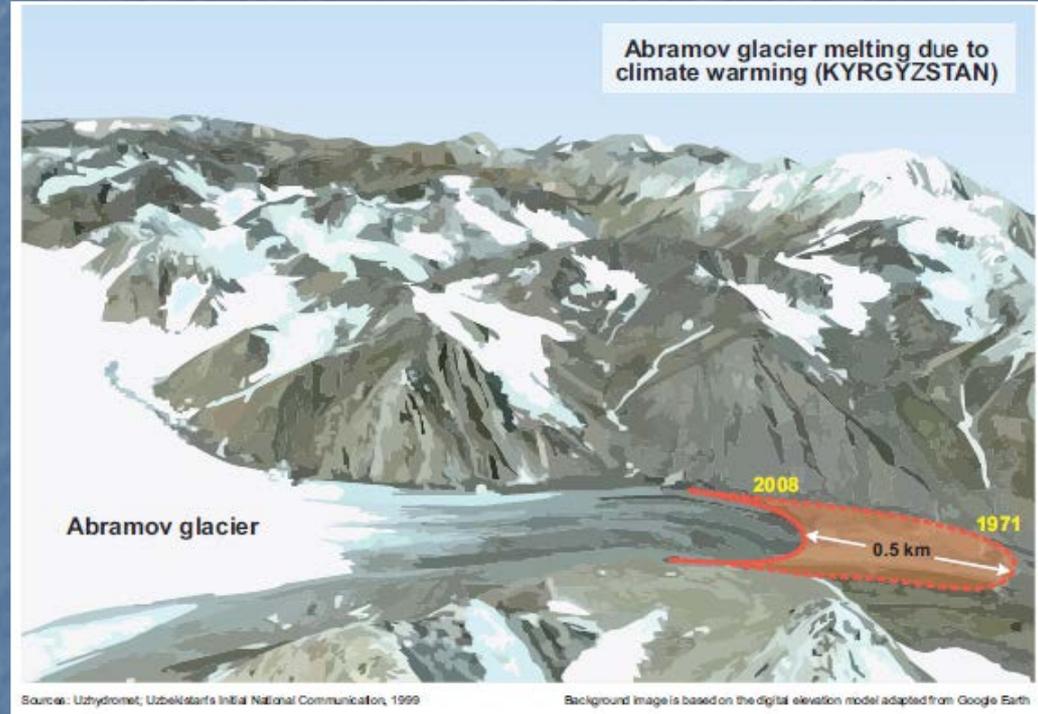
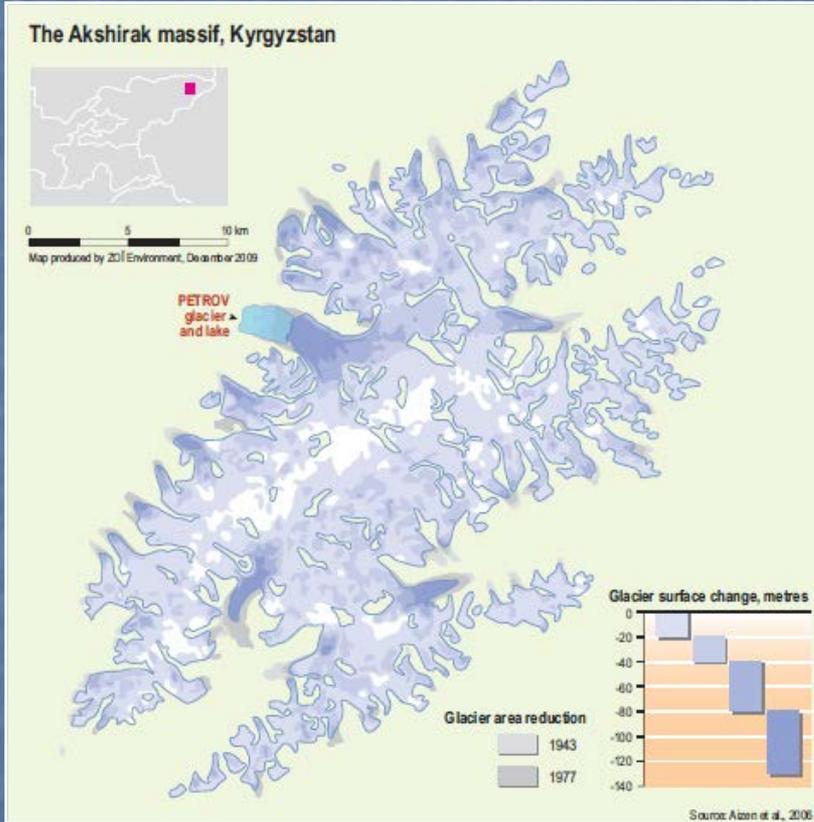


Climate change

- Climate change impact on KR



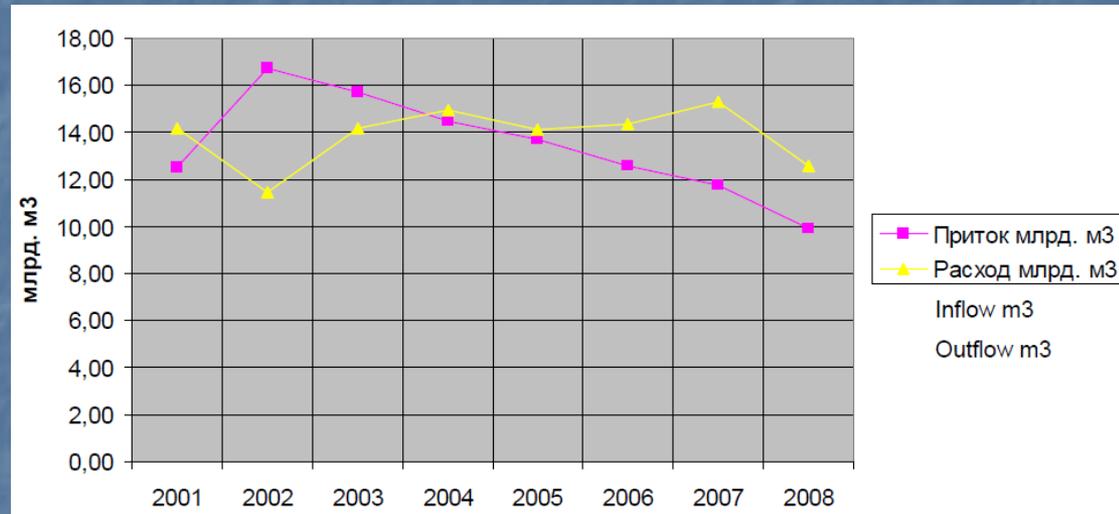
Climate change



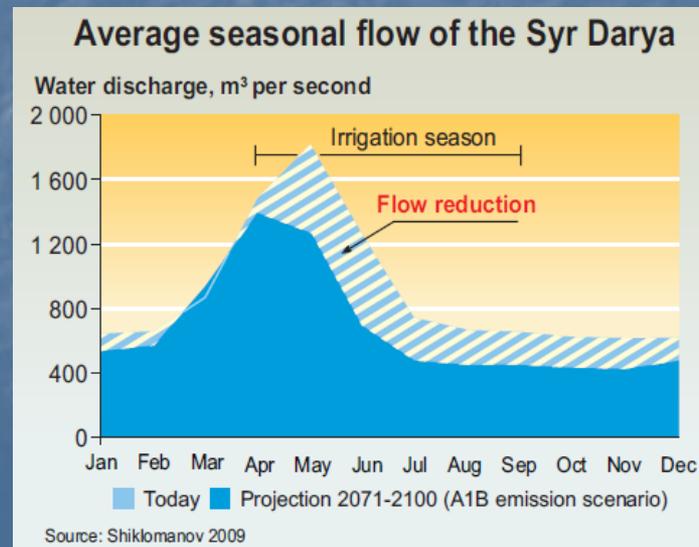
Source: Climate Change in Central Asia - the visual synthesis, Network for Environment , 2009

Climate change

- Reduced flow in the Toktogul Reservoir



In the long term, it is expected to further decrease



Source: Climate Change in Central Asia - the visual synthesis, Network for Environment, 2009

Legal framework for development of renewable energy

- Law "On renewable energy sources" adopted on December 31, 2008
- Law "On Energy"
- Law "On Electric Power Sector"
- Law "On Energy Saving"
- National Energy Program of the Kyrgyz Republic for 2008-2010 and Strategy of development of fuel and energy sector by 2025

Key problems in the renewable energy related legal framework

- Lack of policy documents setting priorities for implementation and use of small-scale renewable energy systems;
- Lack of completeness and adaptation of the regulatory framework to market conditions regulating the introduction and use of renewable energy sources;
- 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.
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- 2. Financial barriers (weak financial support mechanisms).
- 3. Poor information support for renewable energy. Low awareness of people, governmental agencies, organizations and institutions about the benefits of renewable energy.

Governmental support to renewable energy

- On December 31, 2008, the Law "On renewable energy" was adopted;
- Presidential Decree dated 14 October 2008 approved the Program of development of small and medium power plants by 2012;
- Resolution of the Government of the Kyrgyz Republic dated 28 July 2009 approved the Regulation on the procedure of construction, acceptance and connection of small PPs to the grid;
- Law "On Amendments and Additions to the Law On Renewable Energy Sources ", in terms of tariff surcharge for each type of renewable energy.

Ongoing projects in the field of renewable energy

- EBRD funded project "Strategic planning for small hydropower development in the Kyrgyz Republic." First phase of the project has been completed and implementation of the second phase has started, 4 pilot feasibility studies will be developed and proposed to investors for implementation.
- Medium-sized project "Development of Small PPs» implemented jointly with UNDP, which provides for development of the regulatory framework in the field of renewable energy and small PPs, capacity building of staff in the Ministry of Energy in the field of renewable energy and development of feasibility studies for the projects of 5 small PPs.

Development of small power plants in the Kyrgyz Republic? Building of 4 small PPs

First and second phases of the project have been completed, selection of 4 out of 88 pilot small PPs was done and they will be proposed to investors for implementation.

- Sokuluk PP-5 - 1,5 MW? (Chui, p. Sokuluk)
- Oi-Alma PP - 7,7 MW? (Osh Oblast., r. Karakuldja)
- Ortho-Tokoy PP - 20 MW? (Issyk-Kul Oblast, Ortho-Tokoi Reservoir)
- Tortgulskaya PP - 3 MW? (Batken Oblast., Tortgul Reservoir)

(Total cost of the project is USD 49,3 mln)

The goal of the project is to increase the power generation, improve the reliability of power supply of local and remote areas of the country.

According to the results of economic analysis, the payback period for these 4 PPs based on the current and other electricity tariffs will be:

1. Under the tariff rate of 0.7 Som (USD 1.6) payback period is above 50 years.
2. Under the tariff rate of 1.26 Som (USD 2.8) payback period is from 17 to 21 years.
3. Under the tariff rate of 1.32 Som (USD 2.9) payback period is from 15 to 20 years.
4. Under the tariff rate of 225 Som (5 US cents) payback period is from 6 to 9 years.

- The Law of the Kyrgyz Republic "On renewable sources of energy" was amended.
- The main purpose of this was to improve economic mechanisms for encouraging of the use of renewable energy sources (RES), including small PPs, to attract investments.

Amendments provide for extra charges to the tariff for electricity generated by renewable energy sources and small PPs for payback period of the projects.

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- for water energy units, the ratio is 2.1;
- for solar energy units, the ratio is equal to 6.0;
- for biomass energy units, the ratio is equal to 2.75;
- for wind energy units, the ratio is 2.5;
- for earth energy units, the ratio is 3.35.

4 pilot projects recommended for implementation within the "Strategic planning of development of small hydropower plants in the Kyrgyz Republic" project



- Sokuluk PP-5 - 1,5 MW, Chui Oblast, r. Sokuluk
- Oi-Alma PP - 7,7 MW, Osh Oblast., r. Karakuldja
- Ortho-Tokoy PP - 20 MW, Issyk-Kul Oblast, Ortho-Tokoi Reservoir
- Tortgulskaya PP - 3 MW, Batken Oblast., Tortgul Reservoir

THANK YOU FOR YOUR
ATTENTION!!!