



KYRGYZSTAN

Regular Review of Energy Efficiency Policies 2011



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**Energy Charter Protocol on Energy Efficiency and
Related Environmental Aspects**

Kyrgyz Republic

REGULAR REVIEW 2011

Part I:

**Trends in energy and energy efficiency policies,
instruments and actors**

EXECUTIVE SUMMARY

The Kyrgyz Republic is a small Central Asian country with a mountainous landscape and many rivers which determine its high hydro energy potential.

The main energy resource in the Kyrgyz Republic is hydropower. Hydropower resources place the Republic third in rate among the CIS countries after Russia and Tajikistan. A key strategy of the Republic's energy sector development is the development of hydropower resources amounting to 142 billion kWh. Currently no more than 10% of hydropower resources are utilised in the Republic.

At present, the Kyrgyz power grid includes 18 power plants, 16 of which are HPPs and 2 TPPs. In 2009, the electric capacity of power plants in the Kyrgyz Republic equalled 3690 MW. Hydro power plants are the basic electricity generation sources in the Kyrgyz Republic. Moreover, there are serious prospects for the development of hydro power construction in the Republic. On the Naryn River alone, in addition to the operating five power plant cascade with an aggregate installed capacity of 2870 MW, it is possible to construct seven more cascades consisting of 33 HPPs with an aggregate installed capacity of 6450 MW and annual electricity output of over 22 billion kWh.

Thermal power plants are located in the cities of Bishkek and Osh and supply them with power and heat. Almost all fuel for thermal power plants is imported from the neighbouring countries. On average, the power plants in the Republic generate 12-14 TWh of power per annum, 2 TWh of which is exported to the neighbouring countries (key importers include Kazakhstan, Russia, Tajikistan and Uzbekistan).

In 2007, the local sources of the Kyrgyz Republic covered approximately 50% of the total energy demand (crude oil – 20%, coal – 40%, electric power – 100%). The dependence on imports is still very high: the energy imports equalled 44% of the Republic's total energy consumption.

According to estimates, available undiscovered oil and gas resources in the country amount to 289 Mtoe. However, the Republic's self-sufficiency in oil products in general is less than 30% and natural gas is imported from Uzbekistan.

The main areas of energy sector development were determined at the beginning of the 1990s when the country became independent. In 1996 and in 1997 the Law on Energy and the Law on Electrical Power Industry were adopted. These laws regulate the organisation and the functioning of various companies operating in the energy sector.

In 1998 the Law on Energy Conservation was adopted in order to promote energy efficiency in generation, transmission and consumption of energy. However, it failed to produce sufficient improvement in the energy efficiency policy in the Republic and in 2008 a new version of the Law was adopted that provides for specific procedures for development of energy conservation policy and ensuring state control of its implementation, financing sources, elaboration and implementation of various programmes of accounting of energy resources generation and use, energy research and study programmes and creation of state statistics system in energy conservation. It is proposed to set up an energy conservation fund which would accumulate funds from various sources to promote innovative technologies in energy efficiency. Business projects will be financed on a repayable basis. The Law

introduces also incentive mechanisms to promote energy efficiency by providing grants, shorter depreciation norms, and electricity tariff structure ensuring quick return of investment.

The Programme of Energy Conservation of the Republic of Kyrgyzstan for the period of 2009-2015 was drafted on the basis of the Law on Energy Conservation which focuses on ensuring the GDP growth by 2015 without increasing the use of fuel and energy resources through better utilisation of the energy efficiency potential in generation, transmission and final consumption of energy. At the same time the programme states that it is necessary to improve living standards of the population, to enhance energy efficiency of the economy and to reduce the adverse environmental impact.

The Ministry of Industry, Energy and Fuel Resources of the Kyrgyz Republic was established in 2007 and reorganised into the Ministry of Energy of the Kyrgyz Republic in 2009. This Ministry is a state body responsible for the policy and strategy of energy sector development without direct intervention in business operations of fuel and energy companies. There are two supervisory and regulatory agencies functioning under the Ministry:

- The State Department for Fuel and Energy Complex Regulation dealing with the establishment of heat and electricity tariffs and engaged in the issuance of licences for activities in the energy sector of the Republic;
- The State Energy and Gas Inspectorate exercising control over rational and efficient use of energy and gas, as well as over compliance with power installation O&M and safety rules in the Kyrgyz Republic by energy companies and entities.

The average electricity tariff for households is currently USD 0.0126 per kWh, i.e. it is lower than for the industry (USD 0.024 per kWh). In addition, households are exempted from VAT at 20% when paying electricity bills. This tariff structure was adopted in its time due to the need for social protection of the population and capping the price hike for households. The industry is currently subsidising households. The service sector applies the same tariffs as the industry. The tariff for electricity used for power generators' own needs has been set at USD 0.005 per kWh. For the purpose of this review, an average household electricity tariff is used because there are two household tariffs applied, depending on consumption levels: USD 0.01/kWh for users of no more than 150 kWh per month and USD 0.02/kWh for users of over 150 kWh per month.

A similar household subsidy pattern is included in heat tariffs. Moreover, a single heat tariff has been set at USD 9.5 per Gcal for households all over the Republic. The difference between the heat generation cost and the established tariffs is subsidised from the national budget of the Kyrgyz Republic. There is also a cross subsidy for Bishkek CHPP where losses incurred in selling heat to households are recovered from revenues of the generator from hydro electricity exports to the neighbouring countries.

The natural gas tariff for households has been set at the supplier tariff level, with all costs associated with gas transmission network operations in the Kyrgyz Republic being included in the tariff applied to the industry.

Given the foregoing, a major objective of the tariff policy is to phase out the existing system of subsidies. Petroleum product prices are uniform for all users.

The average coal price for households turns out to be lower than for industry and the energy sector because of budgetary subsidies for the purchase of coal provided to certain population groups.

The Law of the Kyrgyz Republic on Renewable Energy Sources No. 283 was adopted on December 31, 2008.

The Law determines legal, organisational, economic and financial bases and mechanisms regulating the relations between the State, producers, suppliers and consumers of RES, production equipment and installations for RES utilisation.

The objectives of this Law are: development and utilisation of renewable energy sources, energy structure improvement, diversification of energy resources and improvement of the social condition of the population, ensuring energy security of the Kyrgyz Republic, environmental protection and sustainable development of the economy.

The subjects regulated by this Law include production, consumption and distribution of the RES-based thermal energy, electricity and fuels, as well as the production and supply of equipment and technologies in the field of renewable energy sources in the territory of the Kyrgyz Republic.

1. INTRODUCTION

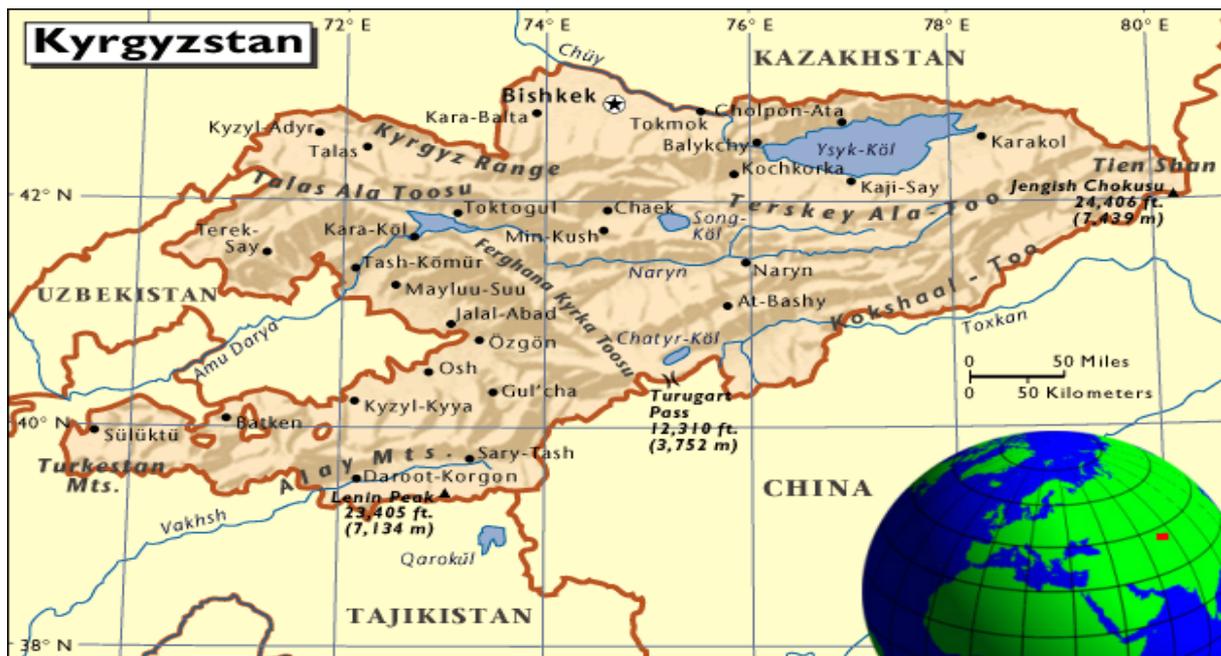
The Kyrgyz Republic is located in the north east of Central Asia. It is classified as an economy in transition; before 1991 it was part of the FSU. The Kyrgyz Republic is a landlocked country which borders on Uzbekistan in the west (the border is 1099 km long), on Kazakhstan in the north (1051 km), and on Tajikistan (870 km) and China (858 km) in the south. The total border length is 3.878 km. The total area of the country equals 198.500 km².

The Pamir-Alai mountainous system is situated in the south west of the Republic. Located in the north east is the Tien Shan with the highest Victory (Pobedy) Peak (7439 m). The mountainous systems are divided by mountain valleys and troughs – Chuiskaya and Talasskaya in the north, Fergana in the south west and Alai in the south.

Kyrgyzstan is an inland mountainous country with a great variety of landscapes, wildlife and vegetation.

There are 1923 lakes in Kyrgyzstan with a total water surface area of 6836 km². The main river is the Naryn. The largest lake in the country is Issyk-Kul.

Figure 1: The Kyrgyz Republic



Source: Ministry of Energy of the Kyrgyz Republic

The population numbered 5.23 million inhabitants in early 2009. The capital of the Kyrgyz Republic is Bishkek. The climate on the most part of the Republic's territory is extremely continental.

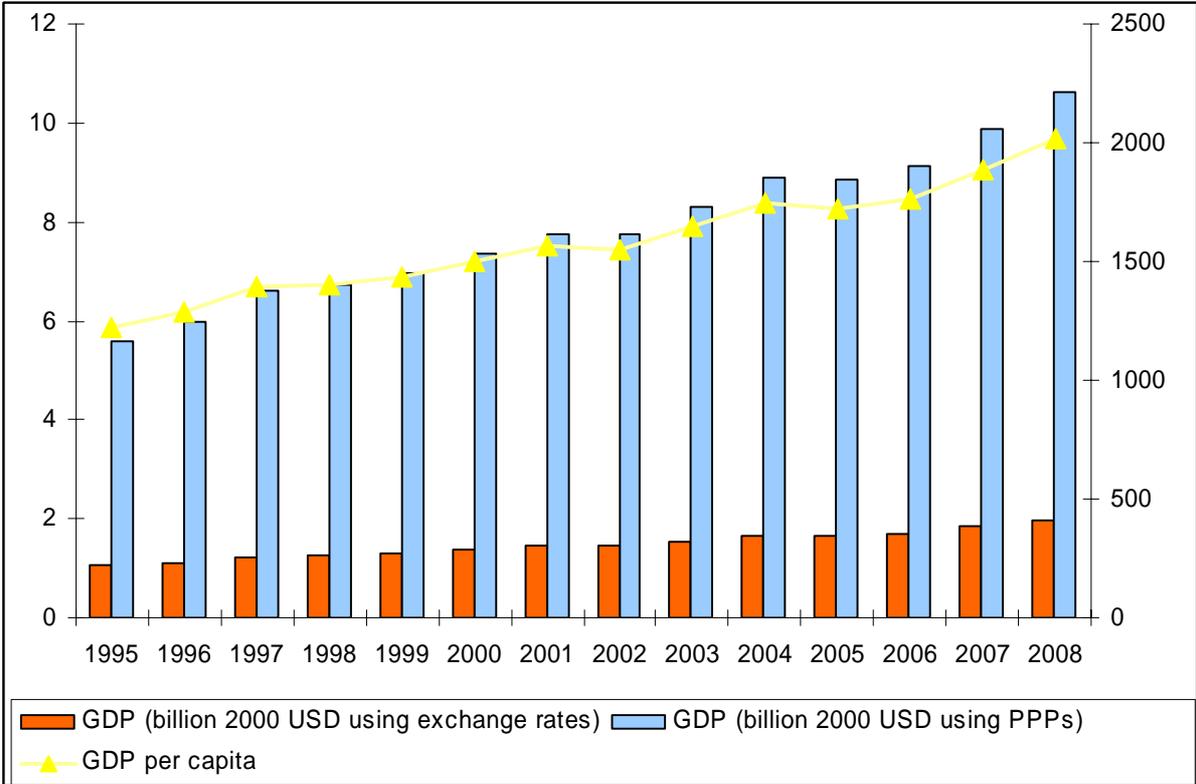
Migration has been a coping strategy adopted by hundreds of thousands of active citizens, with a high outflow of people, with seasonal labour in Russia and Kazakhstan a main source of income for the poorest regions. However, remittances declined by approx. 29% year on year in the first quarter 2009, which will affect household consumption.

Despite reduction in poverty incidence during the last years, in 2004 40% of the population still lived under the national poverty line and around 11% in extreme poverty. Poverty is especially pronounced among rural populations (almost three-quarters of the poor live in the rural and mountainous regions) and is aggravated by ineffective governance and corruption.

The employment rate was close to 60% between 2005 and 2008. The unemployment rate floated between 8.1% (2005) and 8.2% in 2008, and despite the crisis this indicator shows no increase in 2008.

The Kyrgyz economy has had a variable performance in the last decade, alternating years of real GDP growth of 8% (2007-08) and 7% (2003-2004), with years of decline and of zero growth (2002 and 2005 in particular). This has been partly linked to political instability, an unfavourable context for a country with relatively modest natural resources.

Figure 2: GDP Indicators for Kyrgyzstan



Source: IEA statistics, electronic database, 2010

2. BACKGROUND: ENERGY POLICIES AND PRICES

2.1. Energy Sector

The Kyrgyz Republic ranks among the states with ample hydro energy resources, with their potential coming, by an expert estimate, to 142 billion kWh of which about 10% has been utilised to date.

Such ample resources have set the stage for the rapid development of the Republic's energy complex. The Kyrgyz Republic has been a major producer of electricity in Central Asia since early 1980's supplying up to 50% of cheap and environmentally clean hydroelectric power to the Interconnected Energy System (IES) of Central Asia.

In recent years, the Kyrgyz Republic has emerged as a key member of the Central Asian power grid due to its large hydro capacity. This enables electricity exports to the neighbouring countries and frequency regulation in the Central Asian power grid.

At present, the Kyrgyz power grid includes 18 power plants, 16 of which are HPPs and 2 TPPs. In 2009, the electric capacity of power plants in the Kyrgyz Republic equalled 3690 MW. Hydro power plants are the basic electricity generation sources in the Kyrgyz Republic. Moreover, there are serious prospects for the development of hydro power construction in the Republic. On the Naryn River alone, in addition to the operating five power plant cascade with an aggregate installed capacity of 2870 MW, it is possible to construct seven more cascades consisting of 33 HPPs with an aggregate installed capacity of 6450 MW and annual electricity output of over 22 billion kWh.

Figure 3: Layout of Existing and Projected HPPs



Source: Ministry of Energy of the Kyrgyz Republic

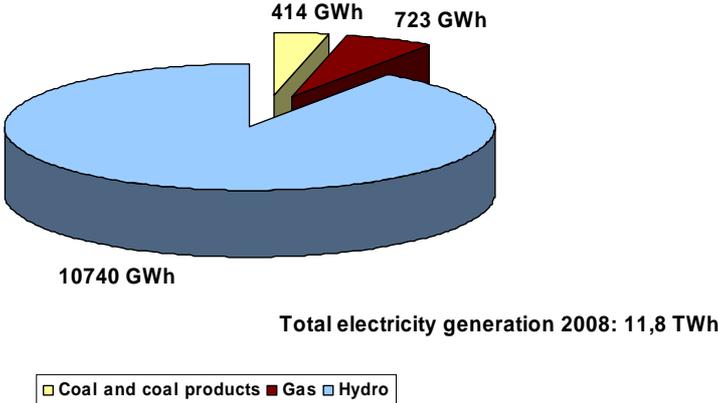
Thermal power plants are located in the cities of Bishkek and Osh and supply them with power and heat. Almost all fuel for thermal power plants is imported from the neighbouring countries.

The power grid in the Kyrgyz Republic is interconnected with other Central Asian countries through 500 kW backbone networks and operates as part of a single energy cycle.

Commencing from September 2001, the Interconnected Power System (IPS) of Central Asia and the Unified Power System (UPS) of Kazakhstan have operated in a parallel mode with the UES Russia, enabling more reliable and economical operations of the power systems and sustainable maintenance of regulatory frequency values, especially in the countries participating in the Central Asian IPS. The power grid of the Russian Federation is accessible through backbone networks in Kazakhstan.

On average, the power plants in the Republic generate 12-14 TWh of power per annum, 2 TWh of which is exported to the neighbouring countries (key importers include Kazakhstan, Russia, Tajikistan and Uzbekistan).

Figure 4: Electricity Generation, by Source



Source: IEA statistics, electronic database, 2010

The country possesses scarce oil and natural gas resources estimated at 14 mln tons and 9.0 bln m³ respectively. One of the main types of energy resources is coal; its technically feasible reserves total at 1.3 bln tons.

2.2. Energy Supply and Demand

Balance between energy import and export; self-sufficiency and dependence on imports:

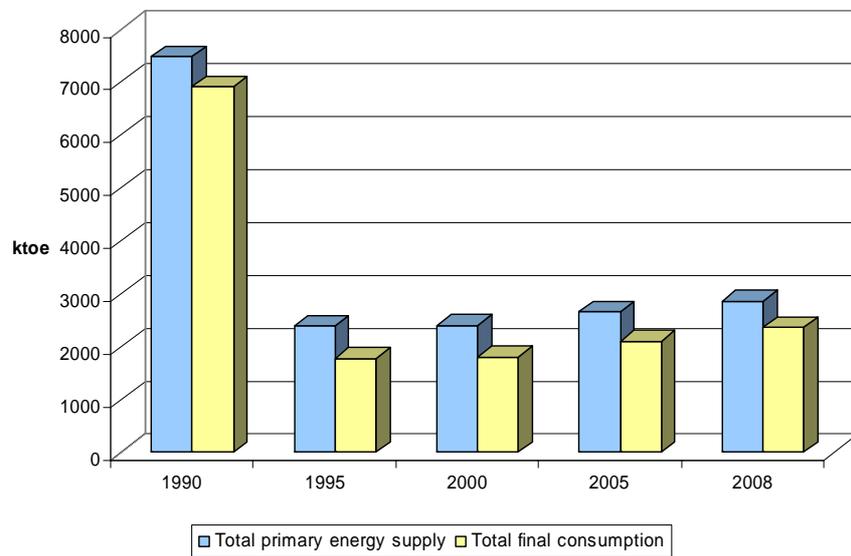
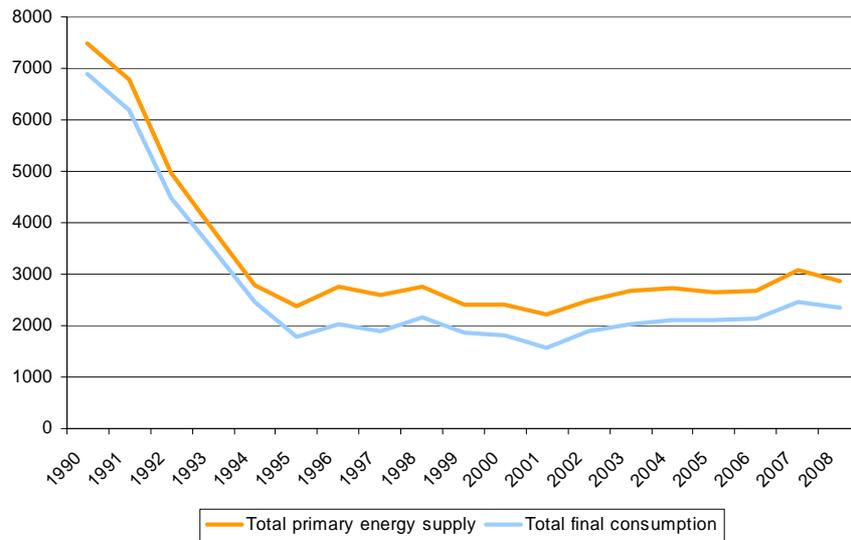
In 2007, the local sources of the Kyrgyz Republic covered approximately 50% of the total energy demand (crude oil – 20%, coal – 40%, electric power – 100%). The dependence on imports is still very high: the energy imports equalled 44% of the Republic’s total energy consumption. The transition period until 1995 is characterised by significant decrease of total primary energy supply (TPES) and total final consumption (TFC) both decreasing with more than 70% compared to 1990 level. The next decade is characterised by fluctuating levels of TPES and TFC with values close to the 2008 levels.

Electricity and heat production:

Hydropower plants are one of the main components of the electricity sector of the Kyrgyz Republic. In 2007, the total volume of generated power amounted to 14.8 TWh, over 90% of which was generated at the Toktogulskiy cascade of HPPs (installed capacity – 2870 MW).

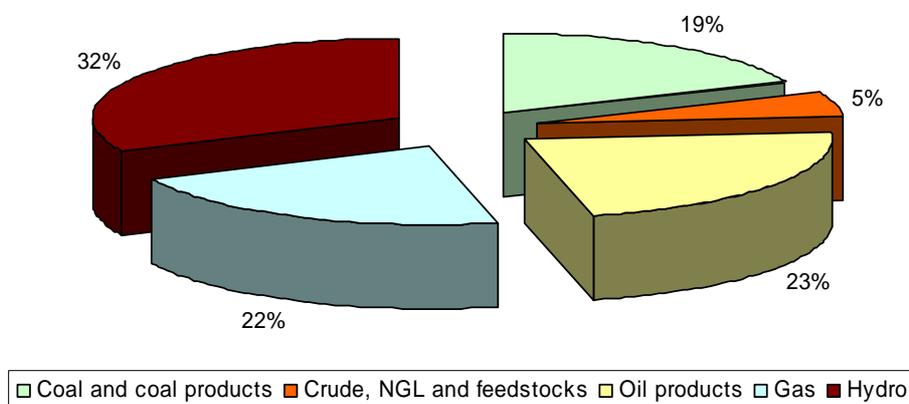
Owing to the integrated uses of water resources (power generation and irrigation), the Republic is in a position to export a certain amount of electricity generated in the summer period to the neighbouring Republics.

Figure 5: TPES and TFC Trends, 1990-2008



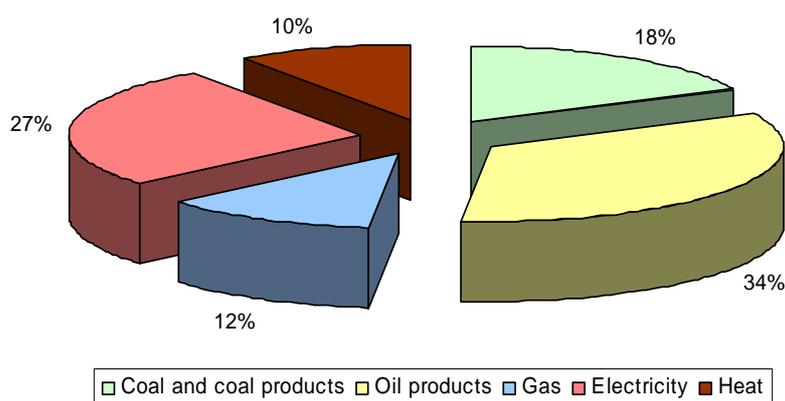
Source: IEA statistics, electronic database, 2010

Figure 6: TPES, by Fuel



Source: IEA statistics, electronic database, 2010

Figure 7: TFC, by Fuel



Source: IEA statistics, electronic database, 2010

In 2007, as compared to 1997, heat generation in the Kyrgyz Republic (steam and hot water) decreased from 4632,0 to 3500 Gcal, or approximately by 26% (mainly due to the reduction in steam production and closing down of the majority of industrial boiler plants).

Only four cities of the Republic have district heating systems: Bishkek – 85% of dwellings, Osh – 40%, Kyzyl-Kiya – 60%, Karakol – 26%. Thermal energy is supplied by CHPPs and boiler plants burning fuel oil, natural gas and coal. In addition, electric boilers plants with a total capacity of 1612 MW operate in the Republic.

Heating 1m² of floor space during the heating season has been estimated to require 160 kWh/m²: 140 kWh/m² in tenement houses and 180 kWh/m² in private houses.

In many cases the micro-climate in the houses is unsatisfactory, the inside temperatures are low because of saving on the heating bill or due to a too weak or too intensive air exchange (only natural ventilation which is not possible to regulate). The main reasons are: poor quality of outdoor insulation of buildings and, in particular, high air permeability of windows as a result of their low quality, imbalanced heating systems and obsolete equipment at heat supply points, no possibilities to regulate heat consumption for heating purposes. Heat losses in main and distribution networks are also high.

Partial reduction in power generation capacity more than halved the environmental pollution and emissions of harmful substances compared to the 1990 levels. Despite the reduced total energy consumption, energy efficiency in general changed insignificantly.

2.3. Energy Policy – General Trends and Objectives

It could be considered that the principal objectives of the government policy in the energy sector are the following:

- 1) energy saving;
- 2) efficient use of primary energy;
- 3) reduction of energy intensity for the production of the domestic product;
- 4) ensuring a secure supply of energy resources using various sources, including local resources, reduction of fuel imports with due account of the need for demonopolisation and decentralisation;

- 5) promotion of the efficient use of local, renewable and secondary energy resources by producers and consumers;
- 6) secure, high-quality and cost-effective generation and supply of electrical and thermal energy, as well as fuel to consumers;
- 7) reducing the adverse environmental impact of the energy sector;
- 8) creation of favourable legal and economic conditions for investment;
- 9) promotion of competition and participation of private capital for improving the economic efficiency of the energy sector.

Summary Table I: Priority of Policy Objectives

Please prioritise from 1 (the highest) to 5 the objectives of your energy policy.

Policy objective	Mark
Reduce total final consumption / GDP	1
Reduce dependence on energy imports	2
Diversification of fuels	4
Reduction of CO ₂	5
Increase utilisation of indigenous primary energy sources	3

2.4. Energy Policy Implementation

After attaining independence in 1991, the Ministry of Energy was established for supervision of the energy sector in the Kyrgyz Republic, including electricity, heat, oil and gas and coal sectors, which had formerly appertained to different structures of the former USSR.

In 1993, the Ministry of Energy was abolished and its functions were transferred to the Ministry of Foreign Trade and Industry (from 2004 – the Ministry of Economic Development, Industry and Trade). In 1993, the Ministry of Energy was abolished and its functions were forwarded to the Ministry of Foreign Trade and Industry (from 2004 – the Ministry of Economic Development, Industry and Trade) which took over the functions of the Ministries of Economy, Industry and Trade, and of Energy.

In order to prevent the negative impacts of the monopolisation in the energy sector, to promote the development of energy markets and the emergence of competitive producers, and to create favourable conditions for competition in the Republic, the State Energy Agency under the Government of the Kyrgyz Republic was established in 1996.

According to the Law on Energy adopted in 1996, for securing reliable, efficient and safe power supply and consumption of energy and respective resources, the State Energy and Gas Inspectorate was established under the State Energy Agency.

The Ministry of Industry, Energy and Fuel Resources of the Kyrgyz Republic was established in 2007 and reorganised into the Ministry of Energy of the Kyrgyz Republic in 2009. This Ministry is a state body responsible for the policy and strategy of energy sector development without direct intervention in business operations of fuel and energy companies. Two supervisory and regulatory agencies are functioning under the Ministry:

- The State Department for Fuel and Energy Complex Regulation dealing with the establishment of heat and electricity tariffs and engaged in the issuance of licences for activities in the energy sector of the Republic;
- The State Energy and Gas Inspectorate exercising control over rational and efficient use of energy and gas, as well as over compliance with power installation O&M and safety rules in the Kyrgyz Republic by energy companies and entities.

The above-mentioned agencies are the main authorities responsible for management and regulation in the energy sector. Related to the energy sector are also entities engaged in environmental protection, construction and other matters; their decisions have a considerable impact on the energy companies' activities.

Between 1992 and 1994, state energy enterprises were transformed into joint-stock companies. At present their activities are regulated by the Law. Although the Government holds the controlling block of shares, such companies are run in accordance with the management principles accepted in the West. The emergence of private capital made it possible to adopt a new approach both to the management and relations between the shareholders. The State does not predominate over the shareholders and participates in management in accordance with the procedure established by the Government.

The National Energy Programme of the Kyrgyz Republic for 2008-2010 and the Strategy of Fuel and Energy Complex Development until 2025 have been adopted. The Programme was approved by the Decree of the Government of the Kyrgyz Republic No. 47 of February 13, 2008 with a view to resolve energy sector problems by means of the following:

- development of its own energy base;
- reduced dependence on energy resource imports;
- improvement of energy efficiency;
- reduction of adverse environmental impacts;
- implementation of energy saving measures;
- elimination of cross subsidies for power production;
- improvement of price and tariff policies.

This Programme revises the lines of energy sector development determined at the beginning of the 1990s and specifies the following objectives:

- secure and safe energy supply at minimised costs;
- energy efficiency improvements;
- improvement of the energy sector management and application of market principles in the energy sector;
- reduction of adverse environmental impacts;
- integration of the energy sectors of the Kyrgyz Republic and other Central Asian states;
- interaction and cooperation at the regional level.

General provisions on the energy sector and the power industry, as well as the basic principles of their development, operation and management, are determined by the Laws of the Kyrgyz Republic on Energy and on Electrical Power Industry adopted by the Parliament of the Kyrgyz Republic on October 17, 1996 and January 23, 1997, respectively.

These Laws specify the activities of individual energy sectors, public, municipal and private energy enterprises, energy producers, suppliers and consumers, their legal and economic relationships where energy or energy resources are the subject-matters thereof.

2.5. Energy Prices

In accordance with the Law on Energy, the State Department for Regulation of the Fuel and Energy Complex under the Ministry of Energy of the Kyrgyz Republic was made responsible for fixing controlled energy prices (for electricity, natural gas and district heating).

The State Department for Regulation of the Fuel and Energy Complex under the Ministry of Energy of the Kyrgyz Republic also exercises the following functions:

- carries out analysis of major economic and financial problems of the energy sector, including investment;
- defines the principles of setting prices for electricity, district heating, hot water supply and natural gas;
- approves the methods of price and tariff calculation for the above-mentioned energy resources;
- negotiates with producers over the issue of prices and tariffs calculated by them in accordance with the approved methodology (if the producer does not succeed in reaching an agreement with the State Department for Regulation of the Fuel and Energy Complex under the Ministry of Energy of the Kyrgyz Republic with respect to such prices and tariffs, then a unilateral decision on price levels is taken and the period of its validity is determined);
- exercises control over the application of electricity, district heating, hot water supply and natural gas prices;
- examines and approves thermal energy consumption rates (applied during the period of price fixing), including the amounts of thermal energy required for hot water supply and the heating of premises;
- examines and approves the rates of fuel consumption for electricity and heat generation;
- within its legal authority considers consumers' complaints, handles disputes arising between suppliers and consumers and protects the interests of consumers.

2.5.1. Energy Pricing Policy

Price regulation in the electricity sector:

In 1998, a methodology of calculation of prices for electrical and thermal energy covering different groups of consumers and more clearly defining the cost distribution coefficients in accordance with different voltage levels and containing a more detailed estimate of technical losses in power networks with different voltage levels were developed.

The methodology of price calculation have become a starting point for the development of Fundamentals of the Tariff Policy in the Kyrgyz Republic for 2008-2012, which is the basis for the definition of economically sound electricity, heat as well as natural gas tariffs.

Price regulation in the gas sector:

The natural gas pricing methodology used in the Republic is based on cost-sharing between individual groups of consumers, including the calculation of single-line and multi-linear tariffs. In accordance with the requirements of the Energy Charter, the new methodology consist of separate calculation of prices for gas transportation by mains and distribution networks as well as tariffs for different groups of consumers.

Price regulation in district heating:

The heat production cost at the enterprises of OJSC “Electric Power Stations” amounted to 17 som per 1 Gcal, and in the system of “Kyrgyzzhilkommunsoyus” – from USD 18 to 80 per 1 Gcal, which is, to a considerable extent, determined by the high fuel costs, as well as the use of obsolete and physically worn equipment. Practically all boiler plants and all the more so, the consumers lack equipment for thermal energy metering and consumption. Electric boiler plants, about 3000 in number and of the total heat capacity of 4200 Gcal per hour, which is 3.5 times higher than the thermal capacity of the Bishkek CHPP, play an important role in thermal energy production. In connection with power shortage in winter, as well as overloading of distribution networks it was decided to convert electric boiler plants to local fuels, which does not result in economic gain as the difficulties of equipment replacements and the provision of boiler plants with fuel have not been taken into consideration.

Regulatory mechanisms:

Electricity, district heating, hot water supply and natural gas prices are established by electricity, district heating, hot water and natural gas suppliers in agreement with the State Department for Regulation of the Fuel and Energy Complex under the Ministry of Energy of the Kyrgyz Republic. If the suppliers of electricity, district heating, hot water and natural gas do not succeed in coming to an agreement on prices with the State Department for Regulation of the Fuel and Energy Complex under the Ministry of Energy of the Kyrgyz Republic, the latter should take the decision with respect to price levels for consumed energy and determine the term of their validity.

Existing barriers:

At present, there are subsidies (privileges for the low-income population, for pensioners and disabled persons, war veterans, etc.) and cross-subsidies (covering the costs of thermal energy production at CHPPs by sales of electric power). In addition, enterprises experience difficulties as a result of the low level of payment collection.

2.5.2. Price Levels

The average electricity tariff for households is currently USD 0.0126 per kWh, i.e. it is lower than for the industry (USD 0.024 per kWh). In addition, households are exempted from VAT at 20% when paying electricity bills. This tariff structure was adopted in its time due to the need for social protection of the population and capping the price hike for households. The industry is currently subsidising households. The service sector applies the same tariffs as the

industry. The tariff for electricity used for power generators' own needs has been set at USD 0.005 per kWh. For the purpose of this review, an average household electricity tariff is used because there are two household tariffs applied, depending on consumption levels: USD 0.01/kWh for users of no more than 150 kWh per month and USD 0.02/kWh for users of over 150 kWh per month.

A similar household subsidy pattern is included in heat tariffs. Moreover, a single heat tariff has been set at USD 9.5 per Gcal for households all over the Republic. The difference between the heat generation cost and the established tariffs is subsidised from the national budget of the Kyrgyz Republic. There is also a cross subsidy for Bishkek CHPP where losses incurred in selling heat to households are recovered from revenues of the generator from hydro electricity exports to the neighbouring countries.

The natural gas tariff for households has been set at the supplier tariff level, with all costs associated with gas transmission network operations in the Kyrgyz Republic being included in the tariff applied to the industry.

Given the foregoing, a major objective of the tariff policy is to phase out the existing system of subsidies. Petroleum product prices are uniform for all users.

The average coal price for households turns out to be lower than for industry and the energy sector because of budgetary subsidies for the purchase of coal provided to certain population groups.

Table 2.1: Electricity Tariffs for End-Users (Taxes Included)

№	Consumers group	Units ¹	Dates of increase in tariffs		
			01.07.2008	01.01.2010	01.07.2010
		USD/kWh			
1	Households	USD/kWh	0.149	0.315	0.399
2	Industry	USD/kWh	0.228	0.315	0.399
3	Public sector	USD/kWh	0.237	0.315	0.399
4	Agriculture	USD/kWh	0.228	0.315	0.315
5	Pumping stations	USD/kWh	0.162	0.315	0.399
6	Other	USD/kWh	0.243	0.315	0.399
7	Households in the Tortogul Region, town of Karakul and Zhazykechuu village	USD/kWh	0.009	0.021	0.031
8	Pumping stations in the Tortogul Region	USD/kWh	0.010	0.021	0.031

Source: Ministry of energy of the Kyrgyz Republic

¹ Exchange rate as of 02/03/2011 1 KGS=0.21 USD, <http://www.xe.com/ucc/>.

Table 2.2: Thermal Energy and Hot Water Tariffs for End-Users (Taxes Included)

No.	Tariff structure and end-users group	Units ²	Dates of increase in tariffs		
			01.07.2008	01.01.2010	01.07.2010
Tariffs for thermal energy for heating					
1	Households	USD/ Gcal	106.57	220.5	525
2	Other end-users	USD/ Gcal	204.98	220.5	525
Tariffs for thermal energy for hot water supply					
3	Households	USD/ Gcal	53.29	220.5	525
4	Other end-users	USD/ Gcal	204.98	220.5	525

Source: Ministry of energy of the Kyrgyz Republic

Summary Table II: Energy Prices

Energy Prices	Yes	No	Partly
Is there an independent regulator of energy prices?			X
Are there any subsidies on energy prices?	X		
Are there any cross-subsidies?	X		
Are the environmental costs fully internalised?			X
Do you have a tax related to energy consumption?		X	
Do you have a tax related to CO ₂ emissions?			X

² Exchange rate as of 02/03/2011 1 KGS=0.21 USD, <http://www.xe.com/ucc/>.

3. END-USE SECTORS

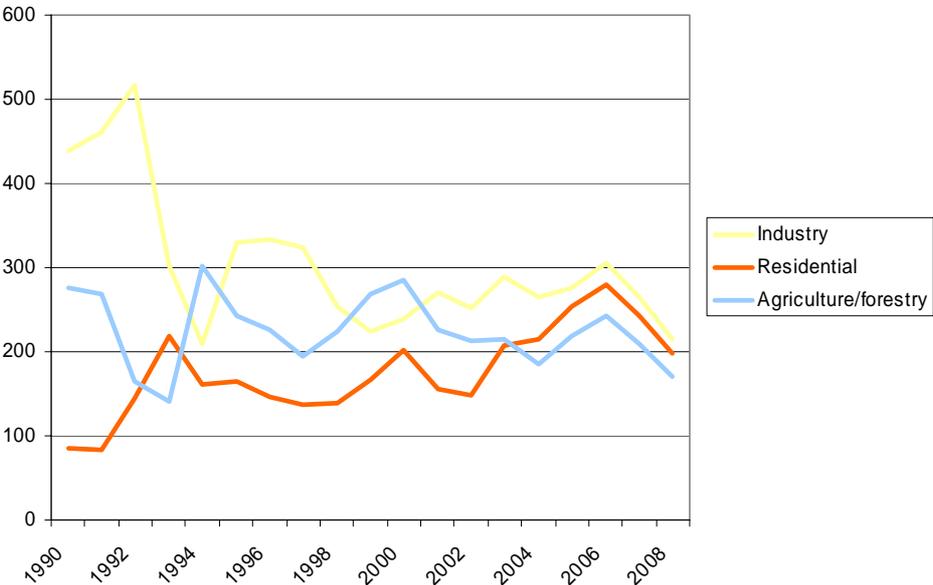
The residential sector (60%), industry (30%) and transport (10%) are the major consumption sectors. The greater part of primary energy carriers – up to 40% – was consumed by households and the service sector, 8% was used for electricity generation, 12% – for thermal production, 1% – for the production of petroleum products, 30% – for the needs of industrial and agricultural production. The demand for non-conventional energy was 0.5%. Various energy losses amounted to 8.5%.

In early 1990s households consumed 16% of the electricity supplied, public sector – 19%, industry, agriculture and commercial consumers – 65%. It was attributed to the fact that coal production exceeded 5 mln tons, with 4.5 mln tons consumed domestically, while gas and fuel oil supplies reaching 2.5 bcm and 600 thousand tons, respectively.

Today the electricity consumption structure has practically shifted to households, which attribute to 63% of total electricity supplied to the domestic market state-funded consumers have 12%, industry, agriculture and commercial consumers – 25%.

At the same time coal consumption dropped to 1609 thousand tons, with gas consumption amounting to 664 bcm and fuel oil – 37 thousand tons. The reduction in coal and gas consumption resulted in added burden on electricity sector. Today district heating, hot water supply and cooking are fully electricity dependent, with 1 bn. kWh consumed by the households in 1990 reaching 3.6 bn. kWh in 2008 and sharp seasonal variation with winter time consumption exceeding summer time consumption by 3.5 times.

Figure 8: Electricity Consumption Trends



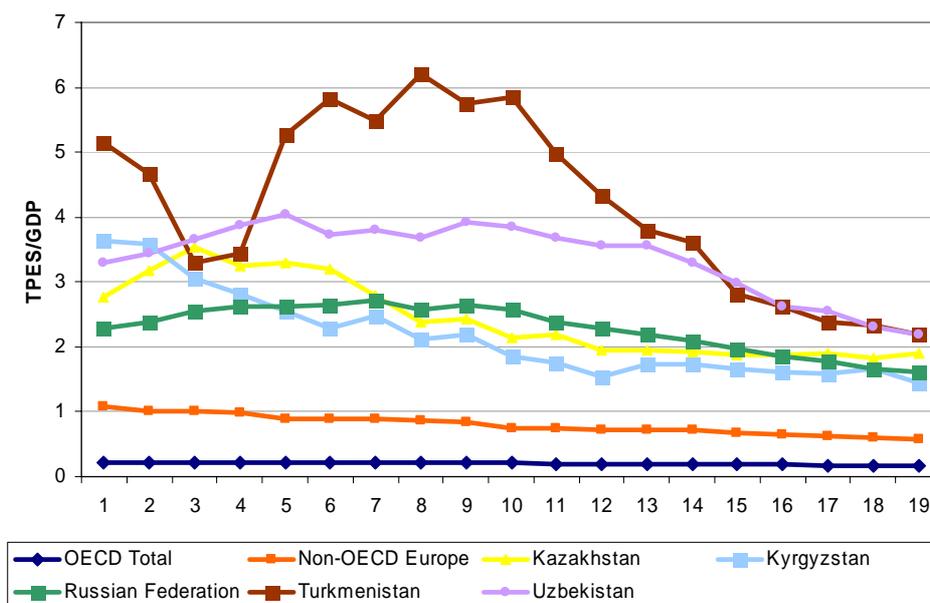
Source: IEA statistics, electronic database, 2010

The greater part of primary energy carriers – up to 40% – was consumed by households and the utility sector, 8% was used for electricity production, 12% – for heat production, 1% – for the production of petroleum products, 30% – for the needs of industrial and agricultural production. The demand for non-conventional energy was 0.5%. Various energy losses amounted to 8.5%.

The end demand for thermal energy exceeded 3500 thousand Gcal. The major part of thermal energy was used by residential consumers (67%) and industry (17%). Energy losses in 2007 were somewhat lower but in some cases they still reached 15-20% of total consumption.

At present the energy intensity of the economy in general remains quite high compared to developed countries energy intensity, however it has the lowest energy intensity compared to neighbouring countries. The energy intensity in Kyrgyzstan amounts to 1.4 toe per 1000 USD. In the developed countries this index ranges between 0.18-0.58, and in the developing countries it is between 1.4 and 2.2.

Figure 9: Comparison of Energy Intensity in Kyrgyzstan and Other Countries



Source: IEA statistics, electronic database, 2010

In 2007, the balance of the primary energy consumption was as follows: petroleum products – 23%; natural gas – 20%, coal – 18%, and electricity – 32%. The major consumer sectors are: the residential sector (60%), industry (30%) and transport (10%).

3.1. Residential Sector

The residential and service sectors are characterised by inefficient use of gas, water and heat, as well as quite inefficient buildings, construction materials and design. Buildings and apartments are not equipped with the heat energy meters. Heat losses in buildings are several times higher as compared to other countries with similar climatic conditions. The current construction sector is characterised by inefficient consumption of construction materials and energy resources and use of non-cost-effective construction structures and materials, as well as use of buildings and houses designs with significant heat losses.

3.2. Industrial Sector

According to the data provided by the National Statistics Committee, the share of electricity and fuel in production costs in the Republic of Kyrgyzstan has grown from 17.6% in 1992 to 19.1% in 2007. In particular, this increase stems from the fact that many industrial consumers still have to bear energy costs to maintain idle or inefficient production capacities.

With the continued decline in energy consumption in the economy of the Republic of Kyrgyzstan, in 2007 the agricultural sector saw increase in energy consumption for production by 19.7% with the average 5% growth in agricultural production. There are no existing energy consumption norms in agricultural production, and farms do not report to the National Statistics Committee of the Republic of Kyrgyzstan on their energy use.

3.3. Services Sector

In the context of current economic situation, the lack of incentives mechanisms to promote energy efficiency and lack of financing to implement energy efficiency projects are the main barriers hindering the energy efficiency activities in the state-funded entities.

4. ENERGY EFFICIENCY POLICIES

4.1. Energy Efficiency Policy and Legislation

In 1998 the Law on Energy Conservation was adopted in order to promote energy efficiency in generation, transmission and consumption of energy. However, it failed to produce sufficient improvement in the energy efficiency policy in the Republic. In addition, no specific by-laws or instructions were adopted to implement this law, and no clear distribution of responsibilities and incentives system was established to support its implementation. The Energy Conservation Fund which was proposed under the Law is in functional since no specific budget support mechanisms were agreed with the Ministry of Finance.

In this context on December 24, 2008, the above-mentioned Law on Energy Conservation was amended. The new version of the Law provides for specific procedures for development of energy conservation policy and ensuring state control of its implementation, financing sources, elaboration and implementation of various programmes of accounting of energy resources generation and use, energy research and study programmes and creation of state statistics system in energy conservation. It is proposed to set up an energy conservation fund which would accumulate funds from various sources to promote innovative technologies in energy efficiency. Business projects will be financed on a repayable basis. The Law introduces also incentive mechanisms to promote energy efficiency by providing grants, shorter depreciation norms, and electricity tariff structure ensuring quick return of investment.

This Law also envisages energy expert audits to be performed from business entities to assess their efficiency in energy consumption, organisation of monitoring and control of energy use and safety of energy installations. Such audits will assess the level of energy efficiency in business activities of economic entities and their compliance with energy consumption standards.

The Programme of Energy Conservation of the Republic of Kyrgyzstan for the period of 2009-2015 was drafted on the basis of the Law on Energy Conservation which focuses on ensuring the GDP growth by 2015 without increasing the use of fuel and energy resources through better utilisation of the energy efficiency potential in generation, transmission and final consumption of energy. At the same time the programme states that it is necessary to improve living standards of the population, to enhance energy efficiency of the economy and to reduce the adverse environmental impact.

To achieve these goals a forecast of the expected fuel and energy resources consumption was developed taking into account the medium- and long-term trends in the domestic economy development set forth in the Strategy of the State Development. At the same time, the following three priorities in promotion of energy efficiency in the country were set:

1. To reach by 2015 1.2 mtce of energy savings in the country by providing qualitative organisational and management support for the energy conservation policy in the country.
2. To ensure 0.7 tce of energy savings by 2015 by promoting the development and use of energy efficient technologies and materials in energy and gas production, transmission and consumption.
3. To reduce the GDP energy intensity and electricity consumption by twofold by 2015 through structural transformation of the economy, as well as to reach 1.0 mtce of energy savings.

The implementation of the Programme is divided in two stages:

- The first stage – 2009-2011 – focuses on relatively low-cost in terms of implementation actions which are sought to produce highly efficient results in the future.
- The second stage – 2012-2015 – provides for activities entailing high investment, but also ensuring a long-term and considerable energy efficiency impact.

The Action Plan with expected outcome of its implementation, main stakeholders, timeframe and estimated volumes of financing was also developed. The proposal on the organisational management chart was made and specific financial, administrative and human resources support mechanisms were developed to implement this Action Plan.

4.2. EE Targets

The key energy policy objectives in the Republic include: rational use of energy, efficient use of primary energy resources, promotion of efficient use of local, renewable and secondary energy by both producers and consumers, and reduction of environmental impacts.

4.3. EE Priorities

The forecast for expected energy consumption has been developed on the basis of the expected balance between power capacity and generation and with due account for capital intensity and rigidity of the energy generation and trends in the medium- and long-term economic development of the country. In this context, impact of various macro indicators on energy consumption has been analysed and it has been concluded that the highest value of the correlation factor corresponds to the balance between GDP and consumption of fuel and energy resources. It allows using the GDP planned production indicator to forecast future fuel and energy demand. This factor has been used to build a model which helps calculate future consumption energy resources depending on different scenarios of GDP annual growth. Three scenarios of possible economic development with annual GDP growth of 8%, 5% and 2.5%, respectively, have been reviewed (tentatively-called: 1 – “Development”, 2 – “Rely on own resources”, 3 – “Survival”).

Three strategic development priorities to attain the main objective have been defined on the basis of these scenarios.

The first priority focuses on ensuring up to 1.2 mtce of energy saving by 2015 through a qualitative organisation and management support for promoting energy conservation process in the country. This requires:

- Ensuring of the adequate institutional support for the state energy saving policy;
- Increasing the level of energy resources savings by the state-funded organisations;
- Improvement of legal framework in the energy saving;
- Reduction of business and technical losses to the approved standards for 2015;
- Introduction in 2009-2019 of the tariff system encouraging energy saving in the energy sector;
- Ensuring full accountability of energy and gas consumption by 2015 through installation of modern metering equipment in 100% business entities;
- Ensuring 100% level of energy payment collection;
- Streamlining the demand-side management to ensure balanced and safe operation of the power grid;

- Ensuring fuel savings in energy generation and consumption at the level of 0.5 mtce annually;
- Development of financial support mechanisms for implementation of the energy conservation policy in the country;
- Improvement of the system of statistical accounting and monitoring in the field of energy efficiency;
- Organisation of broad public awareness raising and information programmes regarding the benefits of the energy saving in all regions of the country.

The second priority aims at ensuring by 2015 the energy savings at the level of 0.7 mtce by means of encouraging the development and use of energy efficient and gas efficient technologies, equipment and materials in the process of energy and gas production, transmission and consumption. For these purposes it is needed to:

- Enhance by 2015 the level of upgrading of energy gas equipment by 50%;
- Create certain economic and organisational environment in the country which is conducive to research, technical and innovative activities in energy efficiency;
- Promote development of the extended multi-tier system of education in energy saving;
- Improve environmental situation within the Republic by reducing emissions in energy production and consumption to the established standards;
- Encourage manufacture and use of state-of-the-art equipment, technologies and materials ensuring higher quality of energy efficiency in the economy of the Republic;
- Create favourable conditions for the production of energy conservation technologies and equipment;
- Promote use of renewable energy sources.

The third priority focuses on reducing by 2015 the level of the GDP energy intensity and electricity consumption by two folds and ensuring 1.0 mtce of energy saving through structural transformation of the domestic economy. This objective would require to:

- Increase efficiency in energy resources consumption in the industrial sector by 1.5 times by 2015;
- Increase efficiency in energy resources consumption in the agricultural sector by 50% by 2015;
- Increase efficiency in energy resources consumption in the residential and utilities sectors in the regions of the Republic in average by 50% by 2015.

Energy conservation actions and measures aimed at increasing energy efficiency will be implemented in the following areas:

- Drafting of legal and normative acts to implement the provisions of the Law on Energy Conservation and energy efficiency measures;
- Reconstruction of the existing energy and energy intensive facilities, upgrade of energy sector, thermal insulation of buildings, construction of energy efficient building;
- Use of domestic energy resources;
- Restructuring of the construction materials industry and launch of production of energy saving and heat-insulating materials;
- Development, production and installation of metering equipment and systems to ensure account and control of consumption of hot water, steam, natural gas and electricity.

4.4. EE Budgets

For the implementation of energy efficiency measures in the Kyrgyz Republic, the Swiss Government granted USD 23.6 mln and the World Bank and IDA provided a loan of USD 4.2 mln.

Moreover, for the rehabilitation of power supply and central heating systems, during the period until 2002 approximately USD 73 mln was allocated (the Northern Development Fund, the Asian Bank for Reconstruction and Development, the Government of Denmark, the World Bank and the IDA). Owing to a USD 1.5 mln grant, provided by the Japanese Government, and a USD 0.65 mln loan from the World Bank, gas metres for JSC “Kyrgyzgas” were purchased.

Data on provided funds (USD mln):

Before 1998	1999	2000	2001	2002
23.6	25.7	17.3	17.2	12.8

The Energy Conservation Programme for 2009-2013 will be implemented with the following state support:

- Introduce incentives to save fuel and energy by implementing targeted energy efficiency measures,
- Establishment of the Energy Conservation Fund,
- Creation of favourable conditions for manufacturers of energy equipment and materials,
- Provision in accordance with the established legal procedure of soft lending to energy efficient projects, import of energy efficient equipment, tools and other materials,
- Promotion of development and introduction of energy efficient technologies and renewable energy sources (RES),
- Development of the international scientific and technical cooperation, as well as education and training in the field of energy efficiency.

The Energy Conservation Fund will be funded out of the proceeds from energy conservation programmes and from contributions by generation, transport, distribution and other energy companies in the Republic of Kyrgyzstan. The voluntary target contributions by legal and natural entities, including foreign ones, could also serve as additional sources of financing of the Energy Conservation Fund.

State financial support for any energy conservation project is provided primarily on a refundable and preferential basis, and for a limited period of time depending on the relevance of a project and payback period. The following mechanisms could also be used:

- Use of repayment schemes of financing of energy efficient projects. The main state support mechanism of the Programme is the provision of the public budget loans to specific projects secured by business plans. Such public budget loans cover only a part of costs related to energy conservation projects, with remaining costs being covered by the energy users with their own resources, borrowed funds or funds saved in the process of implementation of energy conservation projects. Public budget loans are provided on a repayable basis for the period of five years on a preferential basis.

- Use of tariff lending to promote energy efficiency.
- Provision the state-funded entities and organisations using energy resources with the rights to use saved amount of energy. It is important to promote energy saving among partially or fully state-funded entities in the Republic of Kyrgyzstan. The budget funds saved as a result of energy saving activities in budget organisations will be used by this organisation for the entire project payback period plus one more year. This provision has to be applied to encourage energy conservation measures in the organisations funded out of local budgets. Upon the expiry of the payback period and after the use within no less than a year of the amount of savings any budget financing of energy conservation measures has to be reduced by the amount of the previous year savings.
- Promotion of energy conservation through subsidies to the population. This mechanism means the abolishment of the feed-in tariffs and use of direct subsidies and investment to carry out the energy efficient projects. In the context of social protection of the population it is appropriate to subsidise directly the population out of the local budgets or extra budgetary funds instead of feed-in tariffs. This scheme means that this subsidy, for example, covers not the amount of the energy consumed but rather a standard set of energy saving home appliances used by a household.

In the process of selection of projects seeking the state support, the preference is given to those projects which meet the following main criteria:

- The focus on energy efficiency, which means that the project should entails development and production of energy efficient technologies and equipment, as well as their use by organisations and enterprises in the Republic;
- Each organisation, which submits its project, should not have arrears on all compulsory payments to the budgets of all levels of the budgetary system of the Republic;
- Reflection of the energy conservation relevance of the project, which underpins the main scientific and technical advantages of this project as compared to similar projects and its impact on the consumers' interests;
- Economic, business and environmental feasibility of the project;
- Each applicant should ensure co-financing of the investment project;
- The feasibility study and business plan developed in compliance with normative legal acts of the Republic of Kyrgyzstan have to be presented.

The key areas of the investment policy in the field of energy efficiency:

- Development at the republican level of incentives for enterprises to use their own funds by establishing a favourable depreciation regime in the framework of the current legislation. During 2009-2011 the depreciation policy of the enterprises should play a bigger role in investment activities and faster pace of upgrade and replacement of outdated production machinery for the energy saving one;
- Development of tools for attraction of soft loans;
- A wider use of leasing mechanisms to purchase energy efficient technological equipment;
- Use of existing possibilities to attract financing of the investment funds.

4.5. International Cooperation

The Kyrgyz Republic participates in the following energy efficiency programmes: TACIS and the USAID. Within these programmes, the Kyrgyz Republic also cooperates with Denmark, Sweden, Germany, Great Britain, France, Norway, Finland and the USA.

The Kyrgyz Republic is a member of the interstate CIS Electric Power Council and the Interstate Council of the Central Asian States on the Fuel and Energy Complex.

In 1995-1996 the pilot project on energy efficiency in the residential sector was carried out in the Republic of Kyrgyzstan. This project was financed by the Commission of the European Communities and implemented by the *Friedeman and Johnson*, company from Germany. The Demonstration area of energy and water efficiency in Bishkek was created in 2000 within the framework of the UN Energy Efficiency 21 Project. During 2000-2002 a whole number of pilot demonstration projects aimed at reducing consumption of thermal energy and hot water was successfully carried out. Building on the success of these projects the Government intends to develop a strategy to encourage investment in reconstruction of buildings and to promote energy efficiency measures. This process is driven by enhanced energy efficiency in the construction sector, reduced dependence on import of fuel and abatement of the energy sector impact on the environment.

Since 1997, the Project “Rehabilitation of Power Supply and Central Heating Systems” has been implemented in the Republic, with the project cost of the first stage amounting to USD 20 mln, financed by the IDA, the Asian Bank for Reconstruction and Development, DANIDA, and the Swiss Government. Under this project the renovation of heat stations in the residential sector of the city of Bishkek, the rehabilitation of the heat equipment at the CHPP and the main heating network in the city of Bishkek is carried out with the assistance of the TACIS Programme, the Governments of Denmark and other countries. In addition, with the assistance of the Asian Bank of Reconstruction and Development, modernisation of boiler plants in schools, educational institutions, hospitals and child welfare institutions of the Kyrgyz Republic is underway.

The Government of Norway is actively involved in development of small hydro power plants (HPP) in the Republic of Kyrgyzstan. In particular, it has built a number of small hydro power plants in the Naryn region. In addition, now it intends to set up a fund to finance development of small and medium-size HPPs. For this purpose it wants to open an account with one of the commercial banks of the country so that in future this financial institution could help minimise the risks associated with lending and guarantee full return of loans.

The UNDP has developed a special programme to promote development of small energy and energy efficient technologies. Under the UNDP auspices a round table discussion focusing on “Development Prospects of Small Energy and Renewable Energy Sources” was held on October 16, 2008. The UNDP/GEF implements the project on Improvement of Energy Efficiency in Buildings and Heat and Hot Water Supply, which focuses on supporting measures related to promoting energy efficiency in district heating, hot water supply and use of all types of energy in buildings. The UNDP also carries out the project on Promotion of Renewable Energy Sources in Remote Regions of Kyrgyzstan and assists in preparation and publication of guidance handbooks, in particular on bio-installations.

Some donors provide assistance in development and installation of bio facilities. Today Japan-sponsored bio-installations project is being implemented in the Republic. Within the framework of this project three pilot installations in the Tchuja region are being built.

In 2008 the German Technical Cooperation launched the research programme to explore the potential of Kyrgyzstan in the field of energy efficiency and renewable energy sources (RES) with a view of providing further technical assistance to the country. In general, today no public authority has full information on donor activities in the field of promotion of energy efficient technologies and renewable energy sources. In addition, since Government paid little attention in the past to this issue, donors' activities were organised sporadically without any coordination by the State authority dealing with this issue.

4.6. EE Monitoring

The ministries and agencies dealing with the implementation of the energy efficiency policy carry out also the monitoring in this area. Besides, the strict and comprehensive monitoring of all the projects which are funded by international organisations and programmes has been organised. Unfortunately, there is not yet a system for monitoring of implementation of the overall energy efficiency policy in the Republic of Kyrgyzstan.

The system of monitoring and progress assessment of implementation of the Programme of Promotion of Energy Efficiency in the Republic of Kyrgyzstan for the period of 2009-2015 is intended to monitor. A set of indicators which are based on predicted targets by 2015 has been defined to assess the progress in each strategic objective of the Programme. In addition, members of the Government and heads of public authorities and regional administrations are personally responsible for achieving results in their areas of competence. (see Annex 4). There is also division of responsibilities among public authorities for assessing the progress on established indicators, as well as the period of collection of actual statistical data on them.

This monitoring and assessment system allows supervising entirely the implementation of the Programme by identifying well in advance those public authorities which should be responsible for the timely implementation of Programme.

This monitoring and assessment system also entails the introduction of common reporting forms and procedures. This would allow the regular collection of uniform statistics on the progress in implementation of the Programme. For these purposes the Ministry of Industry, Energy and Fuel Resources of Kyrgyzstan will hold review meetings to discuss the progress. These review meetings scheduled are held in accordance with the approved annual schedule. The progress reports on implementation of this strategy document and information on specific activities will be presented and discussed at such meetings. Based on the results of such review meetings, some incentive measures or administrative actions will be taken with respect to those responsible for execution of the Programme. In addition, following the results of the annual progress report the Programme itself can be adjusted in terms of its objectives, specific indicators, development of new activities and deadlines etc. Such proposed amendments need to be justified and substantiated on the basis of practical experience gained in the implementation of the Programme, analytical rationale and calculations, as well as new circumstances.

The Ministry of Industry, Energy and Fuel Resources is responsible for compilation of all statistical information. For this purpose the Ministry will establish on the basis of the Public Platform the sustainable communication and information exchange, including through the website, with all the parties concerned and involved in the implementation of the Programme. In addition, the State will conclude public contracts for various studies and surveys with research institutes and think-tanks to assess the current situation in the field of energy efficiency in general

and in specific areas. The data base on all the projects currently implemented in the Republic in the field of energy saving technologies and renewable energy sources has to be created. This data base should contain the information on financial and technical assistance provided to Kyrgyzstan by the donors in this area. The State will be also interested in enhancing coordination of the donor assistance within the framework of the Programme.

Summary Table III: Energy Efficiency Policies

Please indicate in the table (with X) which status is applicable regarding the following issues concerning energy efficiency policies.

Energy efficiency policies	Yes	No	Partly
Has an energy efficiency policy been developed?	X		
Is energy security a driving force for energy efficiency?			X
Is climate change/environment a driving force for energy efficiency?	X		
Is sustainable development a driving force for energy efficiency?			X
Is employment creation a driving force for energy efficiency?			X
Is industrial competitiveness a driving force for energy efficiency?	X		
Is export of technology a driving force for energy efficiency?			X
Is comfort perceived as a priority for improving energy efficiency?	X		
Are international obligations a driving force for energy efficiency?			X
Is there a special fund for energy efficiency?	X		
Is there an energy efficiency law?			X
Is energy efficiency incorporated in other legislation?			X
Have national targets been formulated?		X	
Is there international cooperation in the field of energy efficiency policies?	X		

5. ENERGY EFFICIENCY INSTRUMENTS AND MEASURES

5.1. Cross-Sectoral Instruments and Measures

On the basis of annual plans for implementing measures for energy efficiency improvement the following activities are carried out: research and practical work, development of legal, regulatory and technical documentation. These activities are carried out by research institutes and educational institutions, by companies and scientific and expert groups established for this purpose.

The issues of financial and strategic planning relating to the implementation of energy saving measures are being resolved, building renovation and power and heat supply rehabilitation projects are implemented. Industrial technological process improvement is underway.

Great attention is paid to the use of local and renewable energy sources.

Table 5.3. Cross-Sectoral Instruments and Measures

TYPE OF INSTRUMENTS	PROGRAMME DESCRIPTION AND AIMS	IMPLEMENTATION STATUS	BUDGET*	(EXPECTED) RESULTS
Information and motivation	Public awareness programme, training, seminars, establishment of consultancy centres	Ongoing	-	Greater public awareness of energy efficiency
Advisory services market development	Training, intensification of demand	Ongoing	-	Advisory services market development

* Please, provide budget in Euros or USD and specify the currency used.

5.2. Measures and Instruments in the Residential Sector

A pilot residential energy efficiency project implemented with the assistance of “Friedman and Johnson” (1995-1996) helped to identify the problems in the area of multifamily buildings heat supply. Technical standards of wall erection for external thermal insulation have been developed. At present, a project seeking to use waste in district heating systems through the construction of a waste-processing plant is under discussion.

An Energy and Water Efficiency Demonstration Zone was arranged in Bishkek in 2000 in the framework of the UNECE project “Energy Efficiency 21” as a constituent element of the Special Programme for the Economies of Central Asia (SPECA). The objective was to demonstrate the technical capabilities of new equipment and modern technologies designed to conserve all types of energy resources, and run organisational and financial schemes for high energy efficiency demonstration projects. During 2000-2002, a number of pilot demonstration projects aimed at reducing heat and hot water consumption were successfully implemented.

Table 5.4. Measures and Instruments in the Residential Sector

TYPE OF INSTRUMENTS	PROGRAMME DESCRIPTION AND AIMS	IMPLEMENTATION STATUS	BUDGET*	(EXPECTED) RESULTS
Financial	Long-term loans for EE improvement	Ongoing	USD 13 mln	Energy efficiency improvements
Information and motivation	Public awareness programme, training, seminars, establishment of consultancy centres	Ongoing	-	Greater public awareness of energy efficiency
Regulatory	Control over construction in accordance with construction codes	Ongoing	-	Energy efficiency improvements
Advisory services market development	Training, promotion of demand	Ongoing	-	Greater public awareness on EE, advisory services market development

* Please, provide budget in Euros or USD and specify the currency used.

5.3. Measures and Instruments in the Industrial Sector

The key objective is the reconstruction and modernisation of the energy sector and the building materials industry. A large-scale rehabilitation of the Bishkek CHPP and main district heating networks, as well as the construction of new and reconstruction of existing substations, and a revamp of distribution power networks are carried out in the energy sector.

Table 5.5. Measures and Instruments in the Industrial Sector

TYPE OF INSTRUMENTS	PROGRAMME DESCRIPTION AND AIMS	IMPLEMENTATION STATUS	BUDGET*	(EXPECTED) RESULTS
Regulatory	Central heating rehabilitation programme	Ongoing	-	Loss reduction in main heat supply networks, rehabilitation of heat supply networks
Regulatory	Power grid loss reduction programme	Ongoing	-	Improvement of accounting and billing in energy companies
Information and motivation	Sector specific courses and seminars	Continuous	-	Greater producer awareness and interest
Information and monitoring	Industrial EE monitoring system development	Continuous	-	Definition of specific EE objectives

* Please, provide budget in Euros or USD and specify the currency used.

5.4. Measures and Instruments in the Services Sector

Energy audits are carried out in the service sector buildings: hospitals, schools, and kindergartens; activities are also underway in the field of equipment upgrading.

For the purpose of improving energy efficiency, seminars on renovation of heating systems in hospitals, schools, and kindergartens are held.

In the process of meeting energy efficiency requirements relating to the reduction of power consumption by household electric appliances, consumption labelling of household electrical appliances must be made in accordance with the Republic's standards.

Table 5.6. Measures and Instruments in the Services Sector

TYPE OF INSTRUMENTS	PROGRAMME DESCRIPTION AND AIMS	IMPLEMENTATION STATUS	BUDGET*	(EXPECTED) RESULTS
Information and motivation	Courses and seminars	Continuous	-	Greater awareness and interest

* Please, provide budget in Euros or USD and specify the currency used.

5.5. Measures and Instruments in the Transport Sector

The following energy efficiency measures have been implemented: restrictions on second-hand motor vehicle imports; annual motor vehicle inspections; upgrading of public motor vehicle fleets; information and training.

Table 5.7. Measures and Instruments in the Transport Sector

TYPE OF INSTRUMENTS	PROGRAMME DESCRIPTION AND AIMS	IMPLEMENTATION STATUS	BUDGET*	(EXPECTED) RESULTS
Financial	Government assistance to urban transport development	Continuous	-	Lower fuel consumption and exhaust levels
Information	Information and training, promotion of rational use of fuel	Continuous	-	Lower fuel consumption and exhaust levels
Regulatory	Exhaust gas compliance with existing standards	Continuous	-	Emission regulation

* Please, provide budget in Euros or USD and specify the currency used.

Summary Table IV: Measures and Instruments

Sectors	Measures and Instruments					
	Normative	Financial	Information/awareness	Education/advisory	Voluntary agreements	Research and development
Residential		X	X	X		
Industry	X		X	X		
Services			X	X		
Transport	X	X	X	X		

6. ACTORS IN ENERGY EFFICIENCY

The Ministry of Energy of the Kyrgyz Republic is a government executive agency responsible not only for sector economics but also for the policies in the energy sector.

Various Ministries, authorities and energy companies are also involved in the implementation of energy efficiency policy:

- the Ministry of Ecology and Emergency Situations;
- the Ministry of Transport and Communications;
- JSC “Electric Power Stations” generation company;
- JSC “National Electric Grid of Kyrgyzstan” transmission company ;
- Power distribution companies: JSC “Sevelelectro”, JSC “Vostokelectro”, JSC “Oshelectro”, and JSC “Jalal-Abadelectro”;
- JSC “Kyrgyzgas”;
- JSC “Kyrgyzneftegas”.

The Ministry of Energy of the Kyrgyz Republic is responsible for the activities related to solving the problems of energy sector development; tariff and price making and approval of tariffs and prices in the energy sector; development of the National Energy Programme; development, revision and implementation of energy efficiency measures and programmes and coordination of international assistance to the implementation of projects under various programmes.

The State Energy Inspectorate under the Ministry of Energy of the Kyrgyz Republic exercises control over rational and efficient use of energy and gas, as well as over compliance with power installation O&M and safety rules in the Kyrgyz Republic by energy companies and entities.

In addition, the following entities operate in the energy field:

- the State Statistical Committee under the Government of the Kyrgyz Republic;
- the Kyrgyz Scientific and Technological Centre “Energy” under the Ministry of Energy of the Kyrgyz Republic;
- the Kyrgyz State Construction, Transport and Architecture University;
- the Kyrgyz National Technical University.

The problems associated with energy efficiency measures are subject to annual reviews and approval by the above-mentioned entities which sum up the implementation results and submit proposals on their acceleration and improvement.

Coordination Centre has been set up to provide the appropriate organisational support for the implementation of the Energy Conservation Programme in the Republic of Kyrgyzstan during 2009-2015, which is also called for ensuring system management of the implementation of the Programme. This Coordination Centre consists of:

- representatives of the public organisations,
- representatives of the local self-government institutes,
- representatives of energy companies,

- representatives of the academic community, and
- representatives of the private sector active in the production of energy efficient technologies and materials.

The recently established Department of Energy Efficiency at the Ministry of Industry, Energy and Fuel Resources will assume the functions of the Executive Board of the Coordination Centre. This Department will be dealing with the overall monitoring and review of the progress in implementation of the Programme and with preparation of consolidated reports for the review meetings.

7. RENEWABLE ENERGY SOURCES

7.1. RES Potential and the National Policy for RES Utilisation

The Law of the Kyrgyz Republic on Renewable Energy Sources No. 283 was adopted on December 31, 2008.

The Law determines legal, organisational, economic and financial bases and mechanisms regulating the relations between the State, producers, suppliers and consumers of RES, production equipment and installations for RES utilisation.

The objectives of this Law are: development and utilisation of renewable energy sources, energy structure improvement, diversification of energy resources, improvement of the social condition of the population, ensuring energy security of the Kyrgyz Republic, environmental protection and sustainable development of the economy.

The subjects regulated by this Law include production, consumption and distribution of the RES-based thermal energy, electricity and fuels, as well as the production and supply of equipment and technologies in the field of renewable energy sources in the territory of the Kyrgyz Republic.

8. ENERGY AND ENVIRONMENT

8.1. General Trends and Objectives

Environmental protection measures in the Kyrgyz Republic cover all major ecological problems of our time, and attach great importance to resolving them in the order of their priority. Some of the measures have already been implemented, while the majority are still in the process of implementation. However, the national economic development policy, restructuring of the economy and the urgency of resolving environmental problems have called for the definition of new political objectives and priorities in the field of environmental protection and the selection of the most efficient ways to achieve them. As a result, the Law on Environmental Protection was adopted in 1998, and the National Energy Programme of the Kyrgyz Republic for 2008-2010 and the Strategy of Fuel and Energy Complex Development until 2025 envisage measures for the protection of the environment against adverse impacts of energy sector installations.

The Environmental Strategy aims at creating prerequisites for sustainable development of the country, for preservation of a clean and sound natural environment, biological and landscape diversity and the optimum nature management, including the following:

- protection of water resources;
- air protection, including the reduction of CO₂, SO₂ and NO_x;
- protection of soil from pollution;
- waste management;
- creation of a waste management system;
- protection from physical pollution;
- reduction of city noise levels.

The environmental policy provides for the promotion of energy saving and utilisation of renewable energy sources resulting in the reduction of environmental pollution through the improvement of fuel combustion processes and conversion to environmentally cleaner fuels, and the promotion of other special measures for the prevention of atmospheric and soil pollution, specified in the National Energy Programme of the Kyrgyz Republic and in a number of documents of the Ministry of Ecology and Emergency Situations of the Republic.

For example, new energy facilities including power stations and boiler plants should only be built on the basis of a thorough study of energy demand, the availability of production capacity, types of fuel and its deliveries, as well as acceptability, security and safety from an environmental perspective.

In 2007, carbon dioxide emissions of in the Kyrgyz Republic were substantial (estimated at 17.5 million tons), including: sulphur dioxide – 7.1 mln tons, Nitric oxides (NO_x) – 3.2 mln tons, carbon monoxide (CO) – 4.5 mln tons.

The energy sector and the freight and passenger road transport are the main sources of carbon dioxide emissions.

CO₂ emissions also occur in industry where the main sources of CO₂ are cement, lime and brick production.

Rather large volumes of CO₂ emissions result from changes in land use. Thus, the main sources of methane include the agricultural sector and waste.

Nitric oxides (NO_x), carbon monoxide (CO) and non-methane volatile organic compositions (NMVOC) are mainly released in the energy sector in the process of organic fuel combustion and oil refining.

The main environmental policy trends in the energy sector of the Kyrgyz Republic in the near future will be the following:

1. A balanced pattern of primary energy supplies to consumers and an increase in the share of electricity and local coals, with a stable share of natural gas mainly intended for the population and a small-scale use of renewable energy sources, mainly on the coast of the Issyk-Kul Lake.
2. Development of measures for reducing SO₂ and NO_x emissions.
3. Promoting the use of environmentally safe fuels and implementation of measures aimed at the reduction of environmental pollution.
4. Establishment of stationary systems for environmental pollution monitoring at major CHPPs and boiler plants, as well as across the Kyrgyz Republic.
5. Ensuring environmental regulation in the energy sector through the definition of economic priorities.
6. Further improvement of the regulations and the tax system relating to environmental protection and allocation of a certain amount of received funds for the implementation of measures designed for the reduction of environmental pollution.

8.2. Environmental Policy Implementation

The general environmental policy in the Kyrgyz Republic is developed and implemented by the Ministry of Ecology and Emergency Situations. The Ministry of Economic Regulation of the Kyrgyz Republic is responsible for processing hazardous waste. Both Ministries together with OJSC “Electric Power Stations” develop and approve regulatory acts on the installation of energy equipment, work out programmes to promote and use local fuels, create favourable conditions for the development of environmentally friendly production, propose waste-free technologies and build up an environmentally friendly industry.

8.3. Environmental Levies and Taxes

For the implementation of economic and ecological decisions the following economic instruments must apply:

- natural resource taxes;
- charges for emissions of harmful substances into the atmosphere;
- penalties for exceeding emission limits;
- Natural resource (minerals) taxes are paid to the State Budget. It directly links the tax with the amount of extracted resources.

The Law of the Kyrgyz Republic on Protection of the Environment (1998) sets the rates for all air pollutants – SO₂, NO_x and substances containing particles included in the list of principal environmental pollutants. All other environmental pollutants (except CO₂) are divided into four groups depending on the level of their hazardousness.

The penalty for unlawful (unlicensed) extraction of minerals is 10 times higher than the regular tax. Penalties for exceeding the limit of environmental pollution may be imposed in two cases: if an environmental inspection finds evidence of pollution which has not been reported and if the enterprise exceeds the permitted level of environmental pollution.

9. ASSESSMENT AND FUTURE PLANS

9.1. Successful Instruments

Residential sector. Long-term and accessible financing (including limited subsidies) coupled with a well-organised system of financial security and public awareness campaigns may turn out to be an efficient instrument for promoting energy efficiency improvement on the demand side. Actions should be taken for the large-scale provision of consumers with control and metering systems of fuel and energy consumption, as well as regulator devices.

Industrial sector. Introduction of new energy efficient technologies; modernisation of obsolete plants and equipment; thermal insulation of industrial and non-industrial buildings; installation of control, metering and regulation systems; implementation of measures relating to the general quality of control and management; introduction of special schemes of incentives to stimulate companies in the field of energy efficiency.

Services sector. Reduction of energy consumption in public buildings (hospitals, schools, etc.) through measures involving technological improvements of heat supply systems, external thermal insulation (roof insulation and, in certain cases, insulation of external walls, as well as door and window repairs or replacements) and other improvements of existing layout solutions.

Transport sector. Information and safeguarding of consumer interests (fuel prices, energy saving regulatory and legislative acts).

9.2. Barriers

Depending of the sector, it is necessary to overcome a number of administrative, financial, social and economic barriers with the help of new policy directions and measures in the area of energy efficiency.

Residential sector. Insufficient awareness and lack of knowledge to understand energy efficiency objectives. Lack of long-term financing opportunities.

Industrial sector. Investment in the industrial production (introduction of new energy efficient technologies and equipment) in the Kyrgyz Republic is not sufficient to allow for equal competition with Western European and CIS markets.

Services sector. Major investments are needed.

Transport sector. Ageing of motor vehicles and, as a result, increasing hazardous gas emissions.

9.3. Improvements

Since the available local energy sources are not sufficient for the full supply of the Republic's economic sectors, the key requirements for their efficient operations include efficient use and conservation of energy resources, as well as expansion of financial and human resources.

The main energy saving areas specified in the National Energy Programme for 2008-2010 and the Strategy of Fuel and Energy Complex Development until 2025 are the following:

- drafting of legislative and regulatory acts and material (for implementation of the requirements of the Law of the Kyrgyz Republic on Energy Saving) on efficient fuel and energy use;

- enforcement of standards and certification rules for energy, heat and electrical engineering equipment and products;
- reconstruction of heat supply systems and improvement of the thermal insulation of buildings.

In addition, it is necessary to develop regulatory documentation, including energy certificates, determining all energy characteristics of buildings. It is envisaged to carry out energy audits of educational and health care institutions, as well as energy audits of industrial facilities, small and medium businesses.

9.4. Recommendations

While implementing the National Energy Conservation Programme, it is recommended to carry out the following energy efficiency measures:

- development and adoption of legislative and regulatory acts and materials on efficient use of energy (to implement the provisions of the Law of the Kyrgyz Republic on Energy Saving);
- revision and adjustment of the National Energy Programme in terms of energy efficiency;
- development of measures and activities necessary for the implementation of the Programme;
- compliance with legal and regulatory documentation governing standardisation and certification requirements for energy, electrical and thermal engineering equipment and products, power consumption labelling of household appliances and determination of the efficiency of boiler plants using various fuels;
- development and application of legal, technical and regulatory documentation and organisational measures promoting introduction and production of energy saving facilities and measures;
- analysis of the statistical system of energy consumption accounting, as well as the development and adoption of recommendations and documentation to improve this system and assess rational energy use;
- development and enforcement of a procedure for conducting energy audits and monitoring of buildings and industrial facilities, conducting energy audits and monitoring at various industrial facilities with a view to analyse efficient energy use, adopt and implement efficiency improvement measures and projects;
- preparation of a demonstration project of a small-scale thermal co-generation plant (jointly with a Danish company), as well as a small hydro rehabilitation project;
- preparation and implementation of educational and training programmes, studies and methodology measures in the field of energy efficiency; preparation and issuing of publications on the above-mentioned subjects;
- organisation and conduct of courses to train specialists in the field of energy sector efficiency improvement;
- arrangement and conduct of public awareness campaigns aimed at improving energy efficiency, continued promotion of energy saving by the mass media.

**Energy Charter Protocol on Energy Efficiency and
Related Environmental Aspects PEEREA**

Kyrgyz Republic

REGULAR REVIEW 2011

Part II:

**Indicators on Energy, Energy Efficiency,
Economy and Environment**

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a. Introduction

This document is Part II of the Review Format of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). Part I covers qualitative data on energy and energy efficiency policies, measures and instruments, and actors. This part focuses on quantitative data.

Conversion of units:

Units are converted to Mtoe using the general conversion factors for energy.

1 Mtoe = 11.63 TWh

1 Mtoe = 4.1868x10⁴ TJ;

1 Mtoe = 10⁷ Gcal

b. Macro-Economic Data

Table b.1. Gross Domestic Product

(billion USD 2000)

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
GDP	1.04	1.37	1.44	1.44	1.54	1.65	1.65	1.70	1.84	1.98
GDP (PPP)	5.06	7.36	7.75	7.75	8.29	8.88	8.86	9.13	9.88	10.64

Source: IEA statistics, electronic version, 2010

Table b.2. Number of Inhabitants

(million)

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Population	4.59	4.92	4.96	4.99	5.04	5.09	5.14	5.19	5.24	5.28

Source: IEA statistics, electronic version, 2010

c. General Energy Data

Table c.1. General Energy Data

(Mtoe)

Indicators	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Primary Energy Production	1.26	1.44	1.35	1.20	1.40	1.48	1.45	1.49	1.43	1.19
Net imports	1.26	0.96	0.82	1.30	1.30	1.30	1.34	1.51	1.97	2.08
Total Primary Energy Supply (TPES)	2.38	2.40	2.21	2.50	2.69	2.74	2.66	2.68	3.07	2.86
Total Final Consumption (TFC)	1.78	1.81	1.56	1.88	2.02	2.1	2.1	2.13	2.46	2.36
TPES/GDP (toe/'000 USD)	2.29	1.75	1.53	1.73	1.74	1.66	1.61	1.58	1.67	1.44
TFC/GDP (toe/'000 USD)	1.71	1.32	1.08	1.30	1.31	1.27	1.27	1.25	1.34	1.19
TPES/population (toe/capita)	0.52	0.49	0.45	0.50	0.53	0.54	0.52	0.52	0.59	0.54
TFC/population (toe/capita)	0.39	0.37	0.31	0.38	0.40	0.41	0.41	0.41	0.47	0.45
Total Electricity Consumption	0.81	0.80	0.72	0.69	0.85	0.72	0.81	0.90	0.80	0.66
Electricity produced from RES	n.a									
Heat produced from RES	n.a									

Source: IEA statistics, electronic version, 2010

d. Sector Consumption: Parameters and Energy Efficiency Indicators

Table d.1. Total Final Energy Consumption (TFC), by End-Use Sector

(ktoe)

Sectors	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Residential	164.26	202.19	156.00	147.83	207.69	214.14	253.61	280.10	242.00	197.28
Industry	464.59	462.20	419.69	615.05	709.40	697.77	672.49	673.40	662.22	631.91
Services	n.a									
Transport	254.20	176.92	165.21	185.88	244.50	316.80	305.65	258.48	487.26	505.59
Agriculture	243.38	285.35	225.41	213.62	215.69	184.81	218.87	241.75	208.89	170.28
Other	654.56	679.43	590.89	717.88	645.49	691.20	653.10	676.43	864.48	859.64
Total (TFC)	1780.99	1806.08	1557.20	1880.27	2022.78	2104.72	2103.72	2130.16	2464.85	2364.70

Source: IEA statistics, electronic version, 2010

* Other includes Non-specified other sectors and Non-energy use

**Table d.2. Energy Efficiency Indicators for Households:
Final Consumption in the Residential Sector, by Energy Source**

(ktoe)

Indicators residential sector	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total Final Consumption	164.26	202.19	156.00	147.83	207.69	214.14	253.61	280.10	242.00	197.28
a. Electricity	164.26	202.19	156.00	147.83	207.69	214.14	253.61	280.10	242.00	197.28
b. Heat										
c. Oil products										
d. Gas										
e. Coal										
f. Combust. Renew. & Waste										
g. Others*										
Floor Area ('000 m ²)										
No. of dwellings ('000)										
Residential use per dwelling (toe/dwelling)										
Residential use per surface (toe/m ²)										

Source: IEA statistics, electronic version, 2010

**Table d.3: Final Consumption in the Industry Sector in 2008, by Energy Source
(or latest year available)**

(ktoe)

Indicators industrial sector	Mining	Manufacturing							Construction	Total
		Iron and steel	Chem. and petrochemical	Non-ferrous metals	Non-metallic minerals	Food and tobacco	Paper pulp and print	Other		
Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	5.25	0.00	5.76	6.62	16.77	10.84	0.77	0.00	0.09	4.39
Heat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combust. Renew & Waste	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	5.25	0.00	5.76	6.62	16.77	10.84	0.77	0.00	0.09	4.39

Source: IEA statistics, electronic version, 2010

e. CO₂ Emissions

Table e.1. CO₂ Emissions from Fuel Combustion

Indicators	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total CO ₂ emissions (Mtonnes/year)	4.43	4.45	3.73	4.78	5.12	5.5	5.04	4.83	6.11	5.92
Share electricity and heat production (%)	48%	44%	47%	34%	32%	30%	30%	31%	26%	23%
Share residential sector (%)	n.a									
Share industrial sector (%)	13%	20%	17%	30%	33%	32%	32%	31%	26%	29%
Share transport sector (%)	16%	11%	12%	11%	13%	16%	17%	15%	22%	24%
Share other sectors (%)	24%	25%	24%	25%	22%	22%	21%	23%	26%	24%
Total CO ₂ /GDP (kg/USD 2000)	4.24	3.25	2.59	3.31	3.32	3.33	3.06	2.84	3.32	2.99
Total CO ₂ /capita (tonnes/inhabitant)	0.96	0.91	0.75	0.96	1.02	1.08	0.98	0.93	1.17	1.12
Total CO ₂ / TFC (tonnes/toe)	2.49	2.46	2.39	2.54	2.53	2.62	2.40	2.27	2.48	2.51

Source: IEA statistics, electronic version, 2010