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Developing the Potential for Energy Efficiency
and Alternative Energy in the Kyrgyz Republic



DEVELOPING THE POTENTIAL FOR ENERGY EFFICIENCY AND ALTERNATIVE ENERGY IN THE KYRGYZ REPUBLIC

EXECUTIVE SUMMARY

Kyrgyzstan currently does not have enough energy to provide reliable light and heat to its residents and factories. Although the country relies heavily on domestic sources of hydropower for much of its electricity, recent droughts and mismanagement drastically cut these supplies. Kyrgyzstan is increasingly seeking to identify and bring on line new sources of energy.

The country currently imports most of the natural gas, petroleum products and coal that it consumes. At the same time, beyond hydro power, Kyrgyzstan has essentially no alternative energy production.

Kyrgyzstan faces a variety of challenges in developing its energy sector. In the foreign policy sphere, Kyrgyzstan confronts problems that are a consequence of the extremely complex and volatile political landscape in Central Asia. Domestically, issues of economic crisis, organizational dysfunction, poorly written laws, and corruption hinder reform. However, there is encouraging news from Kyrgyz civil society, which is becoming more aware of the importance of carefully using resources. So, while alternative energies make up only a tiny fraction of the overall energy mix, the Kyrgyz people seem ready to change the current situation and make use of the possibilities and advantages alternative energies can offer. Nevertheless, enormous political, economic, and technological challenges lie ahead.

IN MOVING FORWARD:

1. Kyrgyzstan should systematically identify and tap available and emerging bi-lateral and multi-lateral assistance for alternative energy with a view to achieving demonstrable results for local priorities. The President's office might serve to house this donor coordination effort. The US and Europe should make alternative energy and energy efficiency a key objective of their foreign direct assistance programs to Kyrgyzstan in all major theme areas: including economic growth, good governance, and civil society.
2. Kyrgyzstan should develop local research skills and facilities, which play a key role in the development of the energy sector, through expanded international contacts. International donors and the local authorities should systematically identify and support activities such as the exchange of scientific and technical

personnel with Russia and the West, joint R&D projects, and participation in international conferences and seminars. Generating a detailed national digital wind map for formulating a wind power program would be a good start.

3. Kyrgyzstan's domestic civic supporters of alternative energy should leverage their community-based successes with alternative energy into public-awareness campaigns, perhaps tapping similar public awareness and advocacy methods proven successful by the Kyrgyzstan women's movement.
4. Using its "Energy Development Strategy to 2025" as a starting point, Kyrgyzstan must overhaul its legal and regulatory framework for energy issues, clarifying regulatory roles, eliminating overlap, and building the capacity of regulators to manage the complex economic, engineering, and environmental issues of the energy sector. The first step is to overcome the lack of understanding, and fear of change that currently block progress.

KYRGYZSTANS'S ENERGY CRISIS

The Kyrgyz Republic is facing a dramatic energy crisis. Residents and factories are coping with power cuts as the result of low reservoir levels that deprived the impoverished country of the ability to produce energy from hydropower stations for significant parts of 2008. As the lamps and refrigerators died out, so did lifts and water pumps, leaving many households without hot and cold running water. Thousands of businesses suffered huge losses and had to close. Some entrepreneurs decided to leave for Kazakhstan and Russia.

The current low reservoir levels can be ascribed to several factors, including recent summer droughts, but also widespread political corruption and mismanagement. For example, some critics argue that the release of an extra two billion cubic meters of water in 2004 for electricity exports to Russia is responsible for the current critical situation. According to some MPs, in October 2005 the water level in the Toktogul reservoir was roughly 19 billion cubic meters, while by October 2008 it had dropped as low as 9.5 billion cubic meters.¹ These data reveal that large volumes of hydroelectricity were either stolen or lost in the production process.

As a result, the Kyrgyz Republic is only becoming more dependent on foreign energy supplies. At the end of 2008, the government announced a preliminary agreement to import 250 million kilowatt-hours of electricity from Kazakhstan. Negotiations are underway with Uzbekistan on gas and electricity supply. Relations with Russia are also evolving. During his 9 October 2008 visit, Russian President Dmitry Medvedev and Kyrgyz President Kurmanbek Bakiy signed an intergovernmental agreement on developing cooperation for electricity supplies, as well as a memorandum of understanding between the Kyrgyz Republic and Russia's energy giant Gazprom.

¹ Kyrgyz Public Corporation Electric Power Stations, "Svodka po Toktogul'skomu vodokhranilishchu na 31 oktyabrya 2008 g.," 31 October 2008, <http://www.energo-es.kg/uroven.php/>.

This current state of affairs has clearly shown that Kyrgyzstan’s developing economy simply cannot afford a high degree of energy dependency, especially on imported energies like oil and gas. On the contrary, the country would benefit greatly from developing its renewable energy sources and introducing new alternative sources of energy supply.

The Current Balance

The International Energy Agency’s (IEA) latest statistics (2005)² provide a good picture of the current energy situation for the country. Kyrgyzstan produces significant amounts of hydropower, but relies on other countries for petroleum products, gas, and coal. The country produces almost no energy from alternative sources, such as solar and wind, though it has considerable potential to exploit these. Even in the area of hydro-electric energy, where Kyrgyzstan inherited significant production capacity from the Soviet Union, it has so far failed to achieve its full potential.

2005 Energy Balances for the Kyrgyz Republic

in thousand tonnes of oil equivalent (ktoe) on a net calorific value basis

Supply/ Consumption	Coal	Crude Oil	Petroleum Products	Gas	Nuclear	Hydro	Geothermal, Solar, etc.	Combustible Renewables and Waste	Electricity	Heat	Total
Production	122	74	0	21	0	1226	0	4	0	0	1447
Imports	435	5	675	596	0	0	0		0	0	1711
Exports	-4	0	-125	0	0	0	0	0	-231	0	-360
TPES	552	79	550	617	0	1226	0	4	-231	0	2798

Electricity/Heat in the Kyrgyz Republic in 2005

² International Energy Agency (IEA), IEA Statistics, Kyrgyzstan
http://www.iea.org/Textbase/stats/countryresults.asp?COUNTRY_CODE=KG&Submit=Submit.

	Electricity	Heat
	<i>Unit: GWh</i>	<i>Unit: TJ</i>
Production from:		
coal	594	2436
oil	0	
gas	1562	4911
biomass	150	150
waste	0	0
nuclear	0	0
hydro	14259	
geothermal	0	0
solar PV	0	
solar thermal	0	0
wind	0	0
tide	0	0
other sources	0	0
Total Production	16415	7347
Imports	0	0
Exports	-2864	0
Domestic Supply	13731	7347

Although these statistics paint a grim picture about renewable energy in the country, the situation is not entirely bleak. Kyrgyzstan produced all of its electricity in 2005, domestically generating 16,415 GWh with no imports that year. Mismanagement of this resource created the current crisis and better policies can improve the situation.

Non-Renewable Energies

Unlike its neighbors Kazakhstan and Uzbekistan, the Kyrgyz Republic has no significant exploited reserves of oil or natural gas. The local coal industry has essentially collapsed.

Oil. In 2005 petroleum production was 79,000 tons. While the only working oil field in the country, in the Fergana Valley, has remaining reserves of 14 million tons of oil, developing this resource requires expensive recovery technology. No serious oil exploration has been carried out elsewhere, although the Chu and Ak-Say valleys are believed to be promising. Some speculate that Kyrgyzstan may possess large underground deposits of oil and gas, but the debt-ridden country lacks the economic and technological capability to explore and exploit new deposits on its own and foreign investors have yet to come forward to cooperate with local energy firms.

Natural gas. Kyrgyzstan produced just 975 tons of natural gas in 2005, compared with a massive 27,747 tons of imports.³ The majority of these imports come from Uzbekistan, the biggest producer in the area, creating an undesirable dependency.

To avoid relying heavily on Uzbekistan, Kyrgyzstan has deemphasized the use of gas-fired thermoelectric stations since the 1990s and sought to expand hydroelectric production. Already in 1994 thermoelectric power production dropped by 46 percent, while hydroelectric production rose by 30 percent. Currently, coal and gas respectively generate 594 GWh (4%) and 1,562 GWh (10%) of Kyrgyzstan's total 16,415 GWh electricity production.

Coal. Although substantial coal deposits are present, in the mid-1990s experts described Kyrgyzstan's coal industry as in a state of collapse. In the early 1990s, only four of the fourteen state-owned coal mines were considered economically viable, and little coal came from privately owned mines. Between 1991 and 1993, brown coal production decreased by 50 percent (to 959,000 tons), and black coal production decreased by 53 percent (to 712,000 tons). As of 2005, overall coal production has further collapsed to 335,000 tons.

Since coal is not economically viable, it would simply be too expensive to re-activate this industry, even apart from the environmental costs such a step would incur. This situation creates a unique opportunity to explore better and cleaner energy sources.

Renewable Energies

Despite the Kyrgyz Republic's strong potential for developing renewable energy, such sources currently represent only 0.06% of the country's total energy supply, excluding hydroelectric power. In addition to the well developed hydroelectric capacity, Kyrgyzstan has potential for solar, geothermal, wind, and biofuels.

Hydroelectric power. Kyrgyzstan produces 14,259 GWh of hydroelectric energy, comprising 86 percent of the country's total electricity production. Not surprisingly hydroelectric power is the main source of electricity given Kyrgyzstan's abundant rivers. The flows derives mainly from the country's location at the mountain headwaters of the Syrdariya, one of the two largest rivers in Central Asia. The Naryn River, the chief tributary of the Syrdariya, now powers a series of hydroelectric stations, the largest of which is the Kürp-Say Hydroelectric Plant, fed by the Toktogol Reservoir in the central part of the Kyrgyz Republic. Other major hydroelectric plants are located

³ International Energy Agency (IEA), IEA Statistics, Kyrgyzstan
http://www.iea.org/Textbase/stats/gasdata.asp?COUNTRY_CODE=KG.

at Atabashin, Alamedin, and Uchkorgon. Such stations have made possible the net export of electric power in varying amounts.



Toktogul Reservoir in Kyrgyzstan

Yet, despite this accomplishment, the Kyrgyz Republic exploits only about 10 percent of its hydroelectric power potential (estimated at 163,000 gigawatt hours/year) and only about 3 percent of its small stream potential. On the Naryn River it is possible to build about 33 additional hydroelectric stations with an estimated capability of 6,450 megawatts and more than 22 billion kilowatthours of yearly electric output.⁴

The main constraint is the outdated Soviet-era electrical grid, designed to avoid the rough Tien Shan Mountains that run through the central part of the Kyrgyz Republic. Plans to build a 249-mile 500kV transmission line, as well as a new 220kV decongestion line connecting the northern and southern parts of the country, are in the works to alleviate this problem. The need for the new grid is particularly critical in the southern part of the country, but divisive north-south resource struggles impede progress. Additionally, since Uzbekistan controls some of the energy delivery systems in the Kyrgyz Republic, the National Electric Grid is considering plans to build and replace several 220kV transmission lines in the south, thanks in large part to recent international loans.

Such loans are crucial to the country. In November 2008, Kyrgyzstan received US\$5 million from the World Bank through the Energy Emergency Assistance Project framework.⁵ Additionally, in December 2008, the IMF approved an 18-month, SDR 66.6 million (about US\$100 million) arrangement under the Exogenous Shocks Facility (ESF),⁶ helping the authorities address a variety of problems, including a shortfall in hydropower.

Solar. The Kyrgyz Republic has good solar production potential, especially at higher elevations, however, there is no financing in the country to fund solar projects. Kyrgyzstan is between 39 and 43 degrees northern latitude. According to several

4 Kyrgyz Public Corporation Electric Power Stations, "Investment Project," http://www.energo-es.kg/projects/investment_projects/.

5 World Bank, "Kyrgyz Republic: Energy Emergency Assistance Project," November 25, 2008, <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21991774~menuPK:34471~pagePK:34370~piPK:34424~theSitePK:4607,00.html>.

6 International Monetary Fund, "IMF Executive Board Approves US\$100 Million Exogenous Shocks Facility Arrangement for the Kyrgyz Republic," December 10, 2008, <http://www.imf.org/external/np/sec/pr/2008/pr08316.htm>.

sources, this would not normally be considered advantageous for solar potential.⁷ Nevertheless, Kyrgyzstan's solar energy resources are stable and adequate because of its dry climatic conditions. There are about 2,600 hours of sunshine per year and insolation energy is 1,500 to 1,900 kilowatt-hours per square meter annually.

The main barrier to a greater use of solar resources is the high cost relative to fossil fuels. Solar power is not economically effective because of its low conversion efficiency, the modest energy density of solar radiation, and the costly materials currently required.

Biofuels. Owing to the large number of livestock (cattle, pigs, and poultry) in the country, Kyrgyzstan has significant potential for using livestock waste to produce combustible gas (methane) and high-performance organic fertilizers. Accordingly, many are strongly interested in the anaerobic digestion of livestock manure to generate heating and cooking fuel in rural areas. The opportunity exists to generate over 1 MWth. Up to now, Kyrgyzstan has not used this potential because it has no culture of using biological waste.

Wind. Wind data recently collected from 81 stations throughout the country reported an annual average wind speed range from 0.5 to 3.6 m/s. Although these data are not very encouraging and suggest few commercially viable opportunities (the total wind potential is estimated at 1,500 MW), Kyrgyzstan is a mountainous country with very complex and localized wind regimes. In such terrain, good wind resource areas are expected to occur locally, but it is difficult to identify the specific sites and quantify the wind resource. Studies on specific wind conditions should be carried out to have accurate data for formulating a wind power program.

CHALLENGES FACING THE ENERGY SECTOR

Kyrgyzstan faces a variety of challenges in developing its energy sector. In the foreign policy sphere, Kyrgyzstan confronts problems that are a consequence of the extremely complex and volatile political landscape in Central Asia. Domestically, issues of economic crisis, organizational dysfunction, poorly written laws, and corruption hinder reform. However, there is encouraging news from Kyrgyz civil society, which is becoming more aware of the importance of carefully using resources. So, while alternative energies make up only a tiny fraction of the overall energy mix, the Kyrgyz people seem ready to change the current situation and make use of the possibilities and advantages alternative energies can offer. Nevertheless, enormous political, economic, and technological challenges lie ahead.

⁷ See, for example, the report of the Basic Energy Sciences' Workshop, Basic Research Needs for Solar Energy Utilization, April 18-21, 2005 http://www.sc.doe.gov/bes/reports/files/SEU_rpt.pdf.

The Difficult Central Asian Context

Kyrgyzstan must develop its energy and other resources within a difficult geopolitical environment, balancing its dependence on Uzbekistan with the possibility of selling energy to countries such as China, Pakistan, and Afghanistan. Uzbekistan is perhaps as important a natural gas supplier to Central Asia as Russia is for most of Europe: the only major gas pipeline connecting the Kyrgyz Republic to the larger network is the Tashkent-Bishkek-Almaty pipeline. Furthermore, although the Kyrgyz Republic can produce enough electricity for its own needs and actively sells electricity to neighboring countries, it must import electricity from Uzbekistan to supply its remote northern regions. This reliance on foreign sources is yet another consequence of the now outdated Soviet-built electrical grid, which prevents Kyrgyzstan from supplying all domestic consumers from domestic sources.

In a scenario that closely resembles Russia's "energy blackmail" of Europe, where critics accuse Moscow of using its large hydrocarbon reserves to gain political influence in countries which are dependent on energy imports to sustain their economies, Uzbekistan is playing a similar role with the Kyrgyz Republic. For example, in 2000, while Kyrgyz security forces fought a series of battles with Muslim rebels, including members of the Islamic Movement of Uzbekistan, Uzbekistan's President Islam Karimov cut gas supplies to Kyrgyzstan, with the official reason given that the Kyrgyz Republic was slow in making payments. Uzbekistan is pressuring Kyrgyzstan to pay \$300 per thousand cubic meters of gas in 2009, up from the 2008 price of \$145. Overall, Kyrgyzgaz pays for about half of the gas delivered from Uzbekistan in cash and about half with Kyrgyz goods, including water supplies. The complexity of the barter deals and the various transportation and transit arrangements underscore the need to replace current arrangements with transparent, market-based cash transactions.

On the other hand, the Kyrgyz Republic could try to strengthen its regional position by enabling electricity exports to reach neighbors in South Asia and provide for its own domestic energy consumption. Water and hydroelectricity could be Bishkek's best tools. Especially the control of river flows that reportedly account for some 70 percent of Uzbekistan's water supply would be an obvious bargaining chip in the event of a crisis.

The major Russian-Kyrgyz hydroelectric project currently underway seems to be a clear move in this direction. On December 15, 2006, the Kyrgyz Republic and Russia announced an agreement to launch a billion-dollar project, which could see Kambarata-1 and Kambarata-2 hydroelectric power stations built to supply electricity for domestic consumption and for export to Afghanistan, China and Pakistan.

However, the project will affect flows to larger nearby countries – particularly Uzbekistan and Turkmenistan. Building the new station could lower the water levels of the Syr Darya or Amu Darya rivers, ultimately harming irrigation flows for cotton crops in neighboring countries that depend on significant amounts of water from these sources. Furthermore, international law backed by agreements signed with the United

Nations⁸, prohibits the Kyrgyz Republic from depriving Uzbekistan of water resources. So, although Kyrgyzstan could decide to increase its energy production by exploiting its untapped hydroelectric potential, there are many regional political issues that could adversely affect any long term planning in this direction.

Domestic Factors

On the domestic front, Kyrgyzstan must deal with the consequences of the global economic crisis, an unwieldy energy policy apparatus and a poorly defined legal framework. Kyrgyzstan is not isolated from the larger international economy and increasingly is forced to deal with the consequences of the economic downturn. Accordingly, the Kyrgyz authorities recently reduced non-priority expenditures to dampen inflationary pressures and accommodate increased social spending in order to shelter poor households from higher food and energy prices.

The lack of a unified decision-making body on energy issues within the Kyrgyz government could potentially hinder many energy-related efforts. Management of national energy and fuel policy is distributed among several ministries and other state agencies, an arrangement that has hindered efficient energy acquisition and distribution. Delivery of heat and electricity is the responsibility of the state-run Kyrgyz Public Corporation⁹, and natural gas purchases are managed by Kyrgyzgas.¹⁰ Oil, gas, and coal exploration is also the responsibility of the State Agency on geology and mineral resources,¹¹ with a clear overlapping of responsibility.

This organizational chaos has led to poor results. The state business project KUN (SUN),¹² responsible for promoting renewable energy activities and functioning as the focal point for this subsector in Kyrgyzstan, did not carry out any significant projects. It was eventually transformed into the current Center on the Problems of Using Renewable Energy Resources, which works in association with the Kyrgyz Association of Renewable Energy Resources.¹³ Unfortunately, the Center is not much more active than its predecessor.

8 Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

<http://www.unece.org/env/water/text/text.htm>. According to Bo Libert, "Water Management in Central Asia and the Activities of UNECE," Helsinki University of Technology, 2008,

http://www.water.tkk.fi/English/wr/research/global/material/CA_chapters/04-CA_Waters-Libert.pdf, "The Water Convention prescribes national measures for the protection and environmentally sound management of shared, transboundary water resources." ... "The Water Convention does not deal explicitly with water quantity issues and the allocation of water, a key issue of dispute in Central Asia, but it does set up a framework for the resolution of these and other problems."

9 Kyrgyz Public Corporation Electric Power Stations, "O kompanii," <http://www.energo-es.kg/company/about/>.

10 <http://www.kyrgyzgaz.kg>

11 <http://www.kgs.bishkek.gov.kg/index.htm>

12 Set up by presidential decree, October 15, 1992 N YPI-298.

13 Skhema upravleniya Ministerstva promyshlennosti, energetiki i toplivnykh resursov Kyrgyzskoi Respubliki, <http://www.mpe.gov.kg/ru/?d=ministry/scheme>

Additionally, investors often cite the ineffectiveness of the legal system as one of the major obstacles in doing business in the country. Kyrgyzstan's legislation retains many characteristics of the Soviet system as reformers have not yet been able to incorporate salient features of western jurisprudence into Kyrgyzstan's system of law.

The government recently started taking measures to improve the situation. In October 2008 President Bakiev adopted a National Energy Program 2008-2010¹⁴ which sets the framework for pricing, tariffs, and taxation issues. In addition, he put forward an Energy Development Strategy through 2025. Previously, in May 2008 the President issued a decree¹⁵ to set up an independent legal entity whose main task is to attract investments for the development of projects and programs in the energy sector in the Kyrgyz Republic. The president directly appoints the head of this agency.

Although Kyrgyz energy legislation is similar to many western countries' energy laws, it has not yet achieved significant results because its directives are rarely implemented effectively. For example, according to the law on saving energy, private and state organizations are held liable¹⁶ for inefficient use of power resources. However, many organizations and private citizens use energy over the legal limits with impunity since they can avoid paying fines by "settling" them privately with state officials, taking advantage of the country's widespread corruption.

Furthermore, there is no standard system to calculate power consumption and therefore power consumption specifications are derived "manually" and included in technical passports for each building, which in theory should be revised every three years.¹⁷ Obviously this periodical revision does not happen and it is unlikely to begin in the future because of the lack of bureaucratic resources. Clearly, a different procedure is needed as well as a standardized system to calculate usage.

Although the law on saving energy defined energy limits, it did not give any clear guidance on how to use energy efficiently. For example, the law does not set any directives for the construction industry on energy efficiency standards in terms of building materials, insulation, ventilation, or lighting and heating equipment. Such features in Western laws have proven effective in saving energy.¹⁸ In Kyrgyzstan ambient temperatures are well below zero for several months of the year, but both old Soviet houses and the newest apartment developments are inadequately insulated. In a country with such shortcomings, the introduction of better construction techniques could play a vital role. Sadly, construction firms are putting up new buildings using cheap and inefficient materials so the situation is not currently improving. Ultimately, Kyrgyzstan needs to overhaul its legislation so that there is greater coordination among the

14 Presidential Decree dated 14 October 2008, No 365.

15 President Decree dated 2 May 2008, No 155.

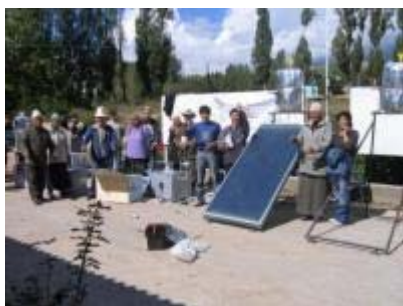
16 The detailed fines are established in chapter 32 of the Administrative Code of the Kyrgyz Republic.

17 Art. 15 of the Administrative law of the Kyrgyz Republic.

18 For example, see 2005 Building Energy Efficiency Standards for California, USA
<http://www.energy.ca.gov/title24/2005standards/index.html>.

Energy law¹⁹ and Energy Industry law²⁰, and laws related to water management, forestry, urban planning, and environmental protection.

Civil Society



Solar water heating in rural regions
of Kyrgyzstan

There seems to be a growing interest among the public in alternative energy. Most encouragingly, this trend started before the current crisis. In the beginning of September, under the motto “we don’t see the future without ecology,” the BIOM ecological movement (founded in 1993) organized a public demonstration in Bishkek’s main square, Ala-Too.

Since 2002, BIOM has supported the “Sunny villages of Kyrgyzstan” and “Kyrgyz communities for sustainable development” projects, which promote energy saving technologies. With the support of the Norwegian Nature Protection Society,²¹ BIOM conducted training sessions aimed at showing people the technology of constructing alternative energy sources, such as solar collectors, from available materials in 20 villages. After that, they revisited the villages and checked up on the ready-made solar collectors.

There are many other NGOs and organizations involved in this work. Among them are: the public foundation Issyk-Kul, Eco-Time, Barsem, and the Environmental Movement of Kyrgyzstan “Tabiyat.” These groups work on environmental and energy related issues and undertake projects such as the construction of biogas installations in rural areas and the promotion of renewable energy.²²

However, the non-state sector could be much more effective in its work. The NGOs lack a high degree of coordination with each other. Likewise, they have so far failed to establish a significant foothold in the larger society. The projects they have undertaken to date are small scale and suffer from little government cooperation or support. Moreover, most projects only exist for a short period of time because they lack financial resources and the requisite knowledge to make a larger impact at the regional and national level. Areas where more work could be done include placing ads and

19 Adopted on 30 October 1996 , No 56.

20 Adopted on 28 January 1997, No 8.

21 Solar energy for Kyrgyzstan, SPARE Project report, 2005-2007, page 5,

<http://spareworld.org/eng/sites/default/files/SPARE%20-%20Solar%20report%20from%20Kyrgyzstan.pdf>.

22 For example, see a series of small projects implemented in Kyrgyzstan, funded by the Global Environment Facility (GEF) as a corporate program. SGP is implemented by the United Nations Development Program (UNDP) <http://sgp.undp.org/index.cfm>.

programs on television, developing effective programs in schools and universities, and improving the life of big communities.

MOVING FORWARD

Kyrgyzstan can better utilize existing energy resources and exploit the country's alternative energy potential by addressing a number of key issues. Realistically, the best approach would be to focus on small projects and leverage international resources as much as possible. Based on initial successes, it will be possible to raise awareness among decision-makers and the broader public about energy issues. Once there is broader interest in the issue, it might be possible to focus more attention on dealing with problems inherited from the Soviet infrastructure legacy and overhauling the broader legal framework dealing with energy issues. Thus, we prioritize the recommendations based on what can be achieved in the short-term, while keeping in mind mid- to long-term goals.

1. Maximize international resources

First, Kyrgyzstan should maximize use of available and emerging bi-lateral and multi-lateral assistance for alternative energy with a view to achieving demonstrable results. For example, since 2002, the Norwegian Ministry of Foreign Affairs has supported the long-term capacity building program "Energy Efficiency and Cleaner Production in Kyrgyzstan" managed by Energy Saving International.²³ This Norwegian support fills a gap because the local financial market is not developed enough to finance small projects on energy efficiency and renewables. One successful project built a micro hydroelectric plant that provides energy to rural entrepreneurs who run cafes and other businesses.²⁴ In a similar effort to attract outside support, Kyrgyzstan joined the Renewable Energy and Energy Efficiency Partnership (REEEP), an international public-private alliance that promotes policies and financial mechanisms in support of renewable energy and energy efficiency, in July 2008.²⁵

23 "Energy Efficiency and Cleaner Production, Capacity Building Program in Kyrgyzstan," Status Report, December 2007

<http://www.ensi.no/references/071211.pas.td.Kyr%20Status%20Report%20December%202007.pdf>

24 Energy Savings International, "Financial Engineering for Small Scale Hydro Power Stations in Kyrgyzstan, Status Report," December 2007,

<http://www.ensi.no/references/071221.ng.ter.Status%20Report%20December%202007.pdf>

25 "Kyrgyzstan Joins REEEP," 17 June 2008, <http://www.reeep.org/9864.10278/kyrgyzstan-joins-reeep.htm>

2. Support Scientific Exchange

Second, Kyrgyzstan should develop local research skills and facilities, which play a key role in the development of the energy sector, through expanded international contacts. International donors and the local authorities should support activities such as the exchange of scientific and technical personnel, joint R&D projects, and participation in international conferences and seminars. Good candidates for such work could be the Department of Nontraditional and Renewable Energy of the Kyrgyz-Russian Slavic University²⁶ and the Energy Department of the Kyrgyz State Technical University,²⁷ which have active programs in this area. Part of the international cooperation should be to help modernize the existing facilities since they are often short of adequate resources.

3. Leverage existing grass-roots initiatives to raise awareness of alternative energy

Third, based on the development of successful projects and local expertise, it would be extremely helpful to raise awareness among decision-makers at all political and administrative levels about the benefits to be gained from greater energy efficiency and alternative sources. It is also important to build public awareness through information campaigns to inform the general public about the existing renewable energy resources, technologies, applications and their environmental and economic benefits. Activities of social movements and different organizations working in this field should be supported and success stories widely publicized.

With greater awareness among the decision-makers and the broader public, it will be possible to address the well known problems Kyrgyzstan inherited as a legacy of its Soviet infrastructure. Most importantly for the goal of promoting energy efficiency and alternative energy use, it is difficult for Kyrgyz energy companies to measure how much energy their industrial, residential and commercial customers are using and then collect appropriate payments from them. As a result, many customers owe large arrears to their energy suppliers.

Furthermore, it is often impossible to implement price signals in a manner that would induce residences and factories to reduce their energy consumption. For example, in a typical apartment building, the heating is provided by a centralized city heating system (in Bishkek a power plant located in the Vostok-5 area) and it is impossible for individual residents to regulate the heating temperature independently. Needless to say, this system is highly

²⁶ <http://www.krsu.edu.kg/Rus/1EtfNVIE.htm>

²⁷ <http://www.kstu.kg>

inefficient with poorly maintained and isolated pipes wasting a great deal of heat in the transportation process.

5. Carry out legal and regulatory reform

Ultimately, on the basis of gains in these areas, Kyrgyzstan will be able to overhaul its legal framework. With a clear sense of what can be achieved and broad support among decision-makers and the public, it will be possible to put in place a coherent energy framework that takes into account the issues of taxation, customs, and environmental protection. Such a framework would be able to improve implementation of the country's energy goals by identifying clear areas of responsibility for state regulatory agencies and provide for training to ensure that the different agencies work well together. The key, of course, is to implement the laws and overcome the existing corruption, lack of understanding, and fear of change that currently block progress.



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info@pasos.org | www.pasos.org