

THE ENERGY INDUSTRY IN THE KYRGYZ REPUBLIC: CURRENT STATE, PROBLEMS, AND REFORMS

Ludmilla BAUM

*Chief expert at the International Institute of
Strategic Research under the President of
the Kyrgyz Republic
(Bishkek, Kyrgyzstan)*

The energy industry is of special importance to Kyrgyzstan. Most of the electric power generated is used to meet the economy's intermediate needs in industrial and agricultural production.

At present, Kyrgyzstan's energy sector, which has a large share of the republic's GDP, is threatened with a significant drop in its potential due to:

- the imbalanced use of hydropower resources necessary for generating electricity caused by the low-water level period;
- the high level of physical and moral wear and tear of the operating equipment due to the long absence of investments;
- unstable financial and economic activity, as well as the increase in technical and commercial losses.

This sector can consequently become a potential source of macroeconomic instability for the country, thus undermining the efforts being made to achieve stable economic growth. The current restructuring of the energy industry has liberalized the electricity sector to a certain extent, which has helped to make spending on the production, transmission, and distribution of electricity, as well as the formation of tariffs for thermal and electric power, more transparent. But this has not led to the anticipated improvement in the economic indices of the energy system. There is still a long way to go.

In this respect, an acute need has arisen to improve management of the sector in order to increase the efficiency and economic benefits and develop new approaches in energy policy. In turn, this is giving rise to the need to reach a higher level of reform in the sector, which should also include a system of measures for creating conditions aimed at developing the energy market.

What reforms in particular does Kyrgyzstan need? There are quite a few different opinions on this issue. Reforms are a complicated issue since any mistakes could lead not only to a production slump in the country, but also to a shortage of fuel and energy resources, stagnation of the agrarian sector, an imbalance in the fiscal system, and the emergence of investment problems that will leave the republic dependent on foreign partners. Whereby issues relating to the development of Kyrgyzstan's electric power industry are directly related to the problems neighboring countries are facing in enhancing their energy industries.

All of this naturally focuses attention on political, economic, technical, and other aspects of energy industry reform.

The Kyrgyz Republic's energy policy is aimed at ensuring energy independence, more reliable and steady operation of the energy system, balanced electric power production and consumption, and an increase in export potential. This policy is being carried out in compliance with:

- the Law of the Kyrgyz Republic on the Electric Power Industry of 30 October, 1996 (No. 56),
- On the Electric Power Industry of 21 January, 1997 (No. 8),
- On Energy Saving of 7 July, 1998 (No. 88),
- On the Special Status of the Toktogul Cascade of Hydropower Plants and the National High-Voltage Power Transmission Line of 21 January, 2002 (No. 7).

In addition, other documents are being elaborated in this sphere: the Country's Development Strategy for 2007-2010; the National Energy Program of the Kyrgyz Republic for 2007-2010 and Development Strategy of the Fuel and Energy Complex until 2025; the Medium-Term Tariff Policy of the Kyrgyz Republic (MTTP) for Electric and Thermal Power for 2008-2012 (approved by a resolution of the Government of the Kyrgyz Republic of 23 April, 2008, No. 165).

All the above-listed legal regulations ensure the resolution of problems that arise concerning the operation of this sector. These documents are primarily targeted at developing the fuel and energy complex and facilitating the upgrading of the existing systems in order to reduce risks in the republic's energy sphere and ensure complete and reliable energy and fuel supply to consumers by raising the republic's own energy base.

In order to enhance market relations and attract investments into the energy industry, the following regulations have been adopted:

- the Law of the Kyrgyz Republic on Introducing Amendments and Addenda into the Law of the Kyrgyz Republic on the Special Status of the Toktogul Cascade of Hydropower Plants and the National High-Voltage Power Transmission Line of 30 July, 2007 (No. 100), and
- the Law of the Kyrgyz Republic on the Building and Operation of Kambaratin Hydropower Plants (HPP) Nos. 1 and 2 of 31 July, 2007 (No. 120).

Current State

Attempts to ensure a more reliable future are only worth pursuing if decisive efforts are exerted to identify ways to make maximum use of the country's internal potential (particularly with respect to electric power and water resources).

Dynamics of the Share of the Fuel and Energy Complex in the Total Volume of Industrial Production (%)

	1990	1995	2000	2005	2006	2007	2008 (first six months)
Industry (total)	100	100	100	100	100	100	100
Electric (power)	4.2	19.1	15.7	20.4	19.7	22.9	18.5
Fuel sector	0.9	2.4	3.9	1.8	1.4	1.4	1.5

Source: National Statistics Board of the Kyrgyz Republic.

The Kyrgyz energy system has several special features. In Kyrgyzstan, most electric power is generated at hydropower plants. In 1993, the hydropower industry produced around 76% of the re-

public's electricity, while by 2007 this index had reached almost 92%. The sustainability of hydropower resources, their obvious environmental advantages over organic fuel, and the extremely high potential capacity of the republic's main water courses ensure the expediency and high economic efficiency of building large and small hydropower plants.

Hydropower plants make it possible to maintain electricity generation. Kyrgyzstan is the only CIS country that has not reduced its production of this commodity. In 1991, 116 billion kWh were produced a year in Central Asia, while in 2005, this amount only reached 86 billion. Even under these circumstances, however, Kyrgyzstan was able to increase its electricity production.

During the years of independence, thermal power stations have been generating less electricity, which has made the energy system more economical. At present, more than 90% of the electricity in Kyrgyzstan is manufactured at hydropower plants. Less coal, gas, and fuel oil is being imported for combustion at thermal power plants. This is due to the interrupted deliveries under interstate contracts in the fuel consumption structure, in which extremely expensive, whereby economically unjustified, energy resources imported at prices close to the world level are the main component. This causes an immense increase of 15-16-fold in the net cost of electricity generation compared with that produced at hydropower plants. Kyrgyzstan depends on deliveries of oil products from Russia, gas from Uzbekistan, and fuel oil from Kazakhstan (totaling approximately 50% of the fuel consumed in the republic). All of this requires large amounts of hard currency and, due to the negative energy trade balance, the energy sector is making a negative contribution to the economic situation. Moreover, the republic's economy is extremely sensitive to price increases on the world energy resource market.

Kyrgyzstan is having to reconcile itself to the risk of importing energy resources. Whereby the risk level is currently growing faster than the ability to adopt corresponding correctional measures.

The electric power industry is one of Kyrgyzstan's main infrastructure elements and it bears the main responsibility for providing the state with local energy resources. At this stage, reliable energy provision is a determining factor of the stable economic functioning and development, as well as of the country's political stability.

In addition, the irrigation needs of Kazakhstan and Uzbekistan are giving rise to problems with regulating water runoff and having a significant effect on electricity-generation capacities.

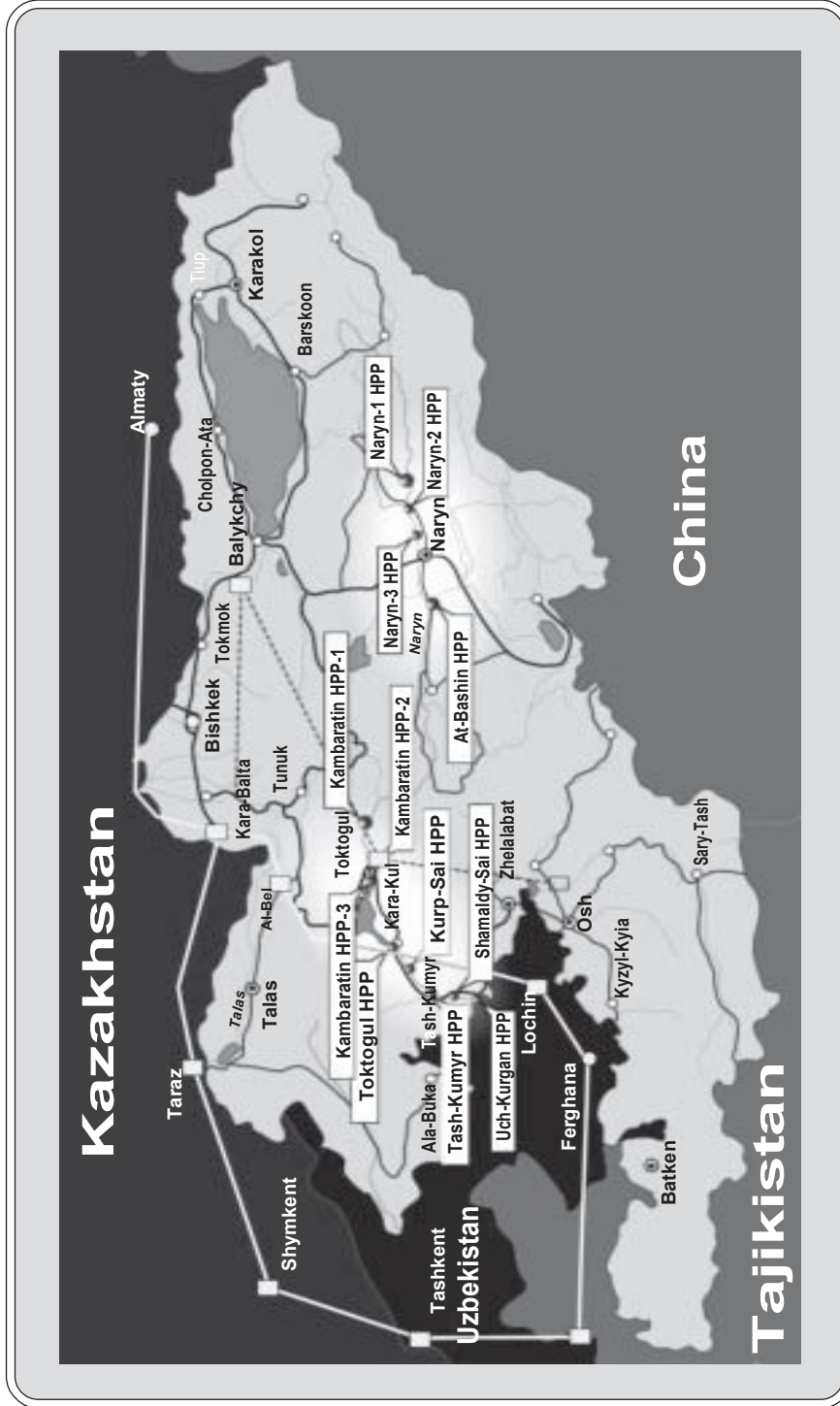
In this respect, Kyrgyzstan's energy sector can still not count on becoming a major source of the country's economic prosperity in the near future, but the sector itself nevertheless possesses sufficient potential for making its contribution to overall economic growth and financial stability in the long term.

The republic is perfectly capable of producing enough electric power to support itself. The energy industry, which had large hydropower resources, is having a perceptible effect on the state and development prospects of the national economy (it accounts for approximately 3-5% of the GDP, 18-20% of the industrial production volume, and around 10% of the state budget revenues). The developed electric power network ensures that almost 100% of the population is provided with electricity, while per capita consumption amounts to approximately 2,400 kWh, which is quite a high index for a developing state.

The country has potential hydropower supplies amounting to approximately 142 billion kWh, no more than 10% of which are being currently used. According to specialists, the hydropower reserves that can technically be used amount to 72.9 billion kWh, while economically efficient reserves reach 48 billion. At present, approximately 13-14 billion kWh are generated annually, while demand is growing every year by 3-5%, which means that 15-20 billion kWh are needed to ensure a normal uninterrupted electricity supply. So the question of building new and reconstructing existing energy capacities is very urgent. It is expected that the share of the energy industry will amount to between 15% and 17% in the medium and long term.¹

¹ Based on the data of the Conference on Reform of Kyrgyzstan's Energy Industry—Ways to Increase Efficiency and Advance the Use of Renewable Energy Sources, September 2007, Issyk-Kul.

Map of Current and Future Hydropower Plants in the Kyrgyz Republic²



² See: OAO Power Plants of the Kyrgyz Republic, available at [http://www.energo-es.kg/company/hps_map/].

Six unique hydrotechnical structures have been built on the lower reaches of the Naryn River. The largest hydropower resources are concentrated in the basins of the Naryn and Sary-Jaz rivers.

The Naryn cascade includes:

- the Toktogul HPP,
- the Uch-Kurgan HPP,
- the Tash-Kumyr HPP,
- the Kurp-Sai HPP,
- several unfinished hydropower plants and a few smaller hydropower stations.

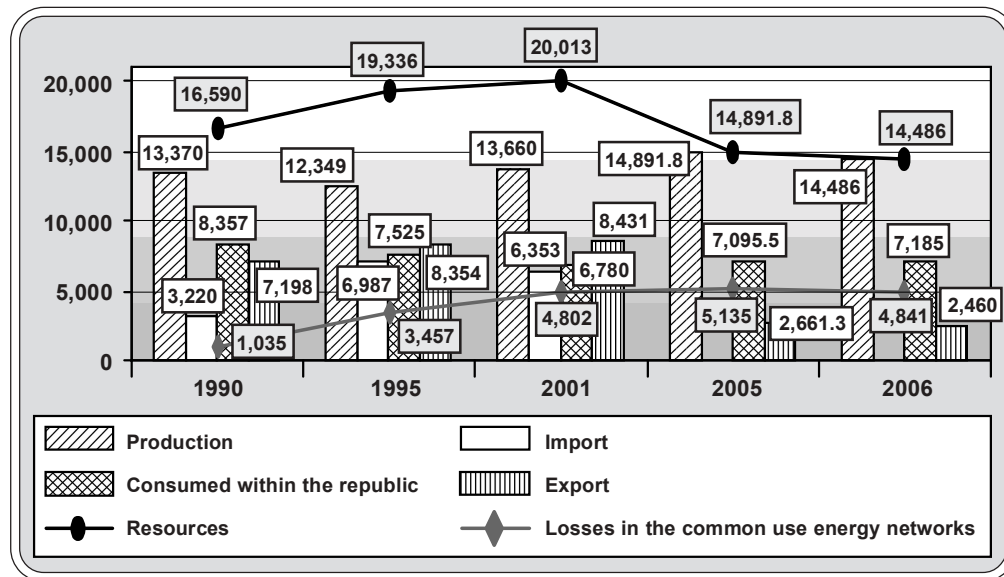
The capacity of the Toktogul HPP is 1.2 million kilowatts, while that of the Kurp-Sai HPP is 800,000.

So the potential of the Naryn River has far from exhausted itself. There are ways to renew the facilities of several more hydropower plants. Building these hydropower plants will make it possible to resolve the region's fuel and energy problems on the whole. Twenty-two hydropower plants with an annual output of more than 30 billion kWh can be built on the Naryn River and its tributaries alone. The Naryn River basin's hydropower potential is to be enhanced even more by building Kamaratin HPP Nos. 1, 2 with a total capacity of 2,260 MW.

Power transmission and distribution, as well as its delivery to consumers, is ensured by a more than 70,000 km power transmission line as well as some 19,000 transforming substations. Most hydropower plants are located in the center of the country.

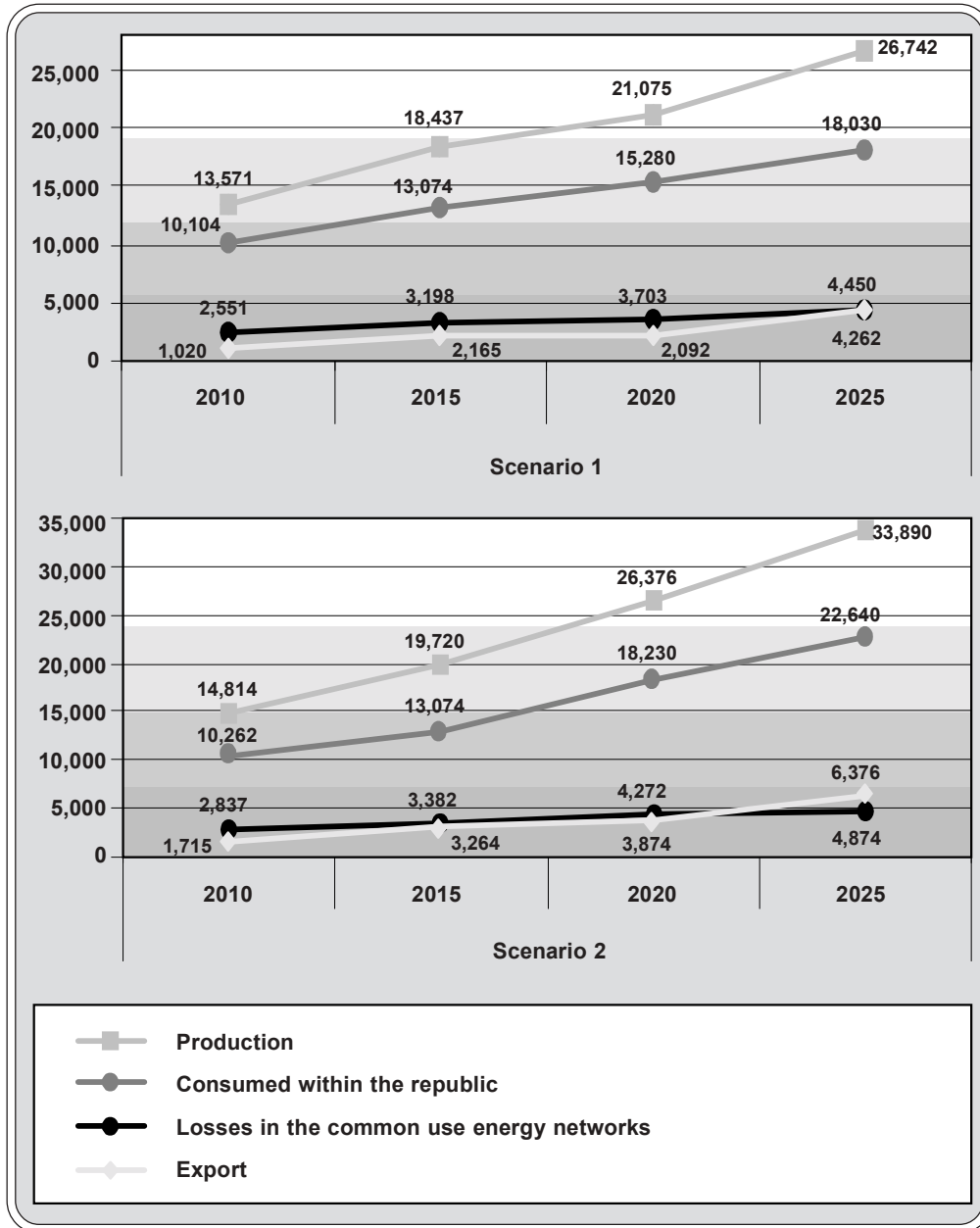
Along with ensuring the economy's domestic needs and supplying the republic's population with electric power, the system envisages export to other countries, has ties with the Central Asian states along the main networks of 220-500 kV, and operates in a unified energy regime. There is access to the energy system of the Russian Federation through Kazakhstan's major networks.

Energy Balance of the Kyrgyz Republic: Report for 1990-2006³ (million kWh)



³ See: National Statistics Board of the Kyrgyz Republic, Thermal Energy Security of the Kyrgyz Republic for 1990-2001 (1991, 2001-2005), Bishkek, 2002; 2006.

Forecast for 2010-2025
in Keeping with the Scenarios
(million kWh)⁴



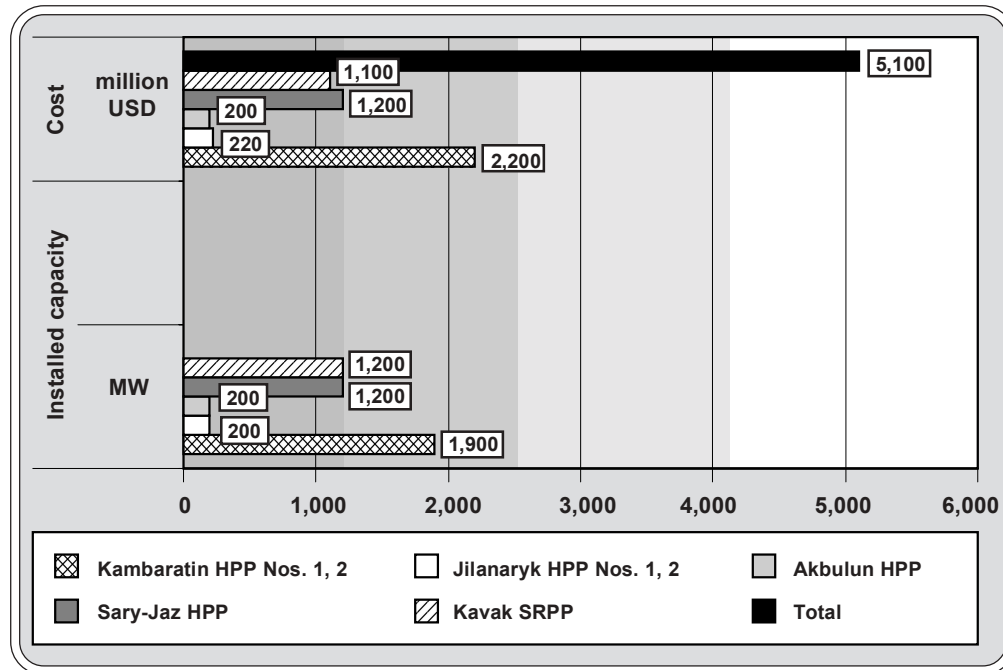
⁴ See: "NEP KR na 2007-2010 gody i strategiiia razvitiia toplivno-energeticheskogo kompleksa do 2025 goda."

According to the energy balance forecast, a reduction in the production of electric power is expected in the mid term (until 2010) in the structure of the Lower Naryn cascade of hydropower plants due to the reduced water volume in the Toktogul hydropower facility generated by climatic conditions and the low water level of the past few years, which will lead to a cutback in export. Electricity production is predicted to increase by 2015 courtesy of Kambaratin HPP-2, which is to go into operation, and by 2025 due to the launching of Kambaratin HPP-1. It should be noted that none of the forecasted scenarios envisages a shortage of energy capacity when the consumption level fully corresponds to the energy production level.

A drop in electricity loss in the networks and an increase in its consumption in keeping with the average annual GDP growth rates are also forecast according to Kyrgyzstan’s Development Strategy.

At this stage the capacities of the existing power plants cannot meet the ever-growing demands for electricity keeping in mind the possible increase in export. In these conditions, the electric power industry is not only hindering an increase in the country’s GDP and economic growth as a whole, but is also a potential risk zone of energy and, consequently, economic security. On the other hand, ensuring a reliable energy supply is becoming the main objective of risk management. In this respect, the question of putting new energy capacities into operation must be resolved.

Forecast of Putting Generating Sources into Operation until 2025⁵

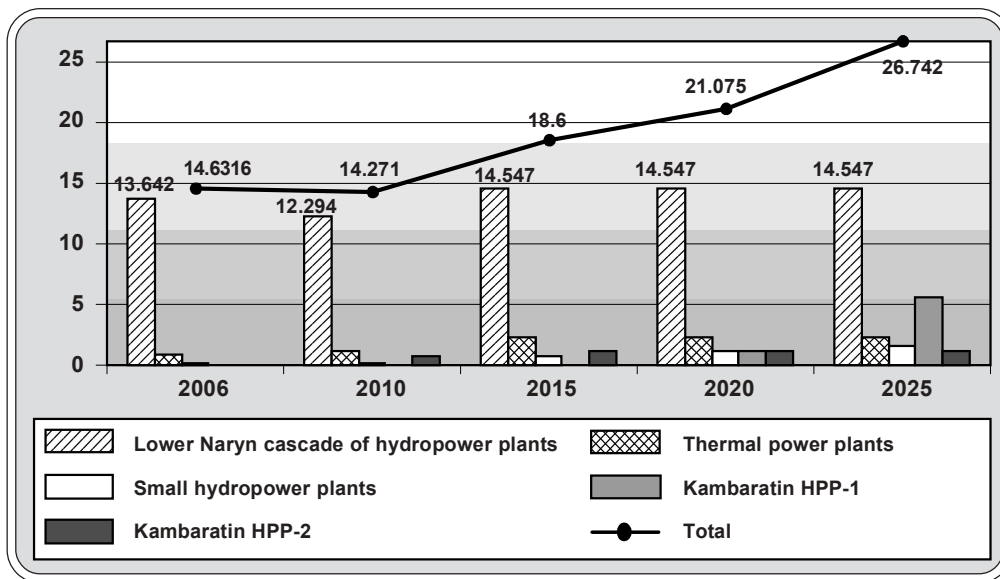


⁵ See: “NEP KR na 2007-2010 gody i strategiiia razvitiia toplivno-energeticheskogo kompleksa do 2025 goda.”

Construction Deadlines

Hydropower Plants	Years
Kambaratin HPP Nos. 1, 2	2010-2020
	2007-2012
Jilanaryk HPP Nos. 1, 2	2007-2010
Akbulun HPP	2010-2014
Sary-Jaz HPP	2010-2025
Kavak SRPP	2008-2015

Forecast of Electricity Production
in Kyrgyzstan by Currently Operating
Promising Power Plants until 2025
(billion kWh)⁶



Large hydropower plants predominated in the republic's electricity production, although there is another quite promising but insufficiently tapped area—the development of small power plants. Development of this sector does not require large investments and is capable of significantly lowering the load on large hydro and thermal power plants by efficiently serving the local markets.

The advantage of small power plants over other traditional types of energy is that they can generate electricity in more economical and environmentally safe ways.

Despite the fact that certain economic indices of small and micro hydropower plants are lower than for large hydropower plants, small plants: make it possible to use the potential of small rivers and

⁶ See: "NEP KR na 2007-2010 gody i strategii razvitiia toplivno-energeticheskogo kompleksa do 2025 goda."

watercourses; place less load on the river ecosystem; make it possible to build small hydropower plants without significant flooding of land and without completely damming up the river; promote the development of local industry; make it possible to resolve the region's social problems; require less initial major spending, operational expenses, and so on.

In Kyrgyzstan, the total potential of the hydropower resources of small rivers and watercourses with medium and longstanding flows from between 3 and 50 cu m/sec constitutes about 5-8 billion kWh a year, but only 3% is used.⁷

At the moment there are 13 small hydropower plants in operation with an installed capacity of 42 MW and an annual production of 125 million kWh. Their production capacities tap only 10-15% of Kyrgyzstan's river potential.

For reference: in the 1950s-1960s, more than 30 small hydropower plants operated in the republic. When the Toktogul cascade of hydropower plants went into operation, some of them were removed from service, although their dams were located in sufficiently "substantiated" places with a reliable flow from corresponding rivers. The technical state of the functioning small hydropower plants is extremely complicated, the plants are not operating at their full capacity and the equipment at some of them has been in use for more than 40 years and so is physically and morally outmoded.

One of the new plants to be built recently was the Naiman small hydropower plant with a capacity of 600 kW in the Nookat Region of Osh Province. In the summer of 2008, the first small hydropower plant, Issyk-Ata, with a capacity of 1.6 MW to be restored after reconstruction was put into operation (it was built in 1960 and produced electricity until 1972). This facility began functioning within the framework of the implementation of the designated measures to develop the small and medium hydropower industry in Kyrgyzstan. At present, there are real prospects for reconstructing and restoring 24 similar hydropower plants with a capacity of up to 200 MW.

Carrying out urgent measures to restore previous small hydropower plants and accelerate the development of the hydropower potential of Kyrgyzstan's small rivers may make it possible to reduce the tension in the fuel and energy balance, improve its structure, lower the financial spending on energy resources, create additional jobs, and so on. The reconstruction of small hydropower plants will allow for a higher level of electricity generation. Between 800 and 1,500 dollars are required to restore 1 kW of capacity. Due to the increase in energy tariffs, the efficient operation of those small hydropower plants earmarked for development, as well as the return on investments in this type of energy will be able to stimulate the involvement of domestic and foreign investors.

There are plans to carry out technical refurbishing and restoration of small hydropower plants removed from service and build new small hydropower plants with a total capacity of 178 MW and average annual production rate of 1 billion kWh a year in different regions of the republic before 2010.

Problems

During the reform significant changes have also occurred in the industrial consumption of electric power. The production slump experienced in the 1990s also reduced the demand for electricity in industry. In addition, absolute electricity consumption increased and the municipal-household sector also began to show noticeable growth in electricity consumption.

⁷ See: *Strategiia razvitiia strany na 2007-2010 gody*, Bishkek, 2007.

- In industry, consumption *decreased* almost 3-fold, but in terms of the energy-intensity of the GDP (expenditure of fuel and energy resources per unit of GDP on a nationwide scale), Kyrgyzstan's indices are more than five-fold higher than the average world value and almost more than three-fold higher than the value of the Asian states (this index reaches 1.7 toe per 1,000 dollars in the republic, while in the world it amounts to 0.32 toe, and in the Asian countries to 0.67 toe).
- Consumption by the population *increased* more than three-fold, which led to a multifold overload of the current electricity networks. A significant regional inequality in energy consumption is seen (more than a two-fold difference).

With respect to the increase in domestic consumption, the industry is faced with serious financial problems. The forecast of more intensive use of electricity revealed problems related to transmission and distribution capacities. Passing the fall-winter peak in recent years was characterized by maximum loading of both the distribution and the system-forming networks. The energy sector is experiencing a drop in the quality of services for consumers due to the worn-out state of the power transmission and distribution networks. Investments mainly went to the production and transmission sector, while a critical situation with respect to the level of equipment wear and tear developed precisely in the distribution sector. Lengthy operation of the electric power industry in conditions of financial and technological insufficiency with an increase and change in the consumption structure led to technological depreciation. For example, the thermal networks in the city of Bishkek have been in operation for more than 25 years. They have completed their life spans and need to be replaced since their reliability has sharply dropped and thermal losses have increased (almost two-fold compared with 1990). In 2007, there were 28,000 emergency shutdowns, whereas, for comparison's sake, in 2000, there were only 10,000, that is, their number has increased almost 3-fold over seven years.

Another thing is that the energy supply system was originally formed to primarily meet industrial needs. The existing capacities are not designed for mass electricity use by the population for cooking food and heating homes. So at the moment it is extremely difficult to monitor the situation, which is largely causing the increase in commercial losses. Systemic losses have risen 3.5-fold, which has led to immense overloading of the electricity networks. Recently, retail networks have not been developing sufficiently, technological wear and tear has been progressing, and the republic is in danger of losing the existing structure. This situation can only be arrested with the help of large investments. So foreign investors much be actively recruited in order to develop the republic's electricity industry. But the large commercial and technical losses are making it difficult to ensure capitalization of the electric power industry, which is hindering technological modernization and the attraction of foreign direct investments for its development.

The industry's low profitability as a whole, which is explained by its technical backwardness, is preventing financial injections. There is also the likelihood that Kyrgyzstan's electric power sector will not be able to arouse serious interest among foreign investors for several other reasons: the sales market is too narrow; the state is an unreliable consumer; there is corruption and mass embezzlement of electricity.

An analysis of the economic activity of the republic's energy enterprises shows the following: an increase in technical and commercial losses of electric power both during transmission and distribution; a drop in the collectability of payments in monetary form; the low level of average tariff collected. Nor is there any exhaustive information on the technical state of the energy facilities and equipment.

According to KEGOC's estimates, the modernization of existing power plants until 2015 will require about 1.2 billion dollars. Investments in expanding the existing and building new power

stations with a total capacity of 1,280 MW should amount to more than 800 million dollars, and the required volume of investments for building new generating capacities of 3,300 MW amounts to 3.5 billion dollars. Another 4 billion dollars in investments are needed in the power transmission and distribution sector. The total estimated amount of investments for developing the energy sector in the medium term (2007-2010) constitutes around 143.5 billion soms (3.5 billion dollars).

Today tariffs are the only way the republic's energy workers can support implementation of the investment program. At the beginning of 2008, the government approved the Mid-Term Tariff Policy (MTTP) with respect to electric power from the second half of 2008 to 2012. Its main objective regarding electric power lies in establishing tariffs by 2010 at a level ensuring full compensation of spending on the production, transmission, and distribution of electricity. A change in electricity tariffs and the tariff structure for different categories of consumption will be carried out in keeping with the plan being drawn up. As a result by 2010 the weighted average amount of tariffs will reach 0.03 dollars per kWh.

There are plans to raise tariffs gradually and regularly, that is, once every six months. These increases should be balanced in order to stimulate an increase in the real sector of the economy and exclude cross-subsidizing of electricity consumers.

It stands to reason that electricity tariffs should include the producers' expenses, which also applies to investment needs. But the real picture of financial investments in the electric power industry shows that they are mainly not going toward development, but being poured into less important endeavors. It turns out that an investment component must be introduced into the tariff, which will dramatically increase it, on the one hand, and enormous amounts of money are being needlessly squandered, on the other. In addition, energy workers should solve the problem of electricity non-payments and its embezzlement (as well as the stealing of cables and equipment). Tariffs in themselves will not resolve the problem of insufficient investments.

So the transparency of financial spending in the power industry must first be ensured before there can be talk about an increase in tariffs. First of all elementary order must be established.

The increase in prices in the energy industry does not justify the expectation of additional funds. An increase in the level of tariffs will lead to an increase in demand for budget funds and to a further increase in consumer debts.

For the future, tariff policy as an efficiency-increasing factor should be oriented toward adopting tough measures on energy saving, rational use of energy resources, and accelerated development of the big and small energy industry.

In this respect, a vitally important task of enhancing the energy complex is improving the operation of enterprises. The significant potential of energy security lies in increasing the electric power industry's efficiency.

Reforms

There is another question requiring a solution—there is no point in producing electricity and heat and then wasting them. Ways must be sought to modernize the existing systems.

When supplying society with electricity, the electric power industry carries out three main functions: it produces, transmits, and distributes energy to the consumer.

During its development, the country's electric power industry has always been regulated and controlled by state structures. Energy enterprises began being regarded as natural monopolies since

all electricity production, transportation, and distribution services could be carried out strictly by these enterprises.

It is thought that the problems in the energy sector are mainly created by the contradiction between the property owner in the form of the state and the private operator in the form of joint-stock companies. In this situation, the latter are not responsible for the current situation and do not have the economic motivation to answer for the work results. This clearly slows down the economic reforms since other sectors of the economy are operating on market mechanisms, include private property, and all responsibility for the financial risks directly influences their viability.

There can be no doubt that reform of natural monopolies is the most difficult thing to accomplish in the energy sector. The experience accumulated in the world shows that privatization of commercial servicing must be carried out in energy companies. And recently privatization of its facilities is one of the main conditions for attracting foreign investments to this strategic branch.

The reform of the energy industry in keeping with international standards can be divided into two stages—restructuring and privatization.

In contrast to the reform of the power industry in Western countries, decentralization and privatization of Kyrgyzstan's energy industry began with transforming the entire industry into a joint-stock company—the Kyrgyzenergo Joint-Stock Company was created, and only later was restructuring carried out (generation, transmission, and distribution branches), that is, division of the Kyrgyzenergo JSC into several energy companies for producing, transmitting, and distributing electricity.

A reform strategy for the Kyrgyzenergo JSC was developed in the republic consisting of three main key aspects:

- 1) The single reproduction complex was divided into four components:
 - generating capacities,
 - transportation (power transmission lines),
 - electricity sales (regional electricity network)
 - central heating facilities.
- 2) A course is being steered in investment policy toward borrowed funds that are being invested in national electricity networks.
- 3) There are plans to solve the task of reducing technical and commercial losses in the distribution networks by using the standard approach of raising tariffs and by means of local budgets, as is envisaged in the Laws on the Electric Power Industry and On Energy Saving.

Restructuring into individual enterprises and organizations implies improvement of the technical state and is aimed at attracting large-scale external investments. The electricity distribution companies are to be the first to undergo decentralization and privatization, or transfer to a private-public partnership.