Appendix A-24

STATUS OF THE ELECTRICITY POOL IN CENTRAL ASIA, AND THE PROBLEMS OF EFFICIENT JOINT USE OF WATER AND ENERGY RESOURCES OF THE SYR DARYA BASIN

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June 1999

Prepared for:

Central Asia Mission
U. S. Agency for International Development

Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ)
Partners: International Resources Group, Winrock International, and Harvard Institute for International Development
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Task Order No. 813
Contract No. PCE-I-00-96-00002-00

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Contents

1. Analysis of Current Operation of the EP CA Energy Systems

The Electricity Pool of Central Asia (EP CA) formed in the eighties as a Power Grid of four Central Asian republics and South Kazakhstan is a continuously developing high-automated complex of electric power plants and electricity network. The complex has a common operation regime, integrated centralized operational dispatcher and service management, common planning development system, an integrated system of economic ties, information channels and prescriptive technological control.

The EP CA in the existing borders was completed in 1991 after the 500 kV electricity ring, a very important element of the Electricity Pool, had been constructed. The main 110 kV-500 kV transmission lines unite for the parallel operation the electric power systems of the five countries: Uzbekistan, Tajikistan, Kyrgyzstan, Turkmenistan and South Kazakhstan.

The parallel operation of the EP CA 83 power plants, including 29 thermal, 48 hydropower power plants of 25,122 MW of installed capacity allows to take the advantages from the energy system joint operation. The main advantages are: the decrease of the maximum aggregate load; lower needs for installed and reserve capacity of power plants, and structure rationalization; optimization of the power plants operation modes to reduce fuel demands and improve environmental characteristics for power production; maintenance of high frequency, reliability and sustainability of energy systems.

The EP CA characteristic feature is the structure of generating capacities which is essentially different in the Central Asian countries. The power and capacity equilibrium is maintained within the Electricity Pool, and this defines their integrating role as the basis for energy security in the region.

This is very important for the region, as the EP CA is functioning and developing owing to the richest water and fuel energy resources, which are spotted both on the territories within a country and in the countries.

Kazakhstan, for example, enters the world's top ten countries for the supply of coal and hydrocarbon raw materials. 98% of explored reserves of crude oil with gas condensate are concentrated in the West of Kazakhstan, and they are evaluated as much as 12-13 billion tons of oil, and 2 trillion m^3 of gas. 7 billion tons of oil underlay in the Kazakhstan sector of the Caspian Sea, 20% are gas occurrences.

Coalfields are concentrated in South and Central Kazakhstan. These are the Ekibastuz, Karaganda, and Shubarkol basins, which have 77% of total coal reserves in the Republic. Coal industry satisfies over 80% of the fuel demands for the energy sector, but gas and fuel oil are used only within 12-13%.

Hydropower resources amount to annually generated 62 billion kWh and are concentrated in the East and SouthEast of Kazakhstan, and they are used only within 11%. The share of the hydropower plants in power generation is 6-7%.

On the whole, the installed capacity of power plants is 18.5 million kW, 93% of capacities are generated at thermal power plants. For 1991-1995, only 50% of the installed capacity was used. A greater part of power plants were built 25-30 years ago, the equipment is outdated "morally and physically", the wear and tear of the capital assets is 51%.

The electric power generation has been down to 66 billion kWh and is 75% of the 1990 level. Coal-dust power plants constitute 79%, gas-and-oil-burning power plants are 12-13%, HPPs – 6-7%, atomic power plants are 0.7 percent.

The length of the electricity transmission lines of all voltage classes totals 460 thousand km, the international lines *Siberia-Kazakhstan-Ural* of 1,150kV operate also. The Kazakhstan energy system was developing within the Power Grid of the Soviet Union, in which the power plants were located based on obtaining the over-all-system effect and in the areas of big fuel fields. Therefore, the energy system of the Republic was comprised of three regional systems:

North Kazakhstan, which networks six oblasts and where 1,900 km of unique main transmission lines of 1,150-500 kV are under work; they provide strong electric communications with the Ural and Siberia's energy systems. This system is being developed in the southern direction to electrically communicate North and South Kazakhstan, and strategically link the system with the EP CA. On this area main electric power sources have been concentrated, they constitute 13.5 million kWh, or 73% of total capacity. The region has basic coalfields (167.7 billion tons of geologic reserves and 38.6 billion tons of balance reserves). Thus, this region is energy- excessive.

South Kazakhstan, pooling four oblasts by an electricity network does not dispose of sufficient primary energy resources, and the region is tied with the energy systems of Kyrgyzstan and Uzbekistan, and it enters the EP CA, has an electric communication with the North Kazakhstan's energy system, which does not completely ensure the energy system reliability and sustainability. The power plants capacity is 3.15 million kWh; they operate based on the import fuel (coal, gas, and fuel oil). The region is 40% energy-deficient.

West Kazakhstan also pools four oblasts by an electric network, and has extended energy ties with the Russian energy systems. This region is 90% energy-deficient. South Kazakhstan is supplied only with 10.5% of installed capacity, and the region is chronically undersupplied with energy. Nevertheless, the region has 98% of carbon raw material stores, and the targeted industrial complex *crude oil production--oil refinery--petroleum chemistry--organic synthesis industry* will require a sharp "spurt" of electric power capacity.

The capacities existed in the past were not efficient to fully satisfy the electric power needs, and the deficit of balance of trade in 1990 was 12.4 billion kWh, including 4-5 billion kWh supplied from Kyrgyzstan to the South Kazakhstan users.

Transition to the foreign currency for inter-system power transfers caused the decrease of inter-system transfers from EP CA. For 1995-1998 they cut as much as five times, electric power supply by 6 times.

Because of the economic crisis and the fall of the electric power demands the home capacities seemed to cover the electric power needs completely. However, deficient financial funds, break-up of economic ties, intermittence with equipment and store part procurements sharply decreased the repair and maintenance quality that caused in 1998 the reducing of the electric power production in South Kazakhstan to 51% of the 1990 line.

The crisis situation has been worse off because of the raised fuel prices, and this caused a subsequent rise in electricity and heat cost value, and correspondingly, profit reduction and operation at a loss of the energy utilities despite the tariff increases. The consumers' inability to pay brought to huge bill receivables for all user categories, and therefore to account payables for the energy utilities.

To ease the deadlock and implement economic reforms the Republic of Kazakhstan restructured and privatized the energy industries and facilities. Since 1995 foreign companies privatized 28 power plants (SDPPs[1], CHPPs[2], HPPs), The Kazakh Electricity Grid Operating Company (KEGOC) was established, regional network distribution companies (NDC) and district electrical networks (DEN) were formed as independent agencies. Because of those reforms, over 70% of energy capacities appeared to be a private property of the AEC Corporation, Tractebel, etc.

At stage I the electric power sector crisis aggravated and caused the maximum electricity load transmission in the fall-winter period, supplemented by the mass power cuts, because of electricity and heat payment defaults, raised fuel prices, and capacity and electricity deficits. The laws on Electric Power Industry and Energy Saving have been developed and approved. The Energy Development Concept for Kazakhstan was developed, it laid down the guidelines for the development and restructuring of the power sector.

Stage II is remarkable for the development and approval by the Governmental Decree of 31 July 1997 the Program of a Future Development of the Electricity Market for 1997-2000. The Program determined main directions for the establishment of the electricity market model, and the phased Plan of Actions of the Kazakhstan Government for the Electricity Market Development. The Plan is being implemented to gradually improve the situation and establish the wholesale and retail electricity market associated with a free formation of wholesale electricity prices. Large energy users have now the right to choose the energy supplier basing on the contractual basis, hence, the establishment of the competitive market is in progress and it contributes to stabilization of the energy-carrier tariffs and prices.

To form the reliable and effective electricity market SC KEGOC developed the rules for the wholesale electricity and capacity market in the Republic of Kazakhstan.

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[1] SDPP—State District Power Plant

[2] CHPP—Central Heating and Power Plant

Uzbekistan has unique fuel and energy stores, and it is a forehand country in the world for crude oil and natural gas reserves. The explored reserves are about 2 trillion m^3.

The accent is given to five dominant oil- and gas-bearing regions: **Ustyurt, Bukhara-Khivin, South-West-Gissar, Surhandarya, and Fergana** regions, in which 160 oil-and-gas-promising fields have been explored. About 60% of the territory in the Republic have good exploration prospects.

Special attention deserves the fact that oil and gas fields in Uzbekistan are remarkable for different factors such as well efficiency, production prime cost. This stands out from the deposits of the adjacent Republics, and allows relying on the efficient deposit development and high profitableness.

Uzbekistan has big coal deposits, and it is the second best in Central Asia for the geological holdings. The coal is mined in three deposit places: Angren, Shargun and Baisun, having 2 billion tons of projection reserves. Hydropower resources are evaluated as resources which can generate 88.3 billion kWh of estimated hydropower a year, but only 6% are being generated.

The installed capacity of hydropower plants makes up 11.26 million kWh, including 87% of thermal-power and 12.6% of hydropower plant capacities. The length of the 0.4-500 kV electric transmission lines is 230.5 thousand km. 45.1 billion kWh, or 99.3% of the planned electric power, were generated in 1997; this constituted 102.5 % of the last-year level and 81.8% of the level of 1990. The tie electricity transfers essentially decreased, and this conditioned unfavorable transfer balance; the energy consumption was as much as 87 % of the 1990 level.

In the structure of the primary resources used for heat and power generation natural gas makes up 82.6 %, fuel oil – 13 %, coal – 4.4 %.

For 1997 the self-cost of electric power increased 1.5 times, heat power – 1.3 times, owing to the raised prices for fuel, material resources and equipment. Because of the rise in prices, electric and heat power tariffs are being reconsidered, based on the decisions of the Government of Uzbekistan. The Uzbek Government set payment terms based on contract prices. Consequently, in August 1997, electric power tariffs were changed for population. The increase of heat and power prime costs caused the decrease of profit in the energy sector.

However, the inventory ruled by the Uzbekistan Cabinet of Ministers (02/19/98) revealed that no unprofitable enterprises existed, and the economic conditions of the enterprises were satisfactory.

Since 1997 the Republic has started privatization of heating system enterprises that do not affect the system operation and which supply heat to groups of users. On the base of the enterprises and agencies that carry on design and survey, construction, erection, repair and supply works 13 joint stock companies were established, in which Minenergo manages the government shares. The “restructuring” of the controlling block of shares is to increase their share for a free trade, including their sale to foreign investors. Currently, the Government owns main energy projects, and as they are

strategically important for the economy and population, the energy sector will be restructured in two stages:

- At Stage 1, it is intended to transform the enterprises, entering the energy system and being structural units, to independent economic entities.

- At Stage 2 Minenergo is going to be transformed to a holding company, basing on the projects restructuring.

Turkmenistan is also one of the world's top ten countries, good for crude oil and natural gas reserves that are estimated more than 6.8 billion tons and 21 trillion m^3, correspondingly. Thus, gas-and-oil-burning thermal power plants of 2,548 thousand kWh total installed capacity appear to be the Turkmenistan energy basis. The Turkmen energy system is excessive. The electric power is exported to Kazakhstan by transit through the energy system of Uzbekistan. Electric power generation made up 9.4 billion kWh in 1997, or 64% of the 1990 level. For this period, there was decline by 3.3 times in electric power export, the electric power consumption decreased to 82.3 % of the 1990 level.

The extent of the electric network of all voltage classes is over 50 thousand km. The Turkmen energy system is connected with the Central Asian energy systems by 500 kV transmission lines. The State Energotechnological Corporation *Kuvvat* provides electric power generation, transport and allocation, Ministry of Energy and Industry regulates and manages electric power. Kuvvat comprises neccessary subdivisions on design, construction, repair, and operation of energy projects. Each velayat[3] has production associations (PA) responsible for generation, transport and distribution of the electric power. The issues of thermal power are guided by special subdivisions under jurisdiction of municipal bodies. The generated thermal power is supplied to the users at negotiated prices.

The Committee on Antimonopoly Activities and the State Price Committee regulate electricity tariffs.

The Turkmenistan energy complex is state-owned, and currently, they make preparations to introduce different forms of ownership taking into account statements and principles of the Treaty on Energy Charter, and development of a normative legal base.

Main water resources of the region are formed on the territories of Kyrgyzstan and Tajikistan, the rivers Syr Darya and Amu Darya, which fall into the Aral Sea, head in those countries also. The Syr Darya basin is highly regulated by the Toktogul long-period storage reservoir, and also by the Kairakkum, Chardara, Andizhan and Charvak reservoirs of seasonal storage with 24.6 m^3 of total operating storage. The reservoirs are regulated based on the irrigation farming interests. The hydropower potential of the rivers' basin in the region is about 554 billion kWh a year, including 293 billion kWh (or 53%) of the Tajikistan share, and 142 billion kWh (or 30%) of the Kyrgyzstan share. In Kyrgyzstan about 7% of potential hydroresource stores have been developed, in Tajikistan--4.6%.

[3] Velayat: Oblast in Turkmenistan

The Kyrgyzstan and Tajikistan oil and gas reserves are not significant. Coal reserves are mainly concentrated in hard-to-get mountain regions under hard mountain and geological conditions; thus, the reserves are evaluated as inefficient and not competitive if to compare them with other energy carriers. The Kyrgyz Republic ranks the best among the Central Asian countries with its estimated coal reserves. However, in the recent years the crude, gas, and coal productions have nose-dived.

The energy system of Kyrgyzstan operates parallel with the Electricity Pool of Central Asia. The installed capacity of electric power plants in the Kyrgyz Energy System is 3.6 thousand kWh, including 82,2 % of hydropower and 17% of thermal power capacities. The extent of the electricity transmission lines of all voltage classes is 72 thousand km including 35-500 kV transmission lines. The Kyrgyzstan energy system is tied with the energy systems of adjacent countries by the main transmission lines, and it forms the constituent of the 500-220 kV electricity ring in the EP CA. The downstream Naryn cascade of hydropower plants of 2.8 thousand kWh of total capacities with the long-period, seasonal and short-time (daily) storage reservoirs is involved. The Kyrgyz hydropower plants cover the variable electricity consumption schedules for the adjacent countries and regulate the frequency in the EP CA. The EP CA optimum operation regime is the regime of electricity mutual supplies, and maximum power generated at the hydropower plants during the vegetation period, if to consider the comprehensive use of the Naryn-Syr Darya hydropower resources, are taken into account in this respect. The concerted activities of all EP CA entities addressed to electric power mutual supplies and transit, frequency regulation and tariff policy play the crucial role to obtain such a regime.

The HPP share in total power generation did not exceed 70% in 1990-1991, but for the recent six years, it raised to 91%. The storage releases from the Toktogul reservoir for energy needs in a winter-fall time increased from 0.3 m^3 to 5.5 m^3. In this period the Toktogul reservoir is operating in the irrigation regime in summer to satisfy irrigation water needs of Uzbekistan, Kazakhstan, and Tajikistan; in winter it is operating in the energy regime to cover the Kyrgyzstan's increased electric power needs. As from 1991 the international relationships and mutual accounts became more complicated, national currencies were introduced, prices for crude oil, coal and gas grew, rail transport tariffs increased, fuel and power deliveries from the adjacent countries in winter cut down, and this affected the structure of fuel and energy balance. The decrease of fuel mining, and cut of heat supplies by boiler houses and TES[4] caused the growth of electricity use for household needs, as people used electric power for heating, warming water and cooking meals.

Hence, the electric power consumption in the fall-winter time has grown from 53% (in 1990-1991) to 70 % (in 1995-1997) of the annual volume.

Under these operation conditions the Toktogul reservoir since 1992 had a forced transition from the irrigation to the energy operation regime. The existing heat and power pricing system does not cover the production and delivery costs, and imperfection of billings and charge records causes a "red-ink" position for the reservoir and the accruing of considerable non-payments. The hard financial situation in the energy sector was the result.

[4] TES—Central Heating and Power Plant

To raise efficiency of the energy facilities basing on new market forms of economic and management activities, to provide stable functioning of the energy system, choose the optimum management structure, form the competitive environment and invest external investments the Republic of Kyrgyzstan developed the Program of the Kyrgyzstan Energy Sector Restructuring and Privatization. The Program proposes several sequential mutual connected stages, which stipulate the necessitation of structural reformations and establishment of economically independent projects, subject to future privatization.

At Stage 1 (1996-1997) SC Kyrgyzenergo was established, it is responsible and implements electric power generation, transfer and distribution; design, construction and repair subdivisions are set apart as independent joint stock companies. Laws *on Energy Sector* and *Electric Power Industry* have been approved by the Parliament; the regulatory Body *State Energy Agency* under the Government of the Kyrgyz Republic was established.

Stage II (1998): The Financial Model for the SC Kyrgyzenergo Restructuring was approved by the Government; compliant to the Model, tariffs stepwise increase to ensure the profitableness of energy utilities. The Kyrgyzenergo restructuring is assumed to separate electricity distribution utilities and small hydropower stations, and form independent stock companies with anticipation of future privatization.

Stage III (1999 and further) proposes formation of state companies, on the SC Kyrgyzenergo base, that will generate and transfer electric power:

- State Stock Company (SSC) *The Naryn Cascade*, which will comprise the Toktogul cascade of hydropower plants, *Bishkek and Osh TES*, and the HPP facilities under construction with the right to separate any HPP under construction as a concession, joint utility, or withdraw it for the strategic investment management.
- SSC *National Electricity Supply Network* comprised of the Central Dispatcher Service, high-voltage transmission lines with all substations, material and technical supply enterprises.

Under the transition to the market economy direct guidance of the current economic activities on the part of central state bodies should be essentially curtailed. At the same time, their role in determining the energy policy is increasing.

In this connection, in accordance with the draft laws *On Energy Sector* and *Electric Power Industry*, functions of the Government, the regulatory Body and energy utilities should be differentiated.

The Tajikistan Energy System also works parallel with the EP CA, the installed capacity is 4,354.5 million kWh, including the HPP's 4 million kWh (or 92%). The annual average power generation at the hydropower plants is 15-17 billion kWh. The Nurek hydropower plant of 3 million kWh installed capacities is the biggest in Central Asia. It has the seasonal-storage reservoir of 10.5 billion $m^{3,}$ and it regulates the Vaksh flow for the irrigation needs in the Amu Darya basin countries. The Nurek hydro structure operates in the irrigation regime in the beginning and in

the middle of the growing season (June-July), and the direct electricity losses make up 310 million kWh.

The Kairakkum hydrostructure on the Syr Darya River operates in the irrigation mode meeting the interests of the Republic of Kazakhstan and Uzbekistan, and does not generate 88.5 million kWh of deficit winter electric power, so the Republic has to buy power in Uzbekistan, Turkmenistan and Kyrgyzstan, and pay high prices. Because of isolated work in the Central Asian energy system, Tajikistan generates about 7-8 billion kWh in summer, having 1.5 billion kWh of excess electric power, and experiencing the power deficit in winter. The former electricity transfer system was destroyed. Under such conditions, Tajikistan, following the international norms intends to require the operation cost compensation for the Kairakkum reservoir and for regulating the Syr Darya flow. The country means to require compensation for the direct losses of 398.5 million kWh of electric power at Kairakkum and Vaksh cascade of hydropower plants, and for annual 60 million kWh of lost energy intended for the drain wells operation on the inundation areas.

The length of the electric transmission lines of all voltage classes is 5, 625 thousand km, including 267 km of 500 kV high-voltage lines. The 500 kV unique electric transmission line *South-North* is being designed to transmit power and capacities of the Bolshoy Vaksh cascade to the north of the Republic, its throughput capacity is 1.5-2.0 million kWh. It is also planned to connect the isolated energy systems of Central Tajikistan and Leninabad Oblast. As of now, the North is supplied by electric power from Uzbekistan. Tajikistan compensates by the same electric power amount in the south.

The break of international relationships and the civil war caused huge economic hardships. Under these conditions, the electric power engineering is the only industry that works sustainable during these bad years and ensures continuity of power service for industrial, agricultural sectors and population. Nevertheless, low tariffs, consumer debt receivables, and lack of equipment stores and investments brought to the crisis in the sector and frequent load cut-off. To ride out the present tense situation radical improvement of the economy is essential, taking into consideration market reforms and the staged restructuring of The State Stock Energy Holding Company *Barki Tochik*:

Stage 1 (1998-1999) stipulates separation of electric power plants and electric power networks by means of detachment of the Cascade of the Varzob HPPs from the Central Electric Networks, and establishment of several stock enterprises, including *Cascade of Varzob Hydropower Plants,* and *Electricity Networks of theRepublican-Value Regions; privatization* of the projects under construction and the ones not participating in the generation, transmission and distribution of the electric power; and the withdrawal of Nurek from the SSC Barki Tochic's balance.

Stage II considers the establishment of stock companies assigned for the construction of hydropower plants and the 500 kV transmission line *South-North*; separation of the power plants from electric networks and establishment of stock companies, producing the right to the energy consumer to choose the power producer; the Barki Tochik converting into a stock company possessing the right to sell the excess summer electric power at negotiated prices.

The association of construction and operation of small hydropower plants was established to attract private investments, the Kofarnikhon Mechanical Repair Plant took a position of a stock-holding company, Sangtudin hydropower plants under construction also have stockholders.

After the normative and legal basis was advanced, in 1998 the Draft Law on Energy Saving was developed and submitted to Madjlis Oli, in 1999 the Draft Law on Energy will be presumably developed.

So, the electric power sector in the Central Asian countries experiences hard times, with the conflicting situation in many instances.

On one part, the Central Asian independent countries came into the possession of the electric power base, which is able to satisfy internal electric power needs. Under the sovereignty, with rich energy stores each country aims to gain energy independence and use home resources in maximum. In Kazakhstan, for instance, most of the electric power plants burn coal, in Kyrgyzstan and Tajikistan they use hydropower, in Uzbekistan and Turkmenistan natural gas.

On the other part, all Central Asian countries put energy limitations both on industrial and household consumers, and this causes economic losses and a social strain. One of the limitation reasons is poor fulfillment of contractual obligations and energy consumers' defaults of payments for electric and heat power, and credit and debit indebtedness both on the national and international level.

Consequently, the EP CA economic efficiency and operation reliability diminished. The capacity allocation at the power plants in the period of the EP CA formation occurred based on the principles of their basing on hydro- and fuel-energy resources available. The electricity demand & supply margins did not agree with the state borders. Hence, the energy systems of north and central oblasts of Kazakhstan were operating parallel with the adjacent Russian energy systems, and south energy systems were operating with the Electricity Pool of Central Asia. The hydropower resources of Kyrgyzstan and Tajikistan were used as the peak energy resources for Kazakhstan, Uzbekistan and Turkmenistan; coal-fired, gas-and-oil-burning heat power plants met the Kyrgyzstan and Tajikistan basic power demands. Thus, the optimal operation schedule of the EP CA hydro- and thermal power plants was provided, and correspondingly, fuel and energy industries, water management systems in the region were functioning appropriately.

The leading frequency-regulating role of the Kyrgyzenergo and Barki Tochik hydropower plants should be emphasized. In the ungrowing season the regulating range of the Kyrgyzenergo hydropower plants was from 400 MW to 2,600 MW, of the Barki Tochik hydropower plants was from 550 MW to 2500 MW.

SC Kyrgyzenergo plays the leading role in frequency regulation. The Nurek Reservoir decreased storage to 861 m; thus, the hydropower plant was involved in the frequency regulation only during the evening maximum. Regime difficulties arose because some energy systems did not have contracts for rendering frequency regulation services, and because of the contract payment defaults. To a greater extent

it refers to the Kazakhstan users (south Electricity Grid Operating Company KEGOC, Zhambyl Regional Energy Company (Zhambyl REC), and South Kazakhstan REC.

Uzbekistan generates 51%, Kyrgyzstan – 13.8%, South Kazakhstan - 9.1%, Tajikistan - 15%, Turkmenistan – 10% of total Central Asian electric power. **(Fig.1)**

Electric Power Generation in Central Asia in 1997

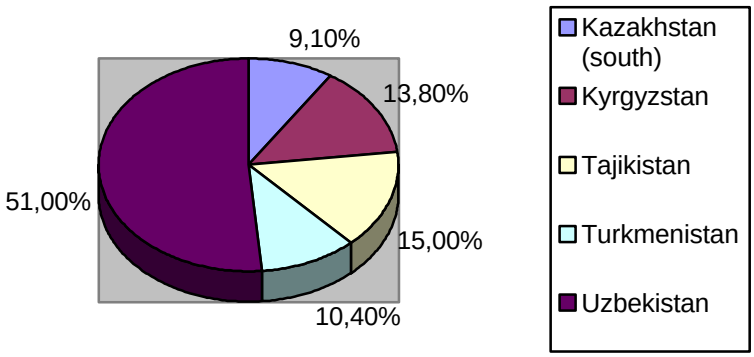

Fig. 1

Total decrease of fuel and energy production in Central Asia by 32% in 1991-1998 occurred in all Central Asian countries, including the decrease of natural gas production by 39 %, oil by 3%, coal by 35%, electric power by 20%.

Mining and production of main fuel and energy resources decreased in most of the Central Asian countries, and this under the tendencies and measures for economic stabilization and growth may put the republics into the situation when the deficit of fuel and energy resources will become a constraining factor for their social and economic development.

The deficit (-) and excess (+) energy of the Electricity Pool in Central Asia is shown on Figure 2.

Deficit (-) and Excess (+) Power of the EP CA Energy Systems in 1990-2010 (real option)

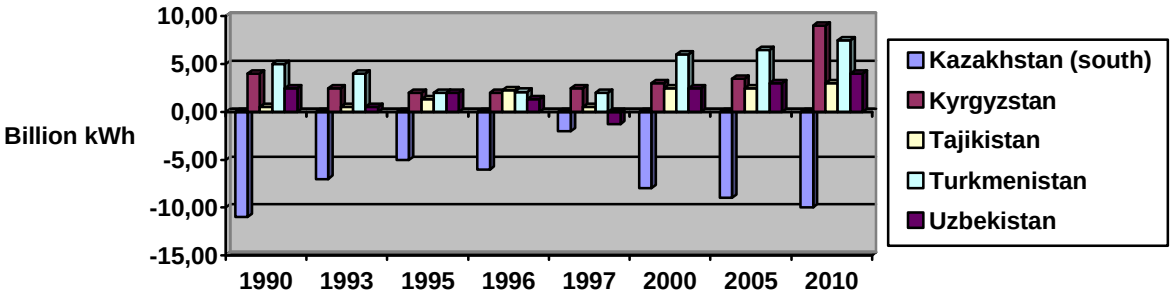

Fig.2

It is pertinent to note that in 1998 the power consumption decrease was a little less intensive versus the previous years, and according to the economic strategy scenarios energy consumption is projected to decrease in the Central Asian countries.

2. The Problem of Providing Efficient Activities Addressed to Joint Use of the Syr Darya Basin Water and Energy Resources

The intention of the Central Asian countries to gain an energy independence and satisfy the home needs using their own energy sources and not taking into account the Naryn-Syr Darya cascade operation modes may cause the decline of reliability and stability of the EP CA energy systems operation. Thus, it is worth expediting to make up optimization calculations for the Naryn-Syr Darya cascade of reservoirs meaning different water condition scenarios in the Syr Darya basin and prospect economic strategies of the countries.

The development and signing of the 17 March 1998 Agreement between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin is the essential step. Within the frames of this Agreement, annual multilateral agreements on joint and comprehensive use of the Naryn-Syr Darya water and energy resources are signed.

The analysis of the Framework Agreement implementation history, the fulfillment of the Agreement in 1998-1999 assumes that their successful implementation by the countries of the Central Asian Economic Commonwealth (CAEC) should enhance water management stabilization and promote energy and fuel supply of Kyrgyzstan and Tajikistan.

However, water practices of the dry year of 1997 and wet year of 1998 showed that an inefficient elaboration of many Agreement issues might cause in the first case, water undersupplies, and in the second case, electric power underdeliveries. Finally, that caused slower tempos of electric power production in 1998, and resulted in the Kyrgyz hydropower unprofitableness.

The Kyrgyz Republic and the Republic of Uzbekistan fulfill the terms of the Agreement, but the Republic of Kazakhstan through the fuel and energy sector restructuring and privatization, and because of departmental approaches does not accomplish them. The ex parte actions of the Kazakhstan energy people towards the disconnexion of the 500 kV electricity ring and destroying of the parallel operation of the Central Asian Electricity Pool brought the energy systems of Kyrgyzstan and Uzbekistan to trouble events, and to a lower operation reliability and stability of the energy systems.

The damage compensation mechanism does not ensue from the Agreement, and as a result of failure to meet its obligations, and on account of a changed water situation the thermal electric power plants will be undersupplied with 100 million m^3 of natural gas in 1999.

During 1999, from Uzbekistan, the Bishkek and Osh TES received 184 million m^3 of natural gas “traded in” the future electric power transfers. Moreover, in the

course of negotiations the Republic of Uzbekistan intended to refuse paying the frequency regulation services rendered by the Toktogul cascade of hydropower plants to the Uzbek energy system.

The deliveries of coal from Kazakhstan were not made during this period though the clauses of the Agreement stipulated the advance coal supplies. Moreover, the Kazakhstan Party eventually diverged from the constructive approach to the issues of redemption of the debt amounted to 22 million U.S. dollars, and refused to approve the actual fuel delivery term. The Republic imposed the condition that it may take off the guarantees to retain the EP CA 500 kV electricity ring closed in 1999.

One of the provisos that the Kazakhstan energy people have been raising during the last two years is to reduce the cost of the power export to the prime cost level set for the Toktogul cascade.

The projection of 1999 as a wet year may cause the Agreement default, and as a consequence, the aggravation of the fuel-supply conditions for the Bishkek and Osh TES in the forthcoming fall-winter period. It should be taken into account that these stations supply the home users with the electric power undergenerated by the Toktogul cascade, which happens due to its water storage in winter for the vegetation irrigation needs of Uzbekistan and Kazakhstan.

Vegetation water availability in the Central Asian rivers in 1998-1999 was above normal. The power generation from the CA hydropower plants was 17,642.9 million kWh, that surpassed the power generation of the corresponding period of 1997-1998 by 2,563 million kWh, and may be explained by the excess water availability in the Naryn, Vaksh and Chirchik.

As a whole, stating difficulties and complexities relating to the implementation of the main clauses both of the Framework Agreement and annual agreements, we may note that a dissonant interconnection of economic and political factors is existing and is demonstrating itself. Objective and subjective nuances conditioned by the CAEC disintegration and reintegration, and affecting directly, or indirectly the implementation of the Agreement on the Use of Water and Energy Resources of the Syr Darya Basin are also inconsistent displaying factors.

The parallel operation of the energy systems in the Electricity Pool of Central Asia ensures the optimum HPPs and TES operation and rational Naryn-Syr Darya water and energy uses. At first glance, to find the optimum methodology how to solve the problem of the Syr Darya basin joint use seems to be an organizational and economic issue. However, the issue may assume the ethnic politicization and become a subject of “whoop-de-doodle” of radical nationalistic sentiments.

Such situation objectively requires not only an extreme caution from each Party, close coordination of their actions, but also the establishment of adequately authoritative collective bodies to find compromises and maintain peace.

Thus, in order to separate we have to unite for the solution of important political and economic problems concerning the Central Asian countries.

The EP CA energy systems cannot separate completely. Above all, it is due to the event that great deals of water and energy projects are jointly used and require cooperative efforts of the partners. The Electricity Pool with the Dispatcher Center is a breathing mechanism. Thus, deep investigations how to build an optimum model combining both integration and separation processes are essential here.

At the current stage, it is expedient to strengthen the investigations in two directions:

The top measures:

Implement the Program of Joint Actions taking into account:

- Market tools for financial economic calculations of how to operate water and hydrotechnical facilities on the Naryn-Syr Darya rivers;

- Optimization of the operation regime for the Naryn-Syr Darya cascade of reservoirs and power plants, identification of compensations for the damage inflicted on the upstream countries for the flow and water-delivery service regulation, offer compensation considering the benefit of the downstream countries derived from the irrigated farming, develop the compensation mechanism for the damage resulted from the failure to fulfill the obligations taken by any Party, or in case water conditions will change;

- Suggestions to develop a single tariff policy for all types of mutually supplied energy resources;

- Providing stability and reliability of the parallel operation of the EP CA energy systems, and formation of the common electricity market establishing the regional Electricity Pool.

Eventually, all this should bring the Central Asian countries to the adoption of the Concept of Cooperation on Joint Use of Water, Fuel and Energy Resources in the Region. This Concept will be based on water and energy-carrier demand forecasts emanating from several scenarios for the economic strategy in the Central Asian countries.

In the next place, the program should be developed to improve the mechanism and methodology of the international negotiation process addressed to the problem of joint water and energy use of the Naryn and Syr Darya rivers, and parallel operation of the EP CA energy systems. The essential principle used for the development of the Program should identify the idea of gradual and phased goal achievement.

The national interests of the Central Asian countries should not be “bottled up” within the territories. Normal functioning of the cascade of the Naryn water and hydrotechnical facilities is a national interest for all, Kyrgyzstan, Uzbekistan, and Kazakhstan.

Hence, the program of international negotiation process should comprise a multistage system of meetings, consultations, reconciliation, and information

exchange, and ultimately, should supplement the Agreement with the civilized instruments for its implementation, taking into account the international experience.