Appendix A-23

CAR POWER MARKET: ISSUES AND OPTIONS

Prepared by:
Daud Beg

November 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

Subcontractors: PADCO; Management Systems International; and Development Alternatives, Inc.

Collaborating Institutions: Center for Naval Analysis Corporation; Conservation International; KBN Engineering and Applied Sciences, Inc.; Keller-Bliesner Engineering; Resource Management International, Inc.; Tellus Institute; Urban Institute; and World Resources Institute.

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1. Terms of Reference

This report has been prepared in accordance with the USAID Environmental Policies and Institutions for Central Asia (EPIC) Program 1999 Workplan Task 2.1.1(a), to study the relationship between Central Asian Republics (CAR) Regional Water and Energy Use Agreements and the efforts to develop a wholesale power market. The specific tasks in the Terms of Reference (TOR) are as follows with sections where these tasks are addressed identified in parentheses:

(a) How are power flows in CAR affected by the regional water and energy use agreement for the Syr Darya basin? (Sections 3 and 4);

(b) How is the fluctuation of the United Dispatch Center (UDC) Energies affected by the regional water and energy use agreement for the Syr Darya basin? (Sections 4 , 5 and 7);

(c) What are the implications of the current barter arrangements associated with compensations payments under the regional water and energy use agreement for the Syr Darya basin for national and regional power market operations? What alternatives exist to these barter arrangements? (Sections 4, 5, and 6);

(d) To what extent can water use be separated from power issues in a CAR regional electricity market? (Section 3 and 6);

(e) How does the current draft "Conceptual Model" for the CAR wholesale power market deal with water resources use in the Syr Darya basin, and what alternatives exist for these arrangements? (Section 10);

(f) What is the information resource requirement for an integrated and/or separate water and energy management system? What light is shed by recent water and energy modeling efforts? How do these efforts fit into the related "Conceptual Model" for the CAR wholesale power market? (Section 8 and 9);

(g) What effect will the addition of the Amu Darya water and energy use agreement, modeled after the Syr Darya agreement, have on overall regional electricity market situation? (Section 3 and 6); and

(h) What further technical and institutional analyses will be needed to answer remaining questions and who are the key counterparts within the region for these analyses? (Appendix A)

The deliverables identified in the TOR include:

1) Draft and Final Report on the relationship between Central Asian Republics regional water and energy use agreements and efforts to develop a wholesale power market addressing the issues raised in Section II above; and

2) Trip Report that summarizes activities carried out during the consultancy and lists all significant meetings held.

Sections relate to the Tasks in T.O.R.

2. Introduction

Prior to undertaking the field trip from August 3 – 24, 1999, documents relating to the water use issues of Syr Darya and Amu Darya, the Interstate Agreements, the Conceptual Model for Wholesale Power Market, and the relevant publications of the World Bank and Asian Development Bank were studied and a Draft Discussion Paper submitted on August 2, 1999. A complete copy of all the relevant Agreements is attached as Appendix B.

During this field trip, the Regional Water and Energy Uses Round Table meeting was attended from August 10-14, 1999 at Issyk Kul in Kyrgyztan, which was participated by senior level officials from USAID, EPIC, Republics of Kazakhstan, Tajikistan, Kyrgyz Republic and Executive Committee of the Central Asian Economic Community (EC CAEC). This was followed by the meeting of CAR Electricity Working Group/Subgroup at Almaty from August 16-17, 1999. The participation in these two workshops provided an invaluable insight into the perceptions, the conflicts, and the issues involved. Further meetings were held with the Basin Management Organization for the Syr Darya river (BVO Syr Darya), the United Energy Dispatch Center (UDC Energia), the Ministry of Energy in Tashkent and site visits were conducted. A list of all the persons met at various meetings is attached as Appendix C.

Cooperation and support extended by USAID, EPIC, Hagler Bailly, UDC Energia, BVO Syr Darya, EC CAEC, Kazakhstan Grid Operating Company (KEGOC), and other agencies and Ministries of Republics of Kazakhstan, Kyrgyztan, Uzbekistan and Tajikistan is gratefully acknowledged.

Structure of the Report:

The main theme of the report is that an integrated approach to water and energy uses of the Syr Darya and Amu Darya Basins is the only self sustaining and feasible option, and a CAR Power Pool based purely on electricity trading, and that too, on monetized spot-trading, is not practicable at this stage of economic development of the Region. As per the Terms of Reference (TOR), the report examines the current Syr Darya Water and Energy Use Agreement, the Operational Protocol, the Agreement on Parallel Work of Central Asian Energy Systems and other relevant documents.

The development of the regional Electric Power Pool (EPP) of Central Asia and the United Energy Dispatch Center (UDC Energia) is then discussed. The comparative experience of Power Trade Pools around the world is explained. A section has been added to provide an overview of the extraordinary Federal Energy Regulatory Commission (FERC) rule- making proposals on Regional Transmission Organizations (RTO) in the United States, which have been recently issued. A critique of the proposed conceptual model for a CAR Power Market is presented, followed by recommendations.

The tasks in the Terms of Reference (TOR) have been addressed in the text of the report and comments and recommendations appear in the relevant sections. These have been consolidated in the final section of the report. In view of the complexity of the issues involved, the scope extends beyond the TOR.

3. Syr Darya Water and Energy Use Agreement

The developments in Syr Darya Basin, since the beginning of this century have been multipurpose and have covered reservoir management, irrigation, flood control, and hydropower generation. These were operated as a unified system in the USSR prior to the creation of Central Asian Republics (CARs) in 1991. The competing uses of Syr Darya by the sovereign states of Kyrgyztan, Tajikistan, Uzbekistan, and Kazakhstan have placed considerable strain on the optimum use of the water and power resources, and has accelerated the environmental degradation and quality of water, wasteful and excessive use for irrigation, causing concern even for the survival of the Aral Sea.

USAID has been providing technical and advisory assistance to CAR through the EPT and EPIC projects. It is a rare example of regional cooperation, that high level ministerial delegations from Central Asian Republics have been meeting at Round Table workshops under the auspices of USAID to conclude an agreement in March 1998 on the use of water and energy resources of the Syr Darya Basin.

The Syr Darya Agreement is the foundation stone of the cooperation between CARs for the joint use of Water and Energy Resources. Articles II, III, IV, and X, specify integrated use of Water and Power facilities. It must be emphasized that an isolated, stand-alone, CAR Power Pool will not be self sustaining unless it is accompanied by supporting water use assessment and application, and complies with the provisions of the Syr Darya Agreement.

An integrated approach to water and power development is not new wherever multipurpose projects are undertaken on river basins, such as Tennessee Valley Authority (TVA) and Water and Power Development Authority (WAPDA) on Indus River in Pakistan.

Whereas, Water and Energy Uses Round Tables have high level representation from the Energy Ministries and Utilities in addition to Water and Agriculture agencies, such reciprocity is lacking in Electricity Group/Subgroup meetings. Complete coordination and information sharing is necessary between the USAID/CAR Regional Electricity and EPIC Programs, if an integrated approach is to evolve which will meet the requirements of CAR.

Comments on the relevant paragraphs of the Syr Darya Agreement relating to Power flows and Energy Exchange are as follows:

Article II: Coordination on water releases, production and transit of electricity and compensation for energy losses, on equivalent basis are to be undertaken annually. The problems of operating regimes in dry and wet years have already been highlighted in the recent Issyk Kul Round Table, and it may be necessary to forecast the operating regime over a longer period of 3 to 5 years. The compensation for energy losses on an equivalent basis is fair and easy to implement, and may be addressed in the "Conceptual Model", but this may be gradually phased out in the eventual competitive market and efficiency-based model.

Article III: This is an article of faith. The infringements have already taken place in the water use regimes and energy deliveries, which will need to be addressed and corrected in annual reviews.

Article IV: The Naryn-Syr Darya excess power emanating during the growing season, and Toktogul multi-year regulated flows exceeding the needs of Kyrgyz Republic will be transferred to Kazakhstan and Uzbekistan in equal portions. This has already been disputed by Kazakhstan. Further privatization in Kazakhstan will exacerbate this situation.

Presently, compensation is to be made in equivalent amount of energy resources, e.g. coal, gas or electricity or in labor. This barter arrangement is the only workable solution until foreign exchange reserves and economies stage a recovery to allow payment in monetary terms, especially foreign exchange. The Conceptual Model has to address this issue, which is not amenable to price bidding.

Similarly, a single tariff policy for all types of energy resources is continuation of the Soviet tradition.

Article V: This section proposes guarantees like Lines of Credit, Escrow. One source of this funding which could be used is the World Bank, who could provide back-to-back guarantees by enhanced co-financing (ECO) mode, or more recently introduced Partial Risk Guarantee, where political risk and default by the corresponding state organizations to make timely payments are covered.

Article VII: O & M costs and their apportionment is already covered under a separate task order by EPIC.

Article X: This article includes terms to be considered jointly by the parties.

The Syr Darya Water and Energy Agreement is quite comprehensive in the context of the socio-economic and political scenario of the CARs and should form the basis of further studies of water and power issues including CAR Power Pool and the Conceptual Model.

4. Operational Protocol for Syr Darya Regional Agreement for the Use of Water and Energy Resources for 1998/9 fall-winter Season and 1999 Vegetation Period.

Subsequent to Syr Darya Regional Agreement of March 1998, the representatives of Water and Energy Authorities of the Republics of Kazakhstan, Tajikistan, Uzbekistan and Kyrgyz Republic met at Bishkek in August 1998, and formulated a comprehensive Protocol for the operation of the Naryn-Syr Darya Cascade of Reservoirs in the Syr Darya Basin, the hydropower generation and the consequent energy resources exchange. This protocol was eventually signed in May 1999, indicating the complexities of the entire exercise and divergent views of the States.

The fact that such a protocol was even agreed upon by four Central Asian Republics is a considerable achievement, and that its compliance left much to be desired highlights problems of implementation, sometimes due to vagaries of nature, like abnormal precipitation this year. Inter-dependence of riparian states is inevitable, and the sovereignty of the new Republics will encourage ambitions to construct new reservoirs within their territories.

EPIC is already engaged in the development of a Water and Energy Computer Model for the Syr Darya basin. This is an essential requirement in the operation of multipurpose projects, where water releases for irrigation and agriculture are to be co-ordinated with hydropower generation. Unfortunately for the power engineers, the requirements of water take precedence. The development of a "Conceptual Electricity Market Model" has to take these operational requirements into account.

The comments of the representative of the Republic of Kazakhstan in the Protocol are as follows, which also need to be addressed:

- Electricity generated as a result of releases for irrigation purposes is sold at the free energy market of the Republic of Kazakhstan specifying the volume of electricity and water releases respectively.

- The Republic of Kazakhstan guarantees that the Kyrgyz Republic will have free access to energy and coal markets.

- In order to conserve and accumulate water in the Toktogul reservoir during the winter period, the demands for electricity in the Kyrgyz Republic will be compensated by electricity supplies from the Republic of Kazakhstan based on interstate agreements.

5. Council for Prime Ministers Agreement about Parallel work of Central Asian Energy Systems

This Agreement by the council of Prime Ministers of the Republics of Kazakhstan, Tajikistan, Uzbekistan and Kyrgyz Republic signed at Bishkek on 17 June, 1999, lays down the principles of the parallel work of Central Asian energy systems as follows:

- "admitting that CA energy systems have been functioning during decades as a single energy system;
- considering creation of favorable conditions for the development of market relations between economic entities is important and establishing of a single market of power energy in perspective;
- trying to create the most reliable and economical regimes of energy supplies to consumers;
- observing the principles of the European Energy Charter, approved in Hague, 17 December 1991;
- the sides have agreed about the following (about the creation of a regional Electric Power Pool of Central Asia (EPP CA))."

Article III stipulates:

- "parallel operation will ensure a reliable and efficient work of the energy systems within the EPP CA;

- EPP means an aggregate of energy systems that have been united on a voluntary basis to provide efficient conditions and safe energy supply to consumers with the maximum use of the advantages of the energy systems parallel operation;

- Each of the Sides independently defines/estimates the scheme and amounts of their own circuits for parallel operation of the EPP CA proceeding from their own national interests."

We would interpret that the article lays emphasis on safety, efficiency and reliability of the EPP CA, in accordance with prudent electricity practice. Whereas there is a considerable freedom in the membership or participation in EPP CA, the States will define their own estimates of parallel operation.

Article V defines EPP CA Transmission System as 500-220 KV lines, both existing and new. Parallel operation will be based on the principle of self-balance for each EPP CA system taking into account the approved treaties.

Article VI relates to the provision of technical services.

Article VII agrees to approve co-ordinated measures to implement energy transfers and agreements on energy transit and also to avoid non-sanction energy power seizures by consumers.

The Agreement is for a period of five years with automatic renewal of another five years. The ICKKTU Executive Committee is the custodian of the Agreement.

The Agreement essentially spells out the mandate and boundaries of EPP CA as approved by the Council of Prime Ministers, and the "Conceptual Model" has to be reviewed in this context.

6. Protocol of the Water and Energy Uses Round Table, Issyk Kul, 10-14 August 1999

USAID/EPIC supported this Round Table initiated by EC CAEC, and attended by senior officials of the water and energy bodies and ministerial representatives of the Republics of Kazakhstan, Tajikistan, and the Kyrgyz Republic. It was regretted that the delegations from Uzbekistan and Turkmenistan could not attend. Inspite of their absence, all the agenda items were deliberated and thoroughly discussed in a fair and friendly manner. We are of the opinion that this is a remarkable example of inter-regional co-operations, which is highly commendable.

The following issues were discussed at the Sessions of the Round Table:

i **Implementation of the March 1998 Agreement:** The report of the Deputy Chairman of Executive Committee of ICKKTU was presented and adopted for information. The positive impact of joining of the Republic of Tajikistan to the Agreement in June 1999 was noted. It was agreed to support the officials of water and energy bodies for the development and approval of the operating Protocol for the year 2000. Inspite of considerable impediments, the compliance of the annual Agreement by Republic of Uzbekistan was noted. Republic of Kazakhstan accepted the default in its obligations, but agreed to fully repay the debts and ensured compliance with future commitments. In view of the fluctuations in the anticipated river flows, the adoption of multi-year operation and compensation regimes was agreed so that each State could develop economic plans based on secured water and fuel deliveries.

The USAID/EPIC program report was presented and it was noted that the program supports the development of the optimization models of the operation regime of the Naryn-Syr Darya water reservoir cascade. This step is extremely vital to support the "Conceptual Electricity Model".

ii **Regional Principles of operation and Maintenance of Shared Water Facilities:** The Report of the USAID consultant on sharing of O&M Costs was presented. The Consultant was requested to consider the comments of the participants and incorporate these in the revised report.

iii **Amu Darya:** The representative from Tajikistan presented his proposals regarding the Amu Darya basin, but these could not be taken up because the representatives from the Republics of Uzbekistan and Turkmenistan were not present. The issue of initiating the drafting of an Interstate Agreement on Amu Darya Water and Energy Use was entrusted to EC ICKKTU.

The energy and power issues dominated the proceedings of Round Table. It was evident that excess power is available in the Region and individual States, and the price of electricity quoted is untenable and highly distorted. At one stage, the representative of Kazakhstan stated that they can generate electricity at 1.2 cents/kwh, why should they buy at 2 cents/kwh from Kyrgyzstan. Every state is looking for markets outside of CAR, from Turkey to India/Pakistan to China. All of these are pointers to an intercontinental grid, a dream at present, but certainly a reality in future, maybe as early as year 2005.

In spite of the problems of implementation of an operational Annual Protocol, the Round Table provides a forum for co-operation and a sense of common destiny of CAR. There is however, a serious vacuum. There must be representation from USAID/CAR Regional Electricity Program at the Round Tables. Similarly, the "Conceptual Model" must be discussed at the Round Table.

7. EPP CA and Unified Dispatch Center

We agree with Hagler Bailly's assessment of the EPP CA. When the Soviet Union developed the huge untapped hydropower resources of the Central Asian region, the extra high voltage grid system at 500 KV and 220 KV was a concomitant technical and economic requirement for bulk transmission from large power stations located at the source of hydro-carbon or hydro-electric reserves to the load centres and industrial conglomerates. The Unified Dispatch Center (UDC) was located at Tashkent. EPP CA was operated for the last four decades as a unified system. It was an envy of the electric utilities, and many developing countries borrowed the technology and experience of this Grid System. Kazakhstan later developed the first 1150 KV line in the world. Although the Soviet 500 KV line towers required three times the steel as compared to the sleek Italian design, they were still economical and found acceptance in many African and Asian countries.

Commercial electricity made its debut at the beginning of this Century and has affected the human race more profoundly than any other single invention. Until the end of World War II, isolated electric utilities provided the service to the consumers, which were mostly privately owned. With the quantum jumps in the power demand, central power stations with increased efficiency were constructed near the sources of energy, i.e., coal mines, gas fields or hydroelectric sources. The extra-high voltage transmission systems were constructed to supply bulk power to the load centres. National Grid systems became the prudent practice of the electric utilities essentially for bulk transmission. Economic dispatch of various power plants was a subsequent development. Reliable transmission of power remained, as it does today, the first priority of the utilities.

The nationalization of the power systems followed the development of extra high voltage grids after World War II, starting with the UK, Europe, then the British Commonwealth worldwide. The collapse of the public-sector electric utilities in less than 50 years after nationalization is due to the complacence of the public sector, exacerbated by oil price shocks of 1972 and 1979, and non-rationalization of tariffs. The circle is now complete with unbundling of the electric utilities.

EPP CA and the UDC at Tashkent are also a product of this phenomenon. The Central Asian power system operated as a "tight pool" meeting the technical requirements of reliability and stability, including frequency control. The staff of UDC are highly competent and are proud of their traditions of sound system operations, in spite of the fact that the equipment in the UDC has not been upgraded, and all the operations at the power generating stations and substations are carried out by telephone. Whereas remote metering is available, remote control is lacking. The upgrading of the facilities at the UDC is long overdue. Similarly, rehabilitation of the Substation equipment is necessary. Bulk oil circuit breakers of the vintage of 1950's are long extinct in most parts of the world but continue to be used in CAR despite severe fire hazards.

USAID/CAR Regional Electricity Program has made a substantial contribution in improving system operations, compensation of generation regulation. AGC, and development of bilateral contracts. The co-operation in the technical field is commendable. It is in the economic and "market-based" principles that the perceptions of UDC and CAR officials are still rather hazy.

8. Power Trade Pools

(a) It may be noted that Power Trading Pools are a comparatively recent phenomenon, and are still in an evolutionary stage. It would be too ambitious to forecast a specific long-term structure for the CAR electricity market. There is no Power Pool which can be termed as "One Size Fits All". All options should remain open to facilitate the step-by-step evolution of the present situation toward a more active and mutually beneficial structure and joint arrangement. Several regional electricity markets, which are already operational worldwide, may provide useful examples:

i. **In Europe,** the Union of Producers, Transporters and Distributors of Electricity (UCPTE), which basically regroups the countries of the European Union, trades about 10 percent of the electricity consumed in the region every year. The organization is very loose and is mainly composed of a series of coordinated bilateral contracts either on long or short-term basis in order to provide capacity, economy energy or mutual reserve supports.

ii. **In the Scandinavian region,** Norway and Sweden have set up very active competitive structure composed of a spot market for physical delivery hedged by a financial stock market. The market is in the process of being extended to Finland and Denmark as soon as their respective national power sector structures are compatible with the requirements of the Norway-Sweden market.

iii. **In North America,** the U.S. and Canada have several bilateral structures for different types of "electricity products". One of the most interesting pools which could be used as an example for the CAR is the Mid-Atlantic Power Pool (MAPP). NEPOOL essentially provides transmission-wheeling arrangements. A discussion on U.S. Power Pools follows in the Report.

iv. **In Southern Africa,** twelve countries of the SADC region (Southern African Development Commission) are implementing a well coordinated "loose pool" structure (the Southern African Power Pool – SAPP) with a coordinating center (Systems Operator) plays the role of central dispatching center of information among the different national dispatch centers of the region. This Coordinating center circulates the information on different national requirements, and the availability of the different plants and lines. It will also be the central point to set up transactions and, if necessary, arbitrate disputes. The SAPP was established under a series of Memoranda of Understanding, sanctioned by the respective governments and the chief executives of the power utilities of the twelve countries in the region. The MOU's are supported by an Agreement between Operating Members and Operating Guidelines (similar to a regional Grid Code). The SAPP has specific objectives of (a) coordinating and cooperating in the operation of their systems to minimize costs while maintaining reliability; (b) recovering their full costs; and (c) sharing equitably the resulting benefits. The benefits are considered to include reductions in the required generating capacity, reductions in imported fuel costs, and improved use of hydroelectric energy.

v. **UK Wholesale Electricity Pool (England and Wales)**. With the privatization of Central Electricity Generating Board (CEGB) three private generating companies emerged, i.e., Nuclear Power, National Power and Powergen. In addition there were some IPP's. The privatization of Area Electricity Boards followed. This necessitated an Independent National Grid, which also controlled the Load Dispatch Center outside London.

Professor Littlechild was appointed the Director General of OFFER (Office of Electricity Regulation). Professor Littlechild was a recluse and operated OFFER from Birmingham having little contact with the outside world.

The electricity pool developed by UK is based on half-hourly "bid-price," which is rather convoluted, and can at best be described as meeting the typical requirements of UK Electricity industry. Nuclear Power invariably bids zero cents/Kwh. The next slab is say

2.5 cents/KWh bid by National Power, and the peak power is bid at, say 3.0 pence/KWh. Under the Clearing Price mechanism, all the generators during that half-hour period will be compensated at 3.0 cents/KWhr, including Nuclear Power, which bid zero cents/KWh. If the intention is to operate Nuclear Power Plants, as a base-load, and pay them the highest opportunity cost, then this model may have merit, but it can hardly be termed as economic or "market-based".

The half-hourly electricity pool prices of UK Pool are published daily in Financial Times, London. A cursory glance would indicate that there are sharp peaks at all kind of odd-hours (generally 2am – 4am). There has been sharp criticism that the UK Pool has not led to reduction in electricity prices and that the generators have abused their market power, and have been in collusion to push up market prices.

After the retirement of Professor Littlechild as regulator, OFFER and OFGAS have been merged and a new Regulator has been appointed, who wants a new I.S.O. (Independent System Operator) and may even have parallel System Pools.

The World Bank Power Trade senior advisor considers that "bid-based" UK model is not appropriate for inter-regional and international electricity pools. Ukraine followed the UK Power Pool model, which has led to confusion and chaos. In CAR, we should avoid these pitfalls.

(b) In sum, the following lessons may be drawn from regional power markets:

- **Organizational framework.** Experience shows that all existing regional power markets have been set up under the umbrella of some recognized organization for economic development such as mentioned above: the European Union or the SADC. Such organizations provide the initial forums required to launch the dialogue and to facilitate communication among interested parties. Specific issues linked to the development and implementation of power market, however, have to be discussed among specialized experts later on. Two conditions of extreme importance in setting a regional power pool are: trust and confidence between partners and an agreed procedure to resolve disputes.

- **Compatibility.** Development of regional power markets is facilitated by three basic rules (i) the compatibility or similarity of the structures of the different national power sectors; (ii) the compatibility of the regulatory systems; and (iii) the possibility of wheeling electricity between countries. The optimal structure for power sectors is the full unbundling among production, transmission and distribution. The compatibility of regulatory systems ensures that the rules, especially for the setting of prices both at generation and transmission levels, are transparent and compatible. The wheeling or third parties access releases the purchasers and the sellers from the constraints created by integrated transmission companies and allows the cross-border energy trade.

(c) **A Potential Structure – Pooling.** A crucial prerequisite to the success of regional trading is that benefits are shared and that an appropriate structure, like a "loose pool," is developed. At the international level, the "loose pool" principle is probably more appropriate and much more flexible than the tight pool structure. Loose pools emphasize gaining the maximum economic and reliability benefits from trading within the parameters of maximum system autonomy. These pools tend to be characterized by long-term bilateral contracts for the supply of electricity between generators and customers. These are supplemented with offsetting short-term contracts and other deals under the overall agreement framework.

Loose pools may provide central services such as data gathering and provision – including continuous real time data to match generation and demand, producing indicative expansion plans, and implementing emergency procedures. Loose pools also establish detailed common design and operational standards to ensure system security and reliability, and to facilitate trade. The U.S.

experience shows that loose pools are flexible, and can evolve from a structure characterized by cooperative trading arrangements between largely integrated utilities into one marked by increased levels of competition when the power sector structures are unbundled and prepared for competition.

If a regional pool structure is put in place in the long-term future, it will be necessary to define a set of terms. Exemplary terms are listed in the following table.

Table 1
Terms of a Regional Pool Structure

Terms of a Regional Pool Structure	Content of Terms
Terms of an agreement	Effective and termination date, relationship to earlier agreements and law, transitional provisions, procedures for amendment, force majeure clauses.
Membership	Initial members, arrangements for membership change, provisions regarding transfer of rights and obligations to successor bodies of original pool participants, status and rights of IPP's
Structure for pool management	Roles of different management bodies, their membership, appointment of key staff, voting arrangements, notice of meetings, budgeting and source of funds.
Valuation of capacity and energy	Procedures by which capacity and energy are valued and are paid.
Settlement of payments	Arrangements on metering, billing and settlement.
Transitions facilities, pricing and access issues	Unbundling of (transmission) price from electricity generation prices reflecting fixed and variable cost of transmission of electricity. Development and procedures of ancillary services.
Dispute resolution	Provisions on informal and formal dispute resolution, procedures for arbitration.

9. Regional Transmission Organizations (R.T.O) in U.S.A.: Releasing a Genie

An extraordinary presentation was made at Putnam Hayes Bartlett (PHB) Hagler Bailly on September 8, 1999 by Federal Energy Regulatory commission (FERC) who has issued Rulemaking Proposals for Regional Transmission Organizations (R.T.O's). The access of this voluminous document is available via Internet through FERC's home page (http://www.ferc.fed.us). We feel that this may revolutionize concepts on Regional Transmission Organizations, and similar presentation may be made for the benefit of UDC, energy and water organizations, and the relevant officials of the Ministries of CAR.

It would not be possible to convey the entire text of the document, but it is important to highlight the main principles and issues:

i. **Open Access** is the key to wholesale power markets, which was introduced by FERC in 1996

ii. **Main objectives** of R.T.O's
- a. improve efficiency in transmission grid management
- *b. improve grid reliability*
- c. remove discriminatory transmission practices
- d. improve market performance
- e. lighter handed regulation

iii. **No "*cookie-cutter*" approach**
FERC is proposing a "flexible" approach, not a mandate, but proceed in "good faith". And certainly no "cookie-cutter" organizational formats

iv. An "**open-architecture**" policy towards R.T.O.'s

v. **Flexible transmission** rate-making, that will also address congestion, pricing and performance-based regulation

vi. FERC will not propose regional boundaries

vii. **Reliability** continues to be the main goal. FERC noted that "the adequacy of the bulk transmission has been challenged to support the movement of power in unprecedented amounts and in unexpected directions"

viii. Unprecedented high spot markets were noted in June 1998, in the Midwest of U.S.A., as high as $7,500 per MWh, compared to an average of $40 per MWh which led to calls for price caps, allegations of market collusion.

ix. **Failure of ISO's in U.SA.** FERC notes that not all the ISO's have been successful in the U.S. Inde GO ISO in the Pacific Northwest has failed. Even the members of MAPP have failed to reach a consensus on the formation of an ISO. According to FERC, multi-state ISO's tend to fail. The impediments include "transmission owners unduly discriminate in the operation of their transmission systems, so as to favor their own or their affiliates power market activities."

x. **Engineering Considerations for R.T.O.'s**
These are explained by FERC as follows:
- a. Reliable Grid operations
- b. Determining Available Transmission Capability (ATC)
- c. Managing Congestion
- d. Planning and Expanding Transmission Facilities
- e. Pancaked Transmission Rates

xi. **Discriminatory Conduct by Transmission Owners**

a. Calculation and Posting of Available Transmission Capabilities in a manner favorable to the Transmission Provider
b. Standards of Conduct Violations
c. Line Loading Relief and Congestion Management
d. OASIS sites that are difficult to use
e. Issues Related to Functional Unbundling and Dealing with Remaining Undue Discrimination

xii. Benefits that R.T.O can offer:

a. An RTO would improve efficiencies in the Management of the Transmission Grid
b. An RTO would improve Grid Reliability
c. An RTO would remove opportunities for Discriminatory Transmission Practices
d. An RTO would result in Improved Market Performance
e. An RTO would facilitate Lighter Handed Regulation

xiii. All State Commissions urged FERC not to adopt a "One Size Fits All" approach to RTO design.

xiv. Effect on States with Low Cost Generation. FERC expressed concern that States with Low Cost Generation could sell power to RTO at higher rates depriving their own inhabitants of cheaper power. FERC's rule making proposed to protect this issue.

xv. Concerns Expressed by the State Commissions:

a. Federal Mandate
b. Regional Flexibility
c. Retail Markets
d. Effect on States With Low Cost Generation
e. Need for Independent Transmission Operation
f. Transmission Cost Shifting
g. Boundary Drawing
h. Regional Approach to Reliability
i. Pricing Reform
j. Participation of Public Power
k. State Role in RTO Governance
l. Existing Regional Transmission Entities

xvi. Minimum Characteristics and Functions for an RTO

Minimum Characteristics

a. Independence
b. Scope and Regional Configuration
c. Operational Authority
d. Short-term Reliability

Minimum Functions

a. Tariff Administration and design
b. Congestion Management
c. Parallel Path Flow
d. Ancillary Services
e. OASIS and Total Transmission Capability (TTC) and Available Transmission Capability (ATC)
f. Market Monitoring
g. Planning and Expansion

xvii. Open Architecture

xviii. Ratemaking for Transmission Facilities under RTO Control

a. Single Transmission Access Rate for Capital Cost Recovery
b. Congestion Pricing

c. Performance Based Rate Regulation

xix. Public Power Participation in RTOs

xx. Other Issues

a. Pre-existing Transmission Contracts
b. Treatment of Existing Regional Transmission Entities
c. Participation by Canadian and Mexican Entities
d. Providing Service to Transmission-owning Utilities That Do not Participate in an RTO
e. RTO Filing Requirements
f. Power exchange (PXs)

FERC's document on Rulemaking for RTO's can serve as an excellent guideline for the CAR Power Market. The keywords are that there should be flexibility, reliability and no mandate, but a plan that works, no "cookie-cutter" organization formats, that there is no single solution for all scenarios, that pitfalls faced by ISO's so far in the U.S. should be avoided.

The discussion with the Head of UDC, and other Energy Ministry officials in CAR, clearly indicated their desire to tailor a Power Pool Model that is suited to the requirements of CAR.

10. Conceptual Model for CAR Power Market

Hagler Bailly has prepared the basic Draft of the Conceptual Model under the Work Plan of USAID/CAR: Regional Electricity Program. We agree with the assessment made in the opening paragraphs concerning the evolutionary nature of the CAR Power Pool and the pre-requisites of its success.

We have a serious reservation about the Conceptual Model that it has not addressed the issue of Joint Use of Water and Hydropower Development in the Syr Darya and Amu Darya basins, which was the main purpose of the creation of CAR Extra High Voltage Grid and UDC Dispatch Center at Tashkent.

Specific comments on conceptual model are as follows:

- **Definitions:** These are complex and not user-friendly. Similar definition in grid codes of SAPP, and UK are easy to understand. It appears that these definitions have been subjected to legal interpretation, which is sometimes not possible in technical terms. Definitions at 2-11, 2-12, 2-13 of "installed" or "rated" capacity vs. the capability ("dependable" capacity) are such examples and need simpler definitions. Similarly 2-6 and 2-7 require clarification with regard to bid price and dispatch price. These definitions may be discussed with UDC so that the definitions currently in use in CAR and Russian Federation may be co-related.

- Many of the definitions have not been used in the draft of conceptual model.

- **Section 3:** The long-term objectives of CAR Power Market are sound and universally accepted but there is no reference to water use requirements. The conceptual model only discusses power pool arrangements in market economy in monetary terms, without reference to power exchanges, barter (in other forms of commercial energy, i.e. coal, oil, natural gas), which are ground realities in CAR.

- **Section 4:** Participants are only "electric power" entities in a traditional power pool concept. Initially there should be primary market members representing each state. Later, when there are further requests for "open access", trading members may be accepted as Associate Members without voting rights.

- **Section 5:** Majority vote of 60% and not 51% is unexplained. Similarly "veto" power by System Operator needs further explanation.

- **Section 6:** The functions of the System Operator have been explained. However, it is based purely on "electric power" concept without participation or co-ordination with BVO or water use entities. It may be explained that the UDC at Tashkent currently monitors water levels at Toktogul and along the cascade which is vital for the integrated operation of the Pool.

- **Section 7:** Water releases required for aggregate irrigation requirements should take precedence in the cascade operation of Syr Darya and Amu Darya basin.

- **Section 8: Market Provisions:** We are not in agreement with the provisions proposed in this Section, which are based on the UK model. The idiosyncrasy of the UK model has already been explained in that "the Energy Clearing Price is conceptually the Bid Price for the highest cost generation dispatched in the hour." This has led to severe criticism within the UK where the collusion amongst the generators is being alleged, or worse still, that the generators are manipulating the market. The newly appointed regulator in UK is already considering reform. In such a scenario, exceptionally high peak prices may be noticed, as reported in FERC Rulemaking of RTO's document.

  Similar bid-based pricing model was imposed on the Ukraine, which has caused utter confusion and chaos.

  The situation in CAR is even more serious as several sovereign states are involved. There is excess capacity available in CAR. Considerable price distortions and discrepancies exist in the cost of

generation, perverted by several rates of exchange, inadequate accounting, etc. In such a scenario correct market signals will not be received.

In view of the glut of power generation, one State, which can supply the entire UDC demand, could underbid all the others and throttle their very survival. In the desperate economies of CAR, this is not an unlikely scenario.

In pure economic terms, we are not in support of the Clearing Price being the highest bid price, which is then paid to all the generators regardless of their bid. Our proposals in this regard are given in Chapter 10, Recommendations, para (vi)(b).

In our informal discussions with the World Bank and other stakeholders, we came to the conclusion that even the most diehard supporters of market economy fear to tread on the path of bid-based pools as presently practiced in the UK for applications in inter-regional or inter-state power pools, even where the economy is robust.

And if this has to be superimposed on a system, which requires water for irrigation and agriculture as its "lifeblood", the results are more than likely to be disastrous.

Section 9: Transmission Congestion Provisions: We agree with these provisions, although we have been informed during our site visits, that Transmission Congestion is not likely to be encountered for the foreseeable future. Additionally, UDC do carry out load flow studies, and they are competent to carry out these studies independently.

Section 10: Treatment of Water Resources: This is a vital section, which has been treated rather summarily. Complete involvement by BVO and other Water Use entities is necessary. Compensation regimes and costs must be developed.

At the CAR: Electricity Working Group/Sub-group meeting in August 1999, it was agreed that this issue needs to be tackled and a working group was being established for that purpose.

Section 11: Risk Management: Water resource problems need to be addressed. The World Bank and other donor agencies will be involved, particularly to set-up an Enhanced Co-financing Facility (ECO) or a Partial Risk Guarantee which will provide back-to-back surety for payments in the event of default by any Participating Member.

We would like to compliment Hagler Bailly for producing an excellent document on the Conceptual Model, which covers many complex issues of a Power Pool operation, particularly Reliability and the related technical back up. Our reservations on the "bid-based" model are intended to throw the net widely to study and take advantage of contemporary experience available elsewhere.

11. Recommendations

Two of the recommendations have already been adopted as a result of the discussions at CAR Electricity Working Group/Sub-group meeting held at Almaty on August 16-17, 1999.

i. **Water Issues:** It has been agreed that the Treatment of Water Resources would be taken up by a special task force, which will determine the minimum water releases required for irrigation and agriculture. Hydropower generation as a result of these water releases will be incorporated in the Conceptual Model.

ii. **South Africa Power Pool (SAPP):** It was agreed that there are lessons to be learned from the experience of South Africa Power Pool (SAPP), and a tour should be organized consisting of the relevant CAR officials and Hagler Bailly. The delegation will visit SAPP facilities as well as the Central Dispatch Center at Harare, Zimbabwe.

Other recommendations are as follows:

iii. **Institutional:**

(a) In order to improve co-ordination and information-sharing, the Round Tables on the Regional Use of the Syr Darys River Basin Water and Energy Resources should be attended by Hagler Bailly at a senior level to appreciate the concerns of integrated operation, which are so vital to electricity market development in CAR.

(b) Reciprocal arrangements should be made for CAR: Electricity Working Group meetings, which should be attended by EPIC, BVO and other water entities as necessary.

(c) Appendix A presents a Program Strategy for USAID Technical Assistance for Central Asian Regional Electricity and Water Management.

iv. **Workshops:**

(a) Federal Energy Regulatory Commission (FERC) documents on Rulemaking for Regional Transmission Organizations (RTO) are a revolutionary development in the field of Electricity Power Pools. It also demonstrates the evolutionary nature of this business. This document issued in May 1999 will have a profound impact on RTO's. It is recommended that a training Workshop be organized in CAR which can be addressed by FERC and representatives of other stakeholders.

(b) The next Round Table on Syr Darya Basin should have a session completely devoted to the comparative experience worldwide on Power Trading and its relevance to CAR.

v. **Computer Model Development**

(a) Water and Energy Computer Model being developed by EPIC is vital for CAR Power Pool as only an integrated approach would be practicable

(b) Cost allocation for O&M is being studied by EPIC but efforts should also be made to allocate costs for water releases for irrigation. This may prove to be a Gordian Knot, and the interim solution may be to allow the water releases and provide compensation by barter, where the energy equivalents for energy resources, e.g., coal, gas, oil can be determined with accuracy.

vi. **Conceptual Model:**

(a) The following agreements/protocols should form the basis for the Conceptual Model:

- Syr Darya Basin Agreement for the Joint Use of Water and Energy Resources (17 March, 1998)

- Agreement by Council of Prime Ministers of the Republics of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan and the Republic of Uzbekistan about the parallel work of CA energy systems (17 June, 1999).

(b) A stand-alone CAR Power Market based only on Power Generation will not be sustainable. The Conceptual Model may be based on the following tiers:

- The first tier should be the joint use of Water and Power Resources based on the minimum (or optimal) use for irrigation. Any excess generation (in Kyrgyztan or Tajikistan) will be compensated by Barter, i.e., equivalent energy resource in Coal, Natural Gas, Oil or Electricity exchange. This tier will be mandatory.

- The second tier will be based on bilateral agreements of power generation by the State Electricity Utilities or their nominated organizations. The States will be free to develop their own Transmission System independently with their own tariff structure and operation organization (e.g. KEGOC).

- If the power demand exceeds the sum-total of tiers 1 and 2 above, UDC may solicit bids, in the economic order, rather than the clearing price being the highest bid.

- "Open-access" will be available to any Generator, private or public, for bulk transmission of power on UDC Grid by paying the "Wheeling Charges".

The above proposals should result in a flexible Power Pool meeting the requirements of the region as well as allowing market-price mechanism for competitive bidding.

vii. Technical: Technical assistance by Hagler Bailly has been appreciated by the recipients, and it should continue with emphasis on UDC upgrading in respect of metering, telemetering, protection relays, and information systems.

Appendix A.
Future Directions for USAID Technical Assistance for Central Asian Regional Electricity and Water Management

1. Issue

Since 1995, USAID's has continued an effective regional water and energy management program designed to promote regional cooperation in water management and in the development of reliable energy supplies for the developing Central Asian nations. The Central Asia power grid and the water and irrigation systems were designed to operate as single, unified systems. Since independence, the republics have struggled to keep both systems operating in a unified fashion, although national economic interests and needs have sometimes complicated that objective. In addition to their continued struggle to ensure efficiency through integrated system operation, the countries must now also consider trade-offs in water use between agriculture and other uses, including power production, as the republics examine their own economic interest vis-à-vis the region's water resources. There are a range complex considerations and potential implications that national and regional power and water management decisions can have for multi-sectoral economies, which include distortions in the power market due to water management polices and effects of increasing hydropower production on downstream irrigation. USAID's strategy for regional energy and water management, must therefore, encompass a broad range of considerations to ensure that its assistance programs supporting various economic sectors do not undermine each other.

2. Background

USAID's regional programs in water and electricity were developed in response to needs of the region to more fully integrate unified systems after the collapse of the Soviet Union in 1991. The broad objectives of both programs are to promote an effective policy framework to achieve private investment in an environmentally sound, regionally efficient, market-oriented economy, and to reduce regional economic and political tensions generated by transboundary environmental issues. USAID's regional water management program has focused on management issues associated with the trade offs in water use and environmental impacts of current water use practices, while the regional electricity program has focused on providing assistance to make the current electricity system more efficient using market based approaches.

The focus of both the regional water and electricity programs is to promote adoption of regional agreements which essentially lay out the ground rules for efficient and fair allocation of resources. In addition, they also promote a strong institutional focus which is necessary to ensure execution of the regional agreements once they are adopted. In 1996, the regional water management program began working with the Executive Committee of the Central Asian Economic Community (EC CAEC) to draft an agreement on management of water and energy resources of the Syr Darya Basin, one of the region's two major rivers. That same year, USAID's regional electricity program began working under the Regional Energy Council to promote regional markets in electricity trade.

Both efforts have culminated in regional agreements. In 1998, the four riparian countries of the Syr Darya Basin entered into an agreement to trade winter fuel in exchange for summertime water releases and wintertime water storage upstream to support summertime irrigation in downstream states. In 1999, members of the Central Asian Economic Community signed an agreement on parallel operations of the Central Asian electricity grid. Given that at least 11-12% of the electricity resources of the grid are comprised of hydropower generated from the water resources of the Syr Darya basin, it is evident that both agreements are interconnected and efforts to implement them must be closely integrated. Conversely, future growth in hydropower production, which might be promoted by changes in regional power sector policies, would by necessity upset the water allocation regime that downstream irrigation water users have come to depend on. Shifts in water allocations would affect national economies that would possibly be accompanied

by political tensions. Given that agricultural production contributes up to 45-50% of GDP in each of the four republics any reduction in amount or timing of water deliveries for use in irrigation could be problematic. On the other hand, while the energy sector currently only contributes about 15% of GDP in the various republics, efficient energy management forms the basis of development in all economic sectors. Growth in local economies from agriculture has limitations due to constraints on water as an input, thus, future growth is more likely to be seen in economic sectors which could depend heavily on reliability of power supplies as a input to production.

Economic growth of the republics is also stifled by environmental and health impacts due to the region's overuse of available water. One study estimated that damages due to water overuse in the Aral Sea disaster zone of Uzbekistan and Kazakhstan are $1-2 billion annually. Annual losses are likely to be higher if impacts to regions outside the disaster zone are taken into account, and the sum takes a heavy toll on the region's economy. However, the republics to date have not appeared willing to address environmental concerns directly, and thus, more work is needed to address the water management and allocation issue from a resource protection perspective. Further, development of the energy sector needs to address potential environmental issues before they occur to prevent further drains on local economies due to adverse environmental impacts.

3. Accomplishments to Date

USAID's regional electricity and water programs have initiated dialogue and kept communication lines open among republics on complex issues of resources systems management. The Water and Energy Uses Round Table, comprising high level water and energy officials from Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan, developed a ground-breaking multi-year agreement on energy and water use for the Syr Darya Basin in 1998. The Round Table has now become part of the organizational structure of the EC CAEC, a development which may be more significant than the agreement that this group developed and saw to conclusion. The group has broadened it interests to other regional issues such as financing the operation and maintenance of shared water facilities and improving the water quality of the Syr Darya Basin, in addition to continuing to address issues that insure smooth implementation of the 1998 agreement. In addition, the Round Table is overseeing the development of an agreed management model for the basin's water and energy resources which will assist the republics in improving river and power systems operation to better meet the competing water needs of the riparian nations.

With respect to power sector developments, the Regional Electricity Working Group recently achieved the conclusion of a regional agreement on the parallel operation of the Central Asian Electricity grid. It has also developed a draft conceptual model for the development of an electricity market for Central Asia. These events are extremely significant given the nature and difficulty of the economic transitions in the Central Asian Republics.

4. Constraints

Status Quo versus Change

Under the Soviet system of barter, irrigation of downstream regions was supported through development of large storage facilities of the upstream regions, complemented by fuel deliveries for regions that hosted reservoirs on their territory. While upstream regions typically have the upper hand in water allocation, this notion was turned on its head as the Soviets emphasized expansion of downstream cotton production throughout the 1960-80's. As a result, the region's historical water allocation favors downstream irrigation accompanied by concomitant fuel deliveries to upstream areas for wintertime heating as part of the historical use pattern (the fuel component of this pattern is often ignored as part of the historical use pattern).

In the Syr Darya Basin, Uzbekistan is the major agricultural producer, with an historical share of 50% of the water use of the basin and realization of most of the economic benefits from water use. Uzbekistan, however, being a downstream state in this instance, suffers few of the external costs due to environmental degradation associated with its agricultural production. Uzbekistan stands to gain little from any change in the status quo, which might either involve use of more of the waters for other purposes in the riparian states or efforts to address salinity problems due to current water use practices.

From the energy side, all of the Central Asian nations wish to pursue national energy self-sufficiency. The notion of self-sufficiency in this case undermines the parallel operation of the Central Asian energy grid. Kazakhstan has, in the past, closed the 500 KV power line running through its territory to take economic advantage of privatization efforts within its borders. However, the power grid is the only means for transporting electricity to some parts of Kyrgyzstan, and it suffered significant power losses as a result.

Since the emergence of the CA republics, the upstream states see new opportunities for hydropower development of their substantial water resources. However, development limits are placed on growth in the hydropower sectors of these countries due to downstream summertime demands for water and regional (including outside of Central Asia) hydropower demands.

At the macro level, some governments of the region are more resistant to transition and change than others. This variation is often difficult to balance when attempting to develop a regional framework that can apply systematically to participating governments. While Kazakhstan, Kyrgyzstan and Tajikistan have been fairly progressive in adopting market reforms, economic and political realities often hamper their effectiveness in reality. Uzbekistan and Turkmenistan on the other hand, have been slow to adopt market incentives and democratic reforms. As a result, policy approaches which might be appropriate where market transitions are taking place may or may not be as useful where economies continue to be centrally planned and held in close control by the governments.

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Institutional

The tension between promoters of the status quo versus those seeking change is often reflected in the manner in which regional organizations responsible for oversight of regional water and power allocations interact. Tensions over turf among sometimes competing organizations can pose considerable obstacles to progress in the complex realm of regional cooperation.

In the early 1990's, in response to international outcries and at the behest of the World Bank, a regional water management organization was established to address problems of the Aral Sea basin. The organization, the Interstate Council for the Problems of the Aral Sea (ICAS) was plagued by lack of agreement between states on the appropriate role that it should play. This organization, located in Uzbekistan, was often viewed as serving the interests of only Uzbekistan rather than leveling the playing field for all member republics. In 1998, the ICAS was disbanded and replaced with the Interstate Fund for the Aral Sea (IFAS) which was chaired by the President of Uzbekistan for a two-year term, ending in Spring 1999. The chairmanship then rotated to Turkmenistan, and with this shift, many expect that IFAS will no longer be in a position to serve as a strong leader in regional water management.

In February 1992, water and reclamation ministers from the five newly independent states signed an agreement to organize the Interstate Coordinating Water Commission. The function of this Commission is to consider the problems of regulation of efficient use and conservation of water resources. The Commission, as originally envisioned, was to be comprised of the heads of the water management organizations with each state. Its is to determine water management policy in the region, to determine integrated and efficient use of water resources, and to develop a long term program of water supply in the region and measures for its implementation. ICWC is also charged with establishment and approval of water use limits, annual for each Republic, and the region as a whole. The ICWC, was subsumed under the ICAS in 1993, and after ICAS was merged into the IFAS in 1997, the status of the ICWC has not been clear. In 1997, Kyrgyzstan questioned ICWC's validity as a true inter-governmental organization due to the fact that

the signatory, the head of the Kyrgyz water management authority, did not at that time have the right to speak on behalf of the government. With the status of the organization in question, it does not have a process mechanism for elevating its decisions to the level of the Prime Ministers, who customarily sign intergovernmental agreements for the CAR nations. Nevertheless, it would seem that there is a clear need for a regional mechanism for high-level water sector officials from the Republics to convene on a regular basis to decide important water management matters.

The Basin Management Organizations for Amu and Syr Darya (BVO's) were established under the Soviet Union during the mid-1980's. These organizations are responsible for development of annual allocation regimes and oversight of water deliveries. After ICAS was created in 1993, the BVO's were subsumed under the ICWC which provided policy direction to the technical activities of the BVO's .

In 1996, the Presidents of Kazakhstan, Kyrgyzstan, and Uzbekistan gave the Interstate Council for Kazakhstan, the Kyrgyz Republic and the Republic of Uzbekistan (ICKKU) responsibility for managing water use from a multi-sectoral perspective. The ICKKU, which has been expanded to include Tajikistan, and is now named the Central Asian Economic Community (CAEC), is responsible for a range of multi-sectoral regional issues, including organization of a free trade zone, military cooperation and development of integrated communications, transportation, and energy and water linkages. President Nazarbaev of Kazakhstan chaired the organization until early 1997 when chairmanship rotated to President Akaev of Kyrgyzstan. At the request of President Nazarbaev, the Kyrgyz President's term was extended for an additional two years. The organization views water and electricity as important inputs to overall regional economic growth, and strives to serve at the behest of its member republics in ensuring mutual and efficient use of water and power resources of the region. It is unclear, however, how committed Uzbekistan is to use of this regional organization of late, as it has refused to agree to set dates for Council of Prime Minister's meetings over the last year. This has impeded progress in adoption of new policies on energy and water management. Although Turkmenistan is currently an observer, it has as a matter of national policy limited its involvement in regional organizations.

The United Energy Dispatch Center of Central Asia (UDC Energia), located in Tashkent, Uzbekistan, is responsible for operation and distribution of power flowing through the Central Asian energy grid. This organization frequently receives praise from local counterparts of the other republics for the fairness and equity with which it executes its responsibilities. There was a proposal (encouraged by USAID) to strengthen this organization by enhancing its status as a true international organization. The issue became a point of contention with Uzbekistan, which did not want to loose its control over the organization. It was precisely this issue that complicated adoption of the parallel operation agreement for the Central Asia energy grid, which was drafted more than two years ago, yet only recently signed in June 1999.

Among the biggest constraints to progress for both the regional water and electricity programs is the growing tendency toward nationalism in the region. Further, countries with the most to lose are the most resistant to change. Therefore, efforts toward more efficient and fair allocation of resources is often impeded. The tendency toward nationalism is frequently observed in the manner in which regional organizations operate, where they are mandated to serve the interests of the host nations rather than taking a truly regional perspective. The result of this is often stalemate in the dialogue among countries with regard to regional issues.

Programmatic

The regional electricity and water programs of USAID have to date been carried out under a single Office but through separate contract mechanisms: one in the area of energy development and the other in the area of environmental and water policy. The efforts of the two contractors, however, have been closely coordinated through close communication and cross-participation in project meetings. Further, the local chairman of the regional Electricity Working Group (supported through the energy sector contract) is also a member of the Water and Energy Uses Round Table (supported through the water and environmental policy contract), and both efforts also are processed through the EC CAEC. This cross-fertilization reduces the potential that activities being supported under either one or the other program will have an adverse effect on the other.

Although there has been close coordination between the separate energy and water programs to date, there remains room for further integrating the program management of these efforts—perhaps under one contract mechanism, and/or USAID manager. This would ensure increased cohesiveness of the two interrelated regional programs.

5. Recommendations for a New Integrated Regional Water and Electricity Program

The regional electricity and water management programs have been successful to date, in spite of the many limitations due to the transition from command-and-control economies to market-oriented systems. However, it would appear that efficiency gains could be obtained by greater integration of future USAID assistance in this field. The defining characteristic of the new approach would be the full integration of all aspects of water and power assistance.

Several other innovations could also be considered. A new and better integrated program could be considered which would use a more decentralized technical assistance approach with a smaller project office and advisors (expat and local) placed within key counterpart agencies (such as EC CAEC, BVOs, and UDC). Technical assistance efforts also could be complemented by appropriate "projectized" investments, in which pilot field activities are undertaken to test new management approaches or commodities provided to support appropriate policy or institutional reforms. The program might also make use of sub-awards (either sub-contracts or grants) to key participating institutes that also can be strengthened to serve as longer-term technical resource bases. These institutions already exist at the national level (though most need help) and would need to be further encouraged and/or created at the regional level.

Several initial ideas and notional tasks under an integrated program are outlined below:

Theme 1: Development of Regional Policies and Programs to Support Improved Water and Energy Management in CAR

a) Defining Roles and Responsibilities for Water and Power Management Entities.

This aspect of a new regional water and energy management program would better define the roles, responsibilities, and interactions of the various working entities to ensure effective integration of the program. The goal of this activity would be to assist the regional organizations responsible for water and power management in working together and better defining their roles vis-à-vis each other. Another aspect of this task would be to review the institutional framework for management of the USAID technical assistance program to better ensure integration of the regional electricity and water programs. This likely would include realigning the Water and Energy Uses Round Table and Regional Electricity Working Group efforts to work together in tandem.

b) Sponsor Efforts to Calculate Economic Benefits and Impacts from Developments in Improved Regional Cooperation in Water and Power Management.

The goal of this task would be to promote an improved understanding of the economic interests each country has in moving more progressively towards market reforms and better management of energy and water systems. In addition, economic analyses could define the potential implications of regional water and power policies on various sectors of the regional and national economies.

c) Promote Policies, Programs and Institutions for Improved Transboundary Environmental and Natural Resources Management in Central Asia.

This aspect of the program would provide for policy development and better information management to improve environmental and natural resources allocation and decision-making. For example, such a program could include activities for development of basin or sub-basin management plans to address environmental objectives while examining a full range of water and hydropower demands. Policy programs could be tied to local pilot projects at the farm level. For example, a program of applying best agricultural management practices to reduce non-point source pollution and salinity could be tied to regional and national policy programs to improve water quality goals and objectives tied to pollution prevention and protection of beneficial uses of water.

Theme 2: Development and Implementation of Regional Water and Power Agreements

a) Implementation Support for Syr Darya Water and Energy Use Agreement.

This component would be designed to support capacity building for implementing organizations, development of improved data collection and information management systems, and an expanded program to ensure broader consideration of resource protection approaches and efforts toward sustainable economic development. In addition, agreement implementation could be supported by small-scale on-the-ground engineering investments to support improvement in river flow conditions, monitoring and metering, etc. A direct sub-award to the EC CAEC to manage the continued oversight of the Syr Darya agreement could be considered, which would operate through the Water and Energy Uses Round Table. However, some means of interactions between the Round Table, the Regional Electricity Working Group and the Regional Energy Council would need to be identified to ensure effective collaboration between these entities.

b) Support for Further Development of a Regional Power Pool and Market.

This effort would continue activities in relation to parallel operation of the Central Asia energy grid as well as promoting development of electricity markets. However, development of the power market would be based on practical approaches that are adapted to Central Asian conditions. The Regional Energy Council and the United Dispatch Center would continue to be the primary counterparts, albeit with better integration of the water sector. However (as noted above), an improved approach for integrating the efforts of the Water and Energy Uses Round Table and the Regional Electricity Working Group would need to be defined to ensure that fuel and water barters do not complicate power markets or that power development does not exacerbate already increasing tensions between upstream and downstream states over competition for water.

Theme 3: Demonstrating Improved Water and Electricity Management in the Region

a) Integrated Water and Power Management in Transboundary Catchment Areas.

This effort would include pilot projects that would use a comprehensive basin management approach to planning and management for power and water resources. Priority might be given to choosing sites that straddle national boundaries so that there is a clear regional dimension. The approach would include support for local pilot projects which would develop plans, in conjunction with local communities and counterparts, to more efficiently utilize water for power generation, irrigation, and environmental purposes. Notional examples of such projects include:

- Pilot catchment shared by Kyrgyzstan and Uzbekistan (in which a dam is located in one territory and the command area the another)
- Pilot catchment shared by Tajikistan and Turkmenistan
- Balkash Basin management (with links to the People's Republic of China)

b) Development of Regional Surface Water Quality Standards and Monitoring for Improved Water Quality and Management Efficiency.

There is an increasing need and interest in improving water quality to address a high priority environmental problem in the region and to support regional sustainable development. There have been several unsuccessful attempts over the past five years to establish goals and objectives and to begin to develop management alternatives to improve existing conditions. Especially in the limited context of regional cooperation to manage the waters of the Syr Darya, there would now appear to be an opening for real progress. One step in this direction would be to develop regional surface water quality standards, which are specifically relevant to the Syr Darya Basin. Data collection and information exchange are essential to the improvement of environmental conditions. Limited complementary support for environmental monitoring equipment might be considered as part of this approach. Collaboration with the hydrometerological agencies could serve as a centerpiece of the institutional approach. Most importantly, a closer collaboration with the Uzbekistan Hydromet agency, which was responsible for drafting and seeing to conclusion a regional agreement on Hydromet cooperation between CAEC countries, could be developed. Collaboration with this agency, an historically a strong supporter of USAID's water management and environmental programs in the region, would be important for strengthening regional consideration of water and power issues from a resource protection standpoint. It could also be a means by which to strengthen relations with Uzbekistan.

Environmental entities within each of the five Central Asian republics are responsible for development of surface water quality standards, for issuing discharge permits, and are given veto authority over water rights permits to be issued by water management authorities. Training in a regional setting to improve development of water quality standards and relating those standards to discharge permitting and water rights approvals at the national level would be an appropriate activity for a new regional water and energy management program. Based on analysis previously sponsored by USAID, further exploration of the use of market-based incentives as an alternative to a regulatory approach also could be usefully built into this effort.

c) Mobilizing Financial Resources for Improved Infrastructure Financing, Guarantees of International Agreements and Operation and Maintenance of Shared Water Management and Power Generation Structures.

Financing intergovernmental agreements on power and water exchanges, developing the means for monetizing exchanges, and ways for financing infrastructure improvements and covering the costs of operation and maintenance will continue to be central to national participation in the regional power and water dialogue. USAID assistance in this area will be critical to the ultimate success or failure of regional agreements on power and water.

Appendix B.
Copies of Regional Agreements

1. Agreement on the Use of Water and Energy Resources of the Syr Darya Basin

Republic of Kazakhstan, Kyrgyz Republic, and Republic of Uzbekistan

Interstate Council of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan

COUNCIL OF PRIME MINISTERS

AGREEMENT
Between the Governments of the Republic of Kazakhstan,
the Kyrgyz Republic, and the Republic of Uzbekistan
on the Use of Water and Energy Resources of the Syr Darya Basin

The Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan, hereinafter referred to as the Parties:

GUIDED by sincere spirits of good-neighborliness and cooperation;

RECOGNIZING the fact that the appointed countries followed the agreed procedure of Syr Darya Basin Water and Energy Uses, ensuring social and economic development of their countries and people's welfare;

NOTING that the Syr Darya basin, comprised of the area of four countries, has water and energy resources to promote the economic growth of the countries;

HAVING a common desire to find the most precise and fair solution to use the water and energy resources of the Syr Darya basin in accordance with the precedents of international law;

ACKNOWLEDGING that benefits derived from the joint operation of the reservoirs of the Naryn-Syr Darya Cascade, through a multi-year flow regulation and the flood control measures, include the use of water for irrigation and power generation;

TAKING INTO ACCOUNT that a joint and comprehensive use of the water and energy resources of the Syr Darya basin must be implemented with regards to the environmental safety of the region;

NOTING the common interests of the participating countries and the urgent need for the development of an efficient and coordinated water regime in the Syr Darya basin, taking into account the problems of the Aral Sea; the Parties agree on the following:

ARTICLE I
Definitions

"Naryn Syr Darya Cascade" refers to the aggregate of the multi-year and seasonal regulation reservoirs.
"Growing period" is defined as the period from April 1 to October 1.
"Non-growing season" is defined as the period from October 1 to April 1.
"Water management year" is defined as the period from October 1 to October 1 of the following year.

ARTICLE II

To ensure the agreed-upon operating regimes of the hydrotechnical facilities and the reservoirs of the Naryn-Syr Darya Cascade and irrigation water releases, the Parties deem it necessary annually to coordinate and make decisions on water releases, production and transit of electricity, and compensations for energy losses, on an equivalent basis.

ARTICLE III

The Parties will take no actions which will violate the agreed-upon water use regimes and energy deliveries, or infringe on the rights of the other Parties to obtain water and energy deliveries in the mutually-agreed amounts or to transport resources through their own territories.

ARTICLE IV

The Naryn-Syr Darya excess power emanating from the release mode utilized on the Naryn-Syr Darya during the growing season, and the Toktogul multi-year regulated flows that exceed the needs of the Kyrgyz Republic, will be transferred to the republics of Kazakhstan and Uzbekistan in equal portions.

Compensation shall be made in equivalent amounts of energy resources, such as coal, gas, electricity and fuel oil, and the rendering of other types of products (labor, services), or in monetary terms as agreed upon, for annual and multi-year water irrigation storage in the reservoirs.

A single tariff policy for all types of energy resources and their transportation shall be applied for mutual settlements.

ARTICLE V

The Parties shall undertake essential measures which will ensure the fulfillment of their Agreement commitments to the other Parties using various forms of guarantees, such as lines of credit, security deposits, or other forms.

ARTICLE VI

The Parties agree that customs fees and duties will not be applied for deliveries of energy or other types of products (labor and services) within the Agreement.

ARTICLE VII

The Parties agree that the operation, maintenance and reconstruction of water and energy facilities shall be covered in accordance with the ownership of the property referred to in the balance sheet and the legal right of ownership.

ARTICLE VIII

Reservoir operation modes, energy amounts and transfers are approved by annual intergovernmental agreements based on the decisions made by water, fuel and energy organizations headed by vice prime ministers of the signatory countries. The BVO Syr Darya and UDC Energia shall be appointed as executive bodies responsible for the release schedules and energy transfers prior to the establishment of the International Water and Energy Consortium and its executive body.

ARTICLE IX

Any disputes or disagreements will be resolved through negotiations and consultations. If the Parties do not reach an accord the issue in dispute shall be considered by an arbitration court that will be established by the Parties for each specific case.

ARTICLE X

To provide further improvement of the management and use of the water and energy resources and the enhancement of economic relations aimed at guaranteed water supply in the basin, the Parties agree to consider jointly the following issues:

- Construction of new hydropower facilities and reservoirs, or alternative sources for hydropower in the region;
- Replacement of barter settlements by financial relations;
- Development of pricing mechanisms based on a single tariff policy;
- Ensuring safe operation of hydrotechnical facilities in the Syr Darya Basin;
- Economic and rational water use with the application of water-conservation technologies and irrigation equipment; and
- Reduction and discontinuation of polluted water discharges in the water sources of the Syr Darya basin.

ARTICLE XI

This Agreement shall be in force from the date the Parties forward the notification of depository on the implementation of the internal state procedures to enforce it.

ARTICLE XII

This Agreement is valid for a period of five years and will be automatically renewed for additional five-year periods, if no written notice on the termination of the Agreement is given six months in advance from any Party.

ARTICLE XIII

This Agreement is open for other countries to enter.

ARTICLE XIV

Given the mutual consent of the Parties, amendments and addenda can be introduced and formalized by separate protocols, and will become integral parts of the Agreement.

This Agreement is finalized in Bishkek, March 17, 1998, in one original copy in Russian.

The original copy remains in the office of the ICKKU Executive Committee, which will submit certified copies to each member country having signed the Agreement.

Signatories:

For the Government of the Republic of Kazakhstan	For the Government of the Kyrgyz Republic	For the Government of the Republic of Uzbekistan
N. BALGIMBAEV	A. DJUMAGULOV	U. SULTANOV

2. Protocol Amendment to the Agreement on the Use of Water and Energy Resources of the Syr Darya Basin

Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan, and Republic of Uzbekistan

Interstate Council of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan

COUNCIL OF PRIME MINISTERS

PROTOCOL
on Inserting Amendments and Addenda in the Agreement
Between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin, of 17 March 1998

To establish a more fruitful cooperation of the Republic of Tajikistan and the countries participating in the Agreement on Creation of a Single Economic Zone addressed to water and energy issues, and proceeding from the request of 19 June 1998 made by the Government of Tajikistan, the Council of Prime Ministers of the Central Asian Economic Community (CAEC) agreed to insert the following amendments and addenda in the Agreement Between the Governments of the Republic of Kazakhstan, the Kyrgyz Republic, and the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin, of 17 March 1998.

The words …[*the Government] of the Republic of Tajikistan* … shall be inserted after the words …*the Kyrgyz Republic*…in the title and the first paragraph of the preamble.

Article 4 shall be supplemented with the paragraph:

The Republic of Tajikistan shall provide the Kairakkum reservoir annual operation according to the regime agreed by the Parties, and the Republic of Kazakhstan and the Republic of Uzbekistan shall supply equal portions of electric power to the Republic of Tajikistan in the period of the reservoir water storage, the agreed equivalent electricity amount shall be subsequently supplied back during summer time.

Article 11 shall be worded as follows:

This Agreement shall be in force from the date of its signature by the Parties.

Performed in_____, _____, in one original copy in Russian.

The original copy remains in the office of the Executive Committee of the Interstate Council of the Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan and Republic of Uzbekistan, which will submit certified copies to each participating country.

For the Government of the Republic of Kazakhstan	**For the Government of the Kyrgyz Republic**	**For the Government of the Republic of Tajikistan**	**For the Government of the Republic of Uzbekistan**

[All four countries signed the document on 7 May 1999, (*the translator's note*)]

3. Agreement on Parallel Operation of the Energy Systems of Central Asia

Republic of Kazakhstan, Kyrgyz Republic, Republic of Tajikistan, and Republic of Uzbekistan

Interstate Council of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan

COUNCIL OF PRIME MINISTERS

AGREEMENT
between the Governments of the Republics of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, and the Republic of Uzbekistan on the Parallel Operation of the Energy Systems of Central Asia

The Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic, the Government of the Republic of Tajikistan, and the Government of the Republic of Uzbekistan hereinafter referred to as the Parties,

Proceeding from multiyear commonality of the historical development, traditional economic, scientific and research links, firmly resolving to establish their own international relations on the basis of mutual understanding, equity and equality;

Recognizing that strengthening friendly and good neighborly relations, establishing cooperation and mutual support between the Parties meet the traditional interests of the CA nations;

Admitting that the CA energy complexes have been functioning during decades as a power grid;

Considering it important to set favorable conditions for the development of market relations between the economic entities, and create an integrated electricity market in the future;

Trying to set the most reliable and economical power supply regimes for the consumers;

Observing the principles of the European Energy Charter, approved in Hague, 17 December 1991,

the Parties agree on the following:

Article 1

The Parties, proceeding from the necessity and economic purposefulness to provide efficient operation of their own energy systems, using the current electricity transmission lines, assume the responsibility to create favorable conditions to develop and implement the advantages of a parallel operation of energy systems and restrain from actions that may damage the interests of the other Party.

Article 2

To form an integrated electricity and capacity market the Parties deem it expedient to consider the issue of establishing the regional Electric Power Pool of Central Asia (EPP CA).

Article 3

The Parties agree that:

- The parallel operation will ensure a reliable and efficient work of the energy systems within the EPP CA;
- The electric power pool means an aggregate of energy systems of the countries, energy producers, and electricity networks, that have been united on a voluntary basis to provide conditions for efficient and

reliable electricity supplies to consumers, gaining maximum advantages of the energy systems parallel operation;

- Each Party shall independently make the layout and identify the amount of their own electricity networks for the parallel operation with the EPP CA, proceeding from their own national interests.

Article 4

The Parties, while considering the issue of the EPP CA use, recognize that the reliable and economic electricity supply, and the creation of the electricity and capacity market is ensured through mutually coordinated technical and economic policies.

Article 5

The parallel operation of the CA energy systems shall be achieved through currently operating and newly constructed 500 –220 kV intersystem electricity transmission lines.

The indispensable requirement for the energy systems parallel operation shall be based on the principle of electric power and capacity self balance for each EPP CA energy system with regard to the concluded agreements.

Given the recognition of the transmission lines capability, the energy system operation mode shall be implemented through the stipulated mutual electricity and capacity deliveries

Article 6

The Parties use and serve the international transmission lines according to the ownership of the property referred to in the balance sheet.

Article 7

The Parties agree to undertake concerted actions to implement energy transfers and the agreements on electricity transits, and avoid unauthorized electric power seizures by consumers.

Article 8

The Parties engage themselves to rendering mutual assistance under emergent conditions to remove accidents/breakdowns at energy facilities and restore normal energy supply for consumers.

Article 9

The Parties agree to take a coordinated decision on the unimpeded and duty-free passing treatments for the operating and repair personnel, equipment, and materials of the other Party to serve the power transmission lines.

Article 10

The Parties agree to take a coordinated decision not to impose custom duties, taxes and other collections, to be paid into the budget, on power transfers and transits through the international power transmission lines, and also on the frequency regulation services.

Article 11

Any disputes concerning interpretation and application of the Agreement will be resolved through mutual consultations and negotiations.

Article 12

Given the mutual consent of the Parties, amendments and addenda can be introduced in the Agreement. The amendments shall be formalized by separate protocols, and will become integral parts of the Agreement.

Article 13

The Agreement is open to enter for other countries that share these goals and principles.

Article 14

The Agreement is valid for a period of five years and will be automatically renewed for additional five-year periods in case the Parties do not take any other decision.

Any Party may cancel the participation in the Agreement through a written notification of the depository not less than one month in advance before termination.

The Agreement shall come into force upon the signatures.

Done in Bishkek 17 June 1999 in one original copy in Russian.

The original copy remains in the ICKKTU Executive Committee, which will submit certified copies to each member country that, have signed the Agreement.

For the Republic of Kazakhstan	For the Kyrgyz Republic	For the Republic of Tajikistan	For the Republic of Uzbekistan
N. Balgimbaev	A. Muraliev	A. Azimov	U. Sultanov

4. Protocol on water and energy use issues in the forthcoming 1998/9 fall-winter season and 1999 vegetation period

PROTOCOL

of the Workshop for the Representatives of Water and Energy Authorities of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tadjikistan and the Republic of Uzbekistan related to water and energy use issues in the forthcoming 1998/9 fall-winter season and 1999 vegetation period

August 24-26, 1998

Bishkek

Received EPIC Almaty September 1, 1998
Translated by N. Pachenko

Participated:

vi. ***On behalf of Regional Authorities***

Ametov I. D. **UDC "Energia", Chief dispatcher**

Khamidov M. Kh. Head of BVO "Syr Darya"

vii. ***On behalf of the Republic of Kazakhstan***

Askarov H. A. Head of water department, Water Resources Committee of the Ministry of Agriculture

Kudaibergenuly K. K. Head of "Balkash-Alakol" BVO

Utegulov N. I. Advisor of the President of JSC "KEGOC"

Kusainov G. S. Director of a department of JSC "KEGOC"

viii. ***On behalf of the Kyrgyz Republic***

Davydov I. A. **First Deputy General Director of JSC "Kyrgyzenergo"**

Beishekeev K. K. Deputy General Director of the Department of Water Economy of the Ministry of Agriculture

ix. ***On behalf of the Republic of Tajikistan***

Samadov Sh. D. Head of the department for fuel and energy complex of the Executive Apparatus of the President of the Republic of Tajikistan

Sirozhev B. S. Chairman of Energy Company "Barki-Tochik"

Nazriev M. N. First Deputy Minister of Melioration (Reclamation) and Water Economy

x. ***On behalf of the Republic of Uzbekistan***

Dzhalalov A. A.	First Deputy Minister of Agriculture and Water Economy
Yusupov B. M.	Head of Water Budget Department of the Ministry of Agriculture and Water Economy
Azimov I. Sh.	Deputy General Director of the Business Partnership "Uztransgaz"
Abdullaev H. N.	Head of planning and economy department of the Ministry of Energy

Workshop participants indicate that the current measures on mutual seasonal supply of electricity and energy resources between the Republics prevented Toktogul reservoir from being deeply drawn-down during the past fall-winter period; favorable weather conditions in 1998 ensured provision of irrigation services during the vegetation period in the Syr Darya basin and allowed the accumulation of water, its reserves increased by 6.5 billion cubic meters in comparison with the same period in 1997. Particularly, in Toktogul reservoir the increase was 3 billion cubic meters; in Kayrakum reservoir – 0.7 billion cubic meters; in Andijan reservoir –
1.1 billion cubic meters; and in Chardara reservoir – 1.7 billion cubic meters. At the beginning of the fall-winter period (October 1, 1998) the volume of water in Toktogul reservoir is expected to be at the level of 15.0 billion cubic meters, 3.2 billion cubic meters larger than in 1997.

As a result of the significant divergence from the forecasted water content during the vegetation period in the Syr Darya basin, the volume of water released from Toktogul reservoir was less than the Interstate Agreement of March 17, 1998 determined.

Moreover, out of 2.2 billion kWh of electricity indicated in the Agreement, gross power supply from the Kyrgyz Republic amounted to 598 million kWh (based on data of August 25, 1998), in particular, 167.5 million kWh of power was supplied to the Republic of Kazakhstan, and 430.6 million kWh of power was supplied to the Republic of Uzbekistan.

According to the offset (new) conditions the following was supplied to the Kyrgyz Republic from the beginning of 1998:

from the Republic of Kazakhstan
power (electricity) - 150 million kWh
coal - 150.4 thousand tons;

from the Republic of Uzbekistan
natural gas - 501.2 million cubic meters
power - 54.2 million kWh
fuel oil - 15.2 thousand tons.

To prevent flooding of lands, facilities, and water discharge to the Arnasai depression, the BVO Syr Darya proposed that during the 1998-99 fall-winter period the gross water releases through Toktogul power generating station should be 6.0 billion cubic meters, and 6.5 billion cubic meters will be supplied for irrigation purposes during the 1999 vegetation period.

Based on the expected power consumption in the IV-th quarter of 1998 and 1999, and shortfalls in energy resource supplies from the neighboring republics ("Kyrgyzenergo" information), it is anticipated that during the 1998-99 fall-winter period water releases through the Toktogul power-generating station will be 9.5 billion cubic meters (3.5 billion cubic meters larger than BVO Syr Darya proposed), and during the vegetation period there will be released 3.7 billion cubic meters for irrigation purposes (2.8 billion of cubic meters less than BVO Syr Darya proposed).

During the 1997-98 fall-winter period 7.1 billion cubic meters was released through the Toktogul power-generating station.

Combining the energy and irrigation operation schedules for Toktogul reservoir during fall-winter and summer periods is possible if energy resources are supplied to power-generating stations in Bishkek and in Osh in volumes indicated for 1998 and 1999 in the Interstate Agreement, including:

natural gas – 600 million cubic meters;
coal – 566 thousand tons;
electricity – 250 million kWh;
fuel oil - 20 thousand tons.

For the Republic of Kazakhstan, Uzbekistan and the Kyrgyz Republic to be able to receive 2.2 billion kWh of electricity during the vegetation period it is necessary to complete the 500 kV loop.

To ensure efficient water and energy use in 1998 - 99 fall-winter period, availability of water for irrigation in 1999, and conservation of water reserves remained in the current year, workshop participants propose:

To establish the following mean daily norms for water releases from the Toktogul reservoir:

1998/9 fall-winter period

October – 250 cubic meters/sec;
November – 390 cubic meters/sec;
December – 500 cubic meters/sec;
January – 540 cubic meters/sec;
February – 520 cubic meters/sec;
March – 400 cubic meters/sec;

1999 vegetation period:

April – 300 cubic meters/sec;
May – 230 cubic meters/sec;
June – 500 cubic meters/sec;
July - 650 cubic meters/sec;
August – 600 cubic meters/sec;
September – 100 cubic meters/sec.

To ensure the provision of the aforementioned releases during the vegetation period, 2.2 billion kWh of electricity is currently being transferred from the Kyrgyz Republic to the neighboring states, including:

To the Republic of Kazakhstan – 1100 million kWh,
To the Republic of Uzbekistan – 1100 million kWh.

To implement the above mentioned power transfers, the Republic of Kazakhstan, Uzbekistan and the Kyrgyz Republic should solve the issue of completing the 500 kV loop and setting the terms of supplies.

To provide water supply in the volume of 800 million cubic meters for the Republic of Kazakhstan through the “Dustlik” canal during the vegetation period.

In order to ensure the provision of winter and summer releases and conservation of the remaining 1998 water reserves from Toktogul reservoir, representatives from the Kyrgyz Republic, the Republic of Uzbekistan, BVO Syr Darya and UDC “Energia” consider the following to be necessary:

3.1. By the end of 1998, to complete the supply of energy resources to the Kyrgyz Republic in volumes indicated for year 1998 in the Interstate Agreement:

from the Republic of Kazakhstan:

electricity – 250 million kWh;
coal – 566.7 thousand tons.

from the Republic of Uzbekistan:

natural gas – 772 million cubic meters;
fuel oil – 40 thousand tons.

If in 1998 the Republic of Kazakhstan partially fulfils its obligations on Karaganda coal supplies, in order to conserve water in Toktogul reservoir for 1999 irrigation period, coal supplies in the IV quarter should be accelerated;

3.2. In 1999, to supply:

from the Republic of Kazakhstan:

electricity – 250 million kWh, including:
I half-year ,1999 – 150 million kWh
II half-year ,1999 – 100 million kWh

Karaganda coal - 566 thousand tons, including:
I quarter – 200 thousand tons,
II quarter – 150 thousand tons,
III quarter – 100 thousand tons,
IV quarter – 116 thousand tons.

from the Republic of Uzbekistan

natural gas – 600 million cubic meters, including:
I quarter – 190 million cubic meters,
II quarter – 110 million cubic meters,
III quarter – 100 million cubic meters,
IV quarter - 200 million cubic meters

fuel oil – 20 thousand tons during summer time

The Kyrgyz Republic should consider the proposal of the Republic of Uzbekistan concerning the supply of the Kyrgyz coal for power-generating stations in Uzbekistan in 1998-1999 against offsets.

By May 31, 1999, the Republic of Tadjikistan will ensure the accumulation of 3,418 million cubic meters of water at Kayrakum reservoir, and water releases in accordance with the BVO Syr Darya operation regime.

The estimated power production insufficiency during the 1998-99 fall-winter period associated with the regimes of water accumulation and draw-down at Kayakum reservoir will be compensated by power transfers from the Republic of Kazakhstan and Uzbekistan to the Republic of Tadjikistan during March-April, 1999. “Barki-Tochik”, UDC “Energia” and BVO Syr Darya will determine the estimated power insufficiency.

During the 1999 summer period the Republic of Tadjikistan will provide the return of electricity to the Republic of Kazakhstan and Uzbekistan (1:1). The volume, conditions of transfers and supplies will be additionally agreed between the Republic of Uzbekistan and the Republic of Kazakhstan.

Representatives of Kazakhstan and Uzbekistan consider that this proposal needs to be studied additionally and improved.

If needed, BVO Syr Darya and UDC "Energia" will adjust the regimes of water releases, agreed by the interested parties, and proceeding from the situation in energy and water economy.

If one of the parties does not fulfil its compensating obligations regarding the volume and terms of energy resource supplies, the Kyrgyz and Tadjik parties have a right to decrease the level of water releases from Toktogul reservoir and to change operation regimes of Kayrakum reservoir, respectively.

The current Protocol is prepared by the Governments of the participated parties for information and for necessary decision-making.

Special opinion

Representatives from the Republic of Kazakhstan propose to consider the possibility of applying the following principles of cooperation:

- Electricity generated as a result of releases for irrigation purposes is sold at the free energy market of the Republic of Kazakhstan specifying the volume of electricity and water releases respectively;

- The Republic of Kazakhstan guarantees that the Kyrgyz Republic will have free access to energy and coal markets;

- In order to conserve and accumulate water in Toktogul reservoir during the winter period, the demands for electricity in the Kyrgyz Republic will be compensated by electricity supplies from the Republic of Kazakhstan based on interstate agreements.

Representatives of the Kyrgyz Republic, the Republic of Tadjikistan, and the Republic of Uzbekistan cannot agree with this special opinion of the representatives of the Republic of Kazakhstan, as it conflicts with Articles 2, 4, 5 of March 17, 1998 Water and Energy Use Interstate Agreement.

Signatures:

On behalf of Regional Authorities
Ametov I. D.,
Khamidov M. Kh.

On behalf of the Republic of Kazakhstan
Askarova Kh. A.
Kudsaibergenuly K. K.
Utegulov N. I.
Kusainov G. S.

On behalf of the Kyrgyz Republic
Davydov I. A.
Beishekeev K. K.

On behalf of the Republic of Tadjikistan
Samadov Sh. D.
Sirozhev B. S.
Nazriev M. N.

On behalf of the Republic of Uzbekistan
Dzhalalov A. A.
Yusupov B. M.
Azimov I. Sh.
Abdullaev Kh. N.

5. Protocol of the Round Table Working Session Meeting on the Regional Use of Water and Energy Resources

PROTOCOL
of the Round Table Working Session Meeting on the Regional Use of Water and Energy Resources

Issyk Kul
10-14 August 1999

Preamble

Officials of the water and energy bodies and responsible representatives of the Republic of Kazakhstan, the Kyrgyz Republic and the Republic of Tajikistan, authorized by the listed above Central Asia Governments, have conducted a working session in Issyk-Kul on 10-14 August 1999 and discussed the issues affiliated with the regional water and energy uses. The meeting was initiated by the Executive Committee of the Interstate Council of the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan and the Republic of Uzbekistan (hereinafter referred to as the "Executive Committee", or the ICKKTU Executive Committee), with technical and financial support of the USAID program on Environmental Policies and Institutions for Central Asia (EPIC).

More than one year has passed since the Agreement between the Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic, and the Government of the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin, of 17 March 1999, Bishkek, was signed. During this period some activities to accomplish its main provisions were carried out.

On 20-25 July 1998 in Issyk-Kul, an international seminar was conducted to discuss the issues of the efficient use of water and energy resources of the Syr Darya and Amu Darya basins. The product of this seminar was an action plan to implement this Agreement. Elements of this action plan were included in the Program of Priority Actions of the CAEC countries. Approval of this program by the Council of Prime Ministers is pending.

During this period the Republic of Tajikistan joined this Agreement and on 17 June 1999, the executive heads of Governments located in the Syr Darya Basin signed amendments to this Agreement that were offered by the Republic of Tajikistan. Thus, currently the Agreement covers the entire Syr Darya Basin.

Participants of the current working session emphasized that the Agreement is very important in the solution of water and energy problems of the Syr Darya Basin and has initiated important long-term cooperation among the Syr Darya Basin countries. The working session of the Syr Darya Basin countries was conducted in a friendly atmosphere with full understanding of the problems and interests of the regional states, the mutually acceptable solutions for the efficient use of water and energy resources, including issues that will facilitate improvement of water quality issues.

However, during the meeting, notice was taken of the fact that in the first year of implementation of energy and water exchanges, commitments with respect to the Agreement have not been fully executed. This is due, in large part, to difficulties related to the economies in transition, and the fact that mutual deliveries between Kazakhstan and Kyrgyzstan have not yet been regulated. However, some progress has been made to resolve these difficulties and more efforts will be made to ensure past and future commitments are fulfilled.

Working Session participants noted with regret that representatives from the Republic of Uzbekistan, Turkmenistan, international organizations BVO "Syr Darya", BVO "Amu Darya", UDC "Energia", and the IFAS Executive Committee did not participate in this meeting.

The following issues have been discussed at the sessions of the meeting:

1. Implementation 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.
   - Recent Developments of the Agreement and Status of Water and Energy Problems in the Region
   - Studies on National Level Constraints to Implementation of the Agreement
   - Future Work in the Syr Darya Basin

2. Regional Principles of Operation and Maintenance of Shared Water Facilities

3. Issues of Mutual Beneficial Joint Use of Water and Energy Resources of the Amu Darya Basin.

The participants of the meeting noted with satisfaction that the Executive Committee will institutionalize the Water and Energy Uses Round Table to consider the problems addressed to efficient water and energy uses in the region, and ensure decision-making in relation to current problems of the 17 March 1998 Agreement. The meeting participants also expressed their thanks to the USAID Central Asian Regional Mission, and EPIC Program for provision of technical and financial support to the efforts in the solution of water and energy problems.

The OSCE mission, which was represented by the OSCE ambassadors in Kazakhstan and Kyrgyzstan, shows great interest in establishing close ties with the regional bodies involved in the water and energy problems in Central Asia.

The representative of the U.S. Embassy Central Asian Regional Office on Environment, Science, and Technology also participated in the Round Table meeting.

After having listened to and discussed all agenda issues the meeting participants have approved:

On the first Issue:

1. To accept the information of B. Mambetov, Deputy Chairman of the ICKKTU Executive Committee regarding current implementation of the Agreement signed between the Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic, the Government of the Republic of Tajikistan, and the Government of the Republic of Uzbekistan on the Use of Water and Energy Resources of the Syr Darya Basin approved 17 March 1998.

2. To emphasize the positive impact of joining the Tajikistan Republic to this Agreement and signing of the 17 June 1999 Protocol by the officials of the Government of the Republic of Kazakhstan, the Government of the Kyrgyz Republic, the Government of the Republic of Tajikistan and the Government of the Republic of Uzbekistan about introduction of addenda and amendments offered by the Republic of Tajikistan to this Agreement.

3. To support the efforts of the officials of water and energy bodies of the states to facilitate the development and approval of the Agreement for the year 2000 on the joint use of water and energy resources of the Syr Darya Basin and to sign this document in September-October 1999 at the next Prime Ministers Council meeting.

4. To emphasize that in compliance with the approved annual Agreements, the Republic of Uzbekistan executes its commitments on energy-carrier deliveries to the Kyrgyz Republic to the full amount.

5. For the recent two years the Republic of Uzbekistan and the Republic of Kazakhstan do not accept full amount of electric power from the Kyrgyz Republic stipulated by the intergovernmental agreements on water and energy uses in the Syr Darya Basin.
6. To state that the Republic of Kazakhstan have arrears of mutual energy-carrier deliveries stipulated by the Agreement. To accept the information of Mr. Rybtsev that Kazakhstan undertakes measures to repay the debts for the electric power delivered by the Kyrgyz Republic.

7. The Republic of Kazakhstan is proposed to accelerate the establishment of an International Water and Energy Consortium.

8. In understanding of the need for regional economic stability, the agreement could create conditions which will allow to approve multi-year operation and compensation regimes and will enable each government to develop concerted economic programs on joint use of water and energy resources of the region.

9. The Kyrgyz Republic proposes to submit the Draft Protocol to the Agreement on the Use of Water and Energy Resources of the Naryn-Syr Darya rivers to the next CAEC Prime Ministers Council meeting.

10. To accept the information of D. McKinney and B. Britton about the activities of EPIC/USAID program in the provision of support to solve water and energy problems in the region. To make a note that this program supports the development of optimization models of the operation regime of the Naryn-Syr Darya water reservoir cascade.

11. To accept the information of V. Boltov (Republic of Tajikistan), V. Kasymova (Kyrgyz Republic) and Sh. Nadyrov (Republic of Kazakhstan) about the national constraining factors that impact the implementation of the Syr Darya Agreement.

12. To accept the information of N. Aitmurzaev (ICKKTU Executive Committee) about regional approaches of prospect efficient use of the Syr Darya Basin water and energy resources.

13. The meeting participants recognized the necessity to vitalize work on water quality control, especially on the state borders, and also advance activities on economic and rational use of water resources, for this the potential of special istitutions of the participating countries could be attracted.

On the second issue:

1. To accept the information of A. Hutchens, the EPIC consultant, about Regional Principles of Sharing Operation and Maintenance Costs of Joint-Use Water Facilities, and World Experience. Deem it necessary to continue work in this direction for water and water-energy joint-use water projects.

2. To state that the Kyrgyz Party submitted earlier to the Executive Committee for consideration of the countries of the region the Draft Agreement on Operation and Maintenance of Joint-Use Water Facilities.

3. To further consider that in compliance with the decisions earlier approved the Republic of Kazakhstan submitted to the ICKKTU Executive Committee their variant of the Draft Agreement regarding the joint use of transboundary river waters, water bodies and water facilities.

4. Request the representatives of the Republic of Tajikistan and the Republic of Uzbekistan to submit their variants of the Draft Agreement and proposals to the ICKKTU Ececutive Committee.

On the third issue:

1. To take note of the information of G. Petrov and M. Nazriev on water and energy uses in the Amu Darya Basin.

2. To further consider that the Republic of Tajikistan submitted the Draft Agreement on Water and Energy Uses of the Amu Darya Basin for the consideration of the prime ministers of the participating countries. To recognize that the discussion of this Agreement without the representatives from Turkmenistan and Uzbekistan is incomplete and no conclusions about future actions to be taken can be drawn from the discussion.

3. The Executive Committee and the Republic of Tajikistan should enlist the support of the Interstate Council in the consideration of an Interstate Draft Agreement on Water and Energy Uses of the Amu Darya Basin including it in the Program of Priority Actions of the participating countries.

4. The ICKKTU Executive Committee should hold consultations with IFAS on the Turkmenistan participation in the development of a Draft Agreement on Water and Energy Uses of the Amu Darya Basin.

Conclusions and Recommendations

1. To support efforts of water and energy officials in the CAEC countries to develop and approve the Draft Agreement on Joint Use of Water and Energy Resources of the Syr Darya Basin for 2000 for submission at the next Prime Ministers Council meeting of the participating countries.

2. To submit the Draft Protocol to the Agreement on Joint and Complex Use of Water and Energy Resources of the Naryn- Syr Darya rivers for the consideration at the next CAEC Prime Ministers Council meeting.

3. To continue the discussion of the Draft Agreement on Water and Energy Uses in the Amu Darya Basin introduced by the Republic of Tajikistan, that affects the interests of all Central Asian countries.

4. To continue consultations on the issues of creating the International Water and Energy Consortium to implement the decisions of ICKKTU and the Council of Prime Ministers.

5. Taking into consideration the importance of the issue of the cost sharing of operation and maintenance of water and energy facilities to continue activities on the development of the regional principles for the issue. Request USAID and other international agencies to render technical assistance and financial support in the development of methods relating to the identification of cost sharing of the participating countries for the operation and maintenance of water and water-energy joint-use facilities, and to conduct a workshop on the issue.

6. To recognize as most important the issue of water quality improvement and economic use of water resources in the region, for this to request USAID and OSCE to render financial and technical assistance for the program implementations.

7. To request ICWC and the Electric Power Council of Central Asia to obligate BVO Syr Darya, UDC Energia and SIC ICWC to participate in the Round Table meetings, when invited.

8. To deem it necessary to conduct regular Round Table sessions quarterly to discuss the problems of the efficient use of water and energy resources in the region.

To convene the next session in Almaty, January 2000.
The Round Table participants will submit proposals on the Agenda.

B. Mambetov
Chairman of the Meeting
Vice Chairman, ICKKTU

N. Aitmurzaev
A. Kenshimov
Secretaries

Appendix C.
List of Persons Met

August 6, 1999: Meeting at USAID, Almaty

Marc P. Madland, Acting Director
Ken KcNamara, Environmental Project Specialist
Theodore Streit, Energy Public Policy Specialist
J. Michael Biddison, Regional Manager, Hagler Bailly

August 6, 1999: Reception at U.S. Ambassador to Tajikistan Residence

Robert Patrick Finn, Ambassador of the USA to Tajikistan
Clifford Kupchan, Deputy Director of the State Department, Coordinator for Assistance to NIS
Gary Linden, OMT Director, USAID, Almaty
Peter Downs, Director, USAID, Tajikistan
Maryam Maleki, Booz, Allen and Hamilton
Nancy Schmaus, Program Manager, Central Asian American Enterprise Fund

August 9, 1999: Alexander G. Kalashnikov, Project Management Specialist, USAID
Dr. Amickhan K. Kenshimov, Regional Water Policy Specialist, EPIC

August 10-14, 1999: Regional Water and Energy Uses Roundtable, Issyk Kul, Kyrgyz Republic
See List of participants

August 16-17, 1999: CAR Electricity Working Group Subgroup Meeting, Almaty
See List of participants

August 18, 1999: Meeting with BVO, Tashkent
Mr. Kh. Khadimov, Head BVO
Barbara Britton, Natural Resources and Water Policy Advisor, EPIC

August 19, 1999: Meeting with UDC, Tashkent
Iskander J. Ametov, Chief Despatcher, UDC
Barbara Britton, Natural Resources and Water Policy Advisor, EPIC

August 19, 1999: Meeting at Ministry of Power, Uzbekistan
Touychi Sh. Akhmedov, Deputy Minister
Elena Korneveva, Department of International Relations, Ministry of Power (and their delegation)
Alexander G. Kalashnikov, USAID
Barbara Britton, EPIC

August 19, 1999: Site visit to UDC Control Center, Tashkent

August 20, 1999: Site visit to Syr Darya, 500 KV substation

August 23, 1999: Meeting with KEGOC, Almaty
Dr. Kenzhemurat D. Dukenbaev, First Vice President, KEGOC
Azamat A. Ibadullayev, Advisor to the President, KEGOC