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**DETAILED FINAL REPORT**

**NIS Institutional Based Services Under the Energy  
Efficiency and Market Reform Project  
Contract No CCN-Q-11-93-00152-00**

**CAR Regional Energy Trade,  
Electricity Contracting and Pricing Reform  
Delivery Order No 11**

*Final Report*

*Prepared for*

U S Agency for International Development  
Bureau for Europe and NIS  
Office of Environment, Energy and Urban Development  
Energy and Infrastructure Division

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## CHAPTER 1 BACKGROUND

### Conditions under Soviet Union

During the time of the former Soviet Union, large-scale development of electricity transmission networks was undertaken beginning in the early 1960s. In Central Asia, because of the large sparsely inhabited regions of central Kazakhstan, the Soviets decided to develop a stand-alone grid to serve the countries of Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and the adjacent five districts of South Kazakhstan. This grid, known in English as the Central Asia Unified Power System (together with the attached generation sources and distribution systems) was connected to the larger, predominantly Russian, system through a single 500 kV line, which was installed to provide emergency power between the two grids. By the time the former Soviet Union came apart in the early 1990s, the CA UPS consisted of more than 3,000 kilometers of 220 and 500 kV transmission lines, stretching from the Tien-Shan Mountains westward to the Caspian Sea and southwards from the Kazakh steppes to the frontiers of Afghanistan and Iran.

Generation was provided to the grid by baseload fossil-fuelled (predominantly gas-fired with some coal) stations in Turkmenistan, Uzbekistan and South Kazakhstan, supplemented with large hydroelectric stations in the mountainous regions of Kyrgyzstan (on the tributaries of the Syr Darya) and Tajikistan (on the tributaries of the Amu Darya). Supplementing these energy sources were must-run generators associated with combined heat and power stations, providing central heat to all of the major cities served by the Unified Power System.

Technical parameters under which the CA UPS operated were developed in Moscow and were executed by a regional dispatch center located in Tashkent, Uzbekistan. This dispatch center was responsible for coordinating the control of the region's 500 and 220 kV transmission lines, certain lower-voltage lines of special regional significance, as well as the major thermal-fired and hydroelectric generating stations. Operation was conducted on the basis of least-cost principles, with the most efficient thermal-fired stations dispatched first, and the least efficient (highest marginal cost) operated only under peak load conditions. Hydroelectric resources were operated in coordination with irrigation needs of downstream users mainly in Kazakhstan and Uzbekistan. Generation from the hydroelectric stations constituted approximately one-third of the total electrical energy consumed by the customers of the CA UPS.

There was little sense of monetary value of the electricity produced and consumed. Electricity was seen as a social right of the populace and a basic material for the agricultural and industrial growth of the Central Asia region of the Soviet Union. What metering was installed was generally used for technical purposes and not for commercial reasons. Since electricity had little if no commercial value, there were no penalties for theft of electricity nor for nonpayment of bills.

## **Independence of the Central Asian Countries**

When independence came to the five countries of Central Asia in late 1992, they were left with exactly the same electrical transmission and generation complex as during the Soviet times, but with the addition of two new elements: national borders and the desire to move to market economies. The national borders introduced the notion of multiple ownership of the grid and the conflicts caused from differing sovereign interests among the individual nations. The grid continued to be operated by the Tashkent center, renamed the Unified Dispatch Center "Energiya", but this organization now found itself dealing not only with the technical challenges associated with managing the generation and transport of electricity through the sparsely-populated region of Central Asia, but also with an entirely new morass of international energy politics.

On the commercial front, each nation had only a vague idea of the meaning of "market economy", a term that most interpreted as a need for each country to become energy-independent, that it should be in their best interest to have enough generation sources within the country to serve all electrical demand. In such cases where imports were pursued, each country practiced the most aggressive marketing and bargaining tactics (preserving state monopolies in electricity generation and fossil fuel production, setting prohibitively expensive transit tariffs, threatening to cut off energy supplies to neighboring countries) rather than establish a competitive market that would achieve economically efficient patterns of trade.

Thus, when USAID sent its definitional team into Central Asia in March of 1995, it found trade taking place among the countries operating under the sparsest of commercial rules. Each country attempted to impose its perception of economic will upon its neighbors, most often to the detriment of even its own national interests. Rule-making was non-transparent, tariffs were arbitrary and not cost-based, and there were no methods of settling disputes among trading partners. The one agency which had even a small chance of unifying the multiple interests, UDC Energiya, was perceived by most parties as being partial to the interests of its host country, Uzbekistan.

## **Definition of the Program**

This program was designed to provide assistance to the five Central Asian Republics: Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan - to address regional trade issues in contracting and pricing for international sales of electricity. Such assistance would enhance the reliable operation of the regional grid, promote the economic dispatch of power plants, and facilitate the sale of electricity at prices that reflect the true economic cost of electric power generation and transmission. A series of seminars were held separately in each country, followed by a seminar in Riga, Latvia to review the Baltic experience and by a series of regional workshops to provide assistance to a Central Asia Electricity Working Group. The power companies and energy ministries of the five Central Asian Republics participated in the program.

## **Structure of Electrical Sectors in the Five Countries**

Following the breakup of the former Soviet Union and the independence of the five countries of Central Asia, each country organized its electricity sector as a branch of its government, following the pattern established in the Soviet era. Thus Kazakhstanenergo, Kyrgyzenergo,

Barki Tochik (Tajikistan), KUVVAT (Turkmenistan), and the Ministry of Power Industry and Electrification of Uzbekistan emerged. Recognizing that an international body was needed to coordinate the activities of the CA UPS, the five countries formed in 1992 the Central Asia Unified Power System Council, a body consisting of the energy ministers formed to guide the activities of UDC Energia. Somewhat later, Kazakhstan, Kyrgyzstan and Uzbekistan, the three countries concerned with energy and water activities connected with the river Syr Darya, formed an organization known as the Interstate Council of Kazakhstan, Kyrgyzstan, and Uzbekistan (the "ICKKU")

In 1996, as the USAID regional electricity program was beginning its activities, the Minister of Energy in Kazakhstan began a bold and rapid program of restructuring and privatization of Kazakhstanenergo. Within a period of a few months, this former behemoth was divided into generating companies, a transmission company, and distribution companies, all of which were corporatized. The Ministry next privatized the large generation companies, comprising some 90 percent of the country's generating capability, and one of the 18 regional distribution companies. Kazakhstan was unwilling to privatize through outright sale the transmission company, instead trying abortively to find a concessionaire to assume operation. Following the government's failure to find a concession operator, a new company, the Kazakhstan Electric Grid Operating Company (KEGOC) was formed from the gross assets remaining from what was left of Kazakhstanenergo.

In Kyrgyzstan the state-owned electricity sector has been corporatized and the government has made some movement toward unbundling and privatization of the distribution assets, although no significant tenders have been issued to date. Tajikistan and Turkmenistan have both corporatized their electricity sectors, but have shown no interest in privatization, although Tajikistan recently signed an agreement with the Asian Development Bank to begin working on legal and regulatory reform of the sector. In Uzbekistan the Ministry of Power Industry and Electrification remains in firm control of the sector.

## Chapter 2

### Activities under the Program

The first round of country-by-country meetings was held in the capitals of the five countries in August of 1996, introductory sessions where the goals of the program were outlined and introductory training was given on such topics as power pooling, international reliability standards, international electricity contracting, and an outline of USAID's successful program in the Baltic states in organizing a cooperative agreement among the power sector parties. At the conclusion of this meeting the representatives of the five countries expressed the desire to meet next regionally to discuss specific model contracts and agreements, rather than receive additional country-by-country training.

In the first regional conference, held in Almaty, Kazakhstan in December of 1996, the participants received model contracts for the international sale of electricity, transit (wheeling) arrangements, system operator agreements, and methodologies for calculating tariffs and frequency regulation. The participants recommended that a) a five-country Central Asia Electricity Working Group be formed to develop international electricity contracts, b) the five countries should consider the formation of a Central Asia power pool to coordinate inter-country electricity system operation, and c) the next meeting should be held in Riga, Latvia to gain insight into how the Baltic nations of Estonia, Latvia and Lithuania successfully established and operate a regional power pool.

The Working Group was subsequently designated by the governments of the five countries, and thirteen of the fifteen members met in Riga, Latvia during March of 1997. They spent two days in discussions with representatives from the Baltic regional dispatch center and the Baltic utility companies, learning how those countries had formed regional trading and pooling arrangements. The Working Group then spent another two days working on some of the agreements which are being used in the Central Asian countries for electricity trading and pricing. At the end of the meeting, they recommended that the Working Group continue their work on upgrading existing agreements, and that they explore the possibility of forming a Central Asian Power Pool.

In May 1997 the Working Group met for two days in Tashkent, Uzbekistan, where they developed a draft agreement on the parallel operation of the bulk power systems of the five countries of Central Asia. They also received information from USAID/Hagler Bailly Consulting on features of western power pools which could be applicable to the needs of the Central Asian countries. The Working Group requested that the next meeting be held jointly with the executive committee of the interstate council of Kazakhstan, Kyrgyzstan and Uzbekistan (ICKKU) to gain that body's approval of the draft parallel operation agreement, and also to hear more detailed information from USAID/Hagler Bailly Consulting on features of western power pools.

At their September 1997 meeting in Bishkek, the working group negotiated the detailed terms of the draft agreement on the parallel operation of the bulk power systems, on provisions on the Central Asia Unified Power System Council, and received information from USAID consultants about the characteristics of "tight" and "loose" power pools in the United States. The draft agreements were structured to be signed by the Governments of the five countries, a

requirement which caused the representatives from Kazakhstan to refuse to sign. Their reasoning was that the power sector in Kazakhstan has been restructured and partly privatized, therefore Kazakhstan could not sign until the multiple parties' representational needs can be met. The ICKKU, which co-chaired the meeting, agreed to take the Parallel Operation Agreement forward and gain approval at a future top-level meeting of the regional leaders.

The December study tour took place in the United States of America, where the Working Group received information on the characteristics of two power pools. The New England Power Pool (NEPOOL), a "tight" pool that operates with one central dispatch center, closely controls the multilateral transactions of their member utilities. The Mid-Continent Area Power Pool (MAPP) is termed a "loose" pool, wherein there are no multilateral market transactions. Besides receiving information from these two pools, the working group also held discussions with member utilities of the pools, with a state regulatory agency, and with pooling experts.

In February of 1998 the Working Group met in Tashkent, Uzbekistan to (1) review the knowledge gained from the December 1997 US study tour, (2) set goals for future activities of the working group, (3) renegotiate the two multilateral agreements negotiated in Bishkek, (4) hear a presentation from KEGOC on development of the wholesale market in Kazakhstan, and (5) hear Hagler Bailly presentations on transit tariff methodologies and pricing of frequency regulating/peaking power. At the close of the meeting, Chairman Ametov declared that Working Group discussions on the parallel operation agreement were completed. The chairman and the secretary of the working group each signed the agreement on behalf of the representatives of the five countries. Each participant's agreement is indicated by language contained in the meeting's protocol. Kazakhstan's representative at this meeting took no objection to the approval procedure.

During the period of 6-21 April 1998, USAID/Hagler Bailly contractors met with sub-group specialists in four Central Asian countries and with the group from Tajikistan in Almaty, due to political instability in Dushanbe, learning of country-specific problems with existing international electricity trading procedures, providing training on a model contract for electrical energy sales, on a power pool multilateral wheeling agreement, and on governance issues for a power pool.

Ashgabat, Turkmenistan was the site of the June meeting of the Central Asia Electricity Working Group. At this meeting, the Working Group heard reports from the sub-group meetings and accepted the USAID-drafted Model Contract for the Sale and Purchase of Energy in Central Asia. They received a first-draft of a Bilateral Wheeling Agreement which based the tariff on quantifiable cost-of-service parameters. Toward the formation of a power pool, the Working Group received governance documents from the 12-nation Southern African Power Pool, and the Power Pool of England and Wales. Mr. Reinier Lock from the law firm of Cameron McKenna described the process by which the Southern African Power Pool was formed, and Michael Bekker spoke on the status of the wholesale power market in the Russian Federation.

The last formal activity with our counterparts under this contract was a third series of meetings with in-country specialists on the topics of power pool governance and transmission tariffs. Hagler Bailly presented a complete set of proposed governance documents, each of which was reviewed in detail by management, operational, and legal specialists. These documents included an Inter-Governmental Memorandum of Understanding, a Memorandum of Understanding among Power Systems and Power Companies in Central Asia, a Founders'

Agreement and a Charter for the Independent International Dispatch Center, and a System Operator's Agreement The Working Group was presented with a Transmission Tariff Pricing Methodology and discussed in detail the draft Bilateral Wheeling Agreement

## Chapter 3 Major Results

Hagler Bailly Consulting met both the broad and detailed objectives of the contractual requirements for this program. Through the series of in-country and regional meetings with the counterparts, the training delivered, the study tours to the Baltics and the United States, and the contractual and governance documents provided, all of the objectives enumerated under Section 1.3 of the contract were achieved.

Following the initial set of in-country meetings in the summer of 1996, our counterparts expressed a strong desire to meet regionally and to discuss the contractual and pricing problems face-to-face with their peers. In the first regional meeting, the counterparts voted to form a formal Central Asia Electricity Working Group to operate under the framework of USAID assistance to attempt to resolve the international commercial difficulties which they discovered once independence came to the area in 1992. At the Baltic Study Tour, the first meeting of the Working Group, they discovered that the Baltic countries were operating under a framework Parallel Operations Agreement, a document which the Central Asians decided to adapt to their area as a means of coming to agreement on the broad terms under which they would cooperatively use the high voltage transmission grid which was left to them from the Soviet times. The Working Group has developed a Parallel Operations Agreement for Central Asia and has forwarded it through the Interstate Council of Kazakhstan, Kyrgyzstan and Uzbekistan to the leaders of the Governments of the five countries for approval.

Three major obstacles have emerged which must be solved to move the idea of full regional cooperation in electricity trading forward. First, the regional Dispatch Center Energia in Tashkent, although widely respected for its technical expertise, is seen by each country except Uzbekistan as showing favoritism toward its host country in the operation of the regional transmission grid. None of the countries can visualize regional operation in Central Asia without the technical leadership of UDC Energia, but they do not know how to solve the problem of perceived bias. Through the USAID program, Hagler Bailly has promoted the idea of making UDC Energia independent of the Government of Uzbekistan, answering to an international association of industry players organized as the Central Asia Power Pool. Hagler Bailly has written a series of framework and detailed documents which would ultimately establish UDC Energia as an independent Joint Stock Company operating under contract to the Pool.

The second obstacle is that the pace of restructuring and privatization is taking place at very different rates in each of the five countries, with Kazakhstan leading the way, having privatized most of their major generating stations and the largest of the 18 regional distribution companies. Other countries, most notably Tajikistan, Turkmenistan, and Uzbekistan, look upon the privatized entities in Kazakhstan as being minor players in the business, and are therefore reluctant to consider their interests when discussing the possibilities of forming a power pool. USAID/Hagler Bailly has encouraged the Working Group to consider the private investors in Kazakhstan as full players, and has devised a plan to bring representatives from the private sector to the next working group meeting on a limited basis, working toward full acceptance of a role for them in the task of designing the Pool.

National sovereignty issues are the core of the third obstacle. Each country is of the mentality that for each transnational transaction there must be a winner and a loser, and no country is

willing to be viewed as a loser. This attitude manifests itself in multiple areas such as wholesale electricity pricing, tariffs for the wheeling of electricity, and access to transmission lines. The predatory nature of each party leads to disputes, and these disputes remain as open sores in this culture where disputes are supposed to be settled through a process of consensus. USAID/Hagler Bailly is attacking this problem with a two-pronged approach. First, we bring international experience in forming power pools where the parties negotiate procedures in which all parties win. These techniques are discussed both in the multi-national Working Group meetings and also with key individuals in the country-by-country meetings. Secondly, we are strongly advocating dispute resolution techniques whereby issues can be fully heard by impartial arbitrators with the full knowledge that the issue will come to a prompt and full settlement.

This program has been brought to a proper conclusion where the key members of the electricity sector of the five countries have received the tools necessary to move forward to build a Central Asia Power Pool, if they reach policy consensus that they want to do this. The Central Asia Electricity Working Group, although still facing the obstacles discussed earlier, has repeatedly expressed its desire to form the Pool, and continues to need the technical assistance of USAID in so doing. A major step necessary at this point is to gain the formal backing of the leaders of the Governments of the five countries, a job which has been entrusted by the USAID Mission/Almaty to the Interstate Council of Kazakhstan, Kyrgyzstan, and Uzbekistan.

## Chapter 4

### Tasks and Deliverables Required under the Delivery Order

1 *Detailed Work Plan for the original contract (Deliverable)*

The Work Plan was completed in March of 1996

2 *Detailed Work Plan for the contract modification (Deliverable)*

The Work Plan for the modification was completed in September of 1997

3 *Collect information on Central Asia power transactions, installed capacity, costs (Task)*

This activity was completed during the definitional phase of the contract and the results are contained in the project files

4 *Prepare and present two seminars in each country (Task)*

The first series of in-country seminars was held in August of 1996. Seminars were held in Bishkek, Kyrgyzstan, Almaty, Kazakhstan, Tashkent, Uzbekistan, Ashgabat, Turkmenistan and Dushanbe, Tajikistan

The second series was conducted in April of 1998. Training of specialists in the areas of model sales contracts, power pool governance, and wheeling agreements were held in Almaty, Tashkent, Bishkek, and Ashgabat. Specialists from Tajikistan were trained in Almaty due to political instability in their home country

5 *Prepare and present six regional seminars on various topics (Task)*

Meetings on the subjects of draft international-quality contracts and agreements and on power pooling issues were held as follows

- Almaty, December 1996
- Tashkent, May 1997
- Bishkek, September 1997
- Tashkent, February 1998
- Ashgabat, June 1998
- Sub-group meetings, July-August 1998

6 *Provide the Written Materials prepared for each of the Seminars (Deliverable)*

The written materials from each regional Seminar and set of Sub-group meetings is bound and submitted in satisfaction of this requirement

7 *Prepare a Summary Report of each of the Seminars (Task)*

At the conclusion of each regional Seminar a memorandum, or "Protocol" was prepared and signed by the participants. A set of these Protocols, in English, is submitted in satisfaction of this requirement

- 8 *Prepare a Memorandum identifying key issues in power contracting and pricing reform among CAR (Deliverable)*

A memorandum dated March of 1996 is submitted in satisfaction of this requirement

- 9 *Prepare and present a seminar in the Baltics (Task)*

The Central Asia Electricity Working Group met in Riga, Latvia in March of 1997 with specialists from the three Baltic countries and from Dispatch Center Baltija

- 10 *Report on Power Pool Options and Pros and Cons (Deliverable)*

A paper presented to the Working Group in September 1997 in Bishkek is submitted in satisfaction of this requirement

- 11 *Report on Draft Power Pool Operating Rules (Deliverable)*

The operating rules, or Pool Agreements, of the New England Power Pool, the Mid-Continent Area Power Pool and the Southern African Power Pool were translated into Russian and provided to the counterparts in satisfaction of this requirement

- 12 *Assist in identification, approval, and implementation of a regional power pool (Task)*

This task was accomplished through the construction of building blocks for the power pool, including governance documents, model contracts, tariff methodologies, and translated power pool operating agreements. Political aspects of gaining approvals from governments was delegated by the USAID Mission in Almaty to the Interstate Council of Kazakhstan, Kyrgyzstan, and Uzbekistan

- 13 *Provide a one-week Study Tour to the Central Europe Power Pool (Task)*

This task was not completed due to budget limitations at the time when such a visit was needed. When the budget problems were resolved there was no time remaining under the contract to organize and conduct such a tour

- 14 *Formal Memo on Pricing Policy for Power Wheeling (Deliverable)*

A paper entitled "Transmission Pricing Methodology", presented to the Sub-group specialists in July and August of 1998 is submitted in satisfaction of this requirement

- 15 *Report on Legal Requirements for Pool Implementation (Deliverable)*

This requirement is addressed by a report of the same title dated September of 1998

- 16 *Summary Report on power pooling plan, including organization, procedures and functioning, and expected implementation timelines (Deliverable)*

This requirement is addressed through a plan submitted to the USAID Almaty Mission in June of 1998

17 *Task Completion Memo describing activities and results (Deliverable)*

This Memorandum satisfies the requirement for a final report

Quarterly Events	Quarterly Deliverables/Outputs	Other Highlights
1Q/96 Defined tasks to be performed during the project, identifying objectives, deliverables, schedule, and	Detailed Workplan Memorandum identifying key issues	
2Q/96 Mobilization and preparations for first round of country-by-country meetings		
3Q/96 Country-by-country meetings with counterparts introducing the program's objectives, reliability and power pool concepts, and drawing parallels with earlier USAID program in Baltic countries	Training Seminars in each country Written materials for Seminars Summary Reports on the Seminars	
4Q/96 Regional meeting of electricity sector representatives from all five countries in Almaty, Kazakhstan	Regional Seminar of all 5 countries Written materials for Seminar	Proposed investigation of a Power Pool for Central Asia Participants recommended that a formal Central Asia Electricity Working Group be formed

<p>1Q/97</p> <p>Study Tour in Riga, Latvia, meeting with counterparts from three Baltic countries and regional Dispatch Center "Baltija"</p>	<p>Baltic Study Tour</p> <p>Written materials for Study Tour</p> <p>Summary Report on the Study Tour</p>	<p>First meeting of the CA Electricity Working Group</p> <p>Agreed to draft Parallel Operation Agreement</p>
<p>2Q/97</p> <p>Regional meeting of electricity sector representatives from all five countries in Tashkent, Uzbekistan</p>	<p>Regional Seminar of all 5 countries</p> <p>Written materials for Seminar</p> <p>Summary Report on the Seminar</p>	<p>First draft of Parallel Operation Agreement and Provisions of Central Asia UPS Council produced</p>
<p>3Q/97</p> <p>Regional meeting of electricity sector representatives from all five countries in Bishkek, Kyrgyzstan</p>	<p>Regional Seminar of all 5 countries</p> <p>Written materials for Seminar</p> <p>Summary Report on the Seminar</p> <p>Report on Power Pool Options</p>	<p>Meeting jointly chaired between Electricity Working Group and ICKKU</p> <p>Five-nation discussions over operation of the 500 kV ring</p> <p>Kazakhstan refused to approve Parallel Operations Agreement</p>

<p>4Q/97</p> <p>Study Tour of two US power pools New England Power Pool, and Mid-Continent Area Power Pool</p>	<p>US Power Pools Study Tour Revised Workplan (Mod 1)</p>	<p>Discussions with experts at New England Power Pool, Northeast Utilities Co , Massachusetts Public Utilities Commission, Mid-Continent Area Power Pool, Northern States Power, and USAID</p>
<p>1Q/98</p> <p>Regional meeting of electricity sector representatives from all five countries in Tashkent, Uzbekistan</p>	<p>Regional Seminar of all 5 countries Written materials for Seminar Summary Report on the Seminar Translated Materials from US Study Tour Translated NEPOOL and MAPP Agreements (Draft Power Pool Operating Rules)</p>	<p>Working Group approved the Parallel Operations Agreement, including Provisions for Central Asia UPS Council - ICKKU to coordinate approval by the five governments</p>

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<p>2Q/98</p> <p>Country-by-country meetings with specialists from each country's power sector to discuss pool governance issues, model contracts, and wheeling agreements</p> <p>Regional meeting of electricity sector representatives from all five countries in Ashgabat, Turkmenistan</p>	<p>Training Seminars in each country</p> <p>Written materials for country-by-country training</p> <p>Regional Seminar of all 5 countries</p> <p>Written materials for regional seminar</p> <p>Translated SAPP Agreement (Draft Power Pool Operating Rules)</p> <p>Summary Report on Power Pooling Plan</p>	
<p>3Q/98</p> <p>Country-by-country meetings with specialists from each country's power sector to discuss pool governance issues, model contracts, and wheeling agreements</p>	<p>Training Seminars in each country</p> <p>Written materials for country-by-country training</p> <p>Formal Memorandum on Pricing Policy for Power Wheeling</p> <p>Legal Requirements for Pool Implementation</p> <p>Final Report</p>	

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