

REQUEST FOR PROPOSALS

FEASIBILITY STUDY FOR THE

KYRGYZSTAN: DATKA-KEMIN 500 kV TRANSMISSION LINE PROJECT

Submission Deadline: **4:00PM**

LOCAL TIME (BISHKEK TIME)

December 21, 2007

Submission Place: Mr. M. Aitkulov
Deputy General Director
National Electrical Grid of Kyrgyzstan JSC
326, Jibek Jolu
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SEALED PROPOSALS SHALL BE CLEARLY MARKED AND RECEIVED PRIOR TO THE TIME AND DATE SPECIFIED ABOVE. PROPOSALS RECEIVED AFTER SAID TIME AND DATE WILL NOT BE ACCEPTED OR CONSIDERED.

REQUEST FOR PROPOSALS

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Section 1: INTRODUCTION

The U.S. Trade and Development Agency (USTDA) has provided a grant to the Grantee, the Ministry of Finance of the Kyrgyz Republic, which has delegated authority to the National Electrical Grid of Kyrgyzstan JSC (NEGK), to fund the Datka-Kemin 500 kV Transmission Line Feasibility Study. The grant agreement is attached at Annex 4 for reference. NEGK is soliciting technical proposals from qualified U.S. firms to provide expert consulting services to carry out the Feasibility Study.

1.1 BACKGROUND SUMMARY

Endowed with significant hydropower resources, Kyrgyzstan is a net exporter of electricity, primarily to Kazakhstan, Uzbekistan and China. Exports amount to nearly 2.5 billion kilowatt hours per year. Kyrgyzstan also has the potential to export power to South Asia, assuming that the 500kV Central Asia – South Asia power line is built. However, Kyrgyzstan's energy sector is facing serious technical problems and capacity constraints, as the Kyrgyz system is old and antiquated, and winter electricity demand is twice that of pre-independence years due to growth in residential electric heating loads. One important weakness in the Kyrgyz electric power transmission system is the presence of unbalanced loads, causing overloaded lines and substations. This is exacerbated by the long distance, high cost and lack of capacity to transmit power through alternate power lines in neighboring countries.

At the present time, 90% of Kyrgyzstan's power is produced in hydropower stations in southern Kyrgyzstan, while the main load centers of usage of electric power are in northern Kyrgyzstan, with the capital city of Bishkek and the concentration of industry located in this part of the country. Electricity is transmitted from southern Kyrgyzstan to northern Kyrgyzstan primarily on one 500 kV line. Due to the heavy dependence of Kyrgyzstan on electric power for residential heating, in the winter this line is overloaded. The only alternate transmission path is through Uzbekistan and Kazakhstan, involving a longer route and leading to security issues for reliable power supply and excessive wheeling charges.

In order to alleviate the overloading of the existing 500 kV line and eliminate the need for transmission through Uzbekistan, NEGK is planning to build an additional 500 kV transmission line from southern Kyrgyzstan to northern Kyrgyzstan. The routing of the line would allow interconnection with the Datka substation, the Kambarata Hydroelectric power station and the grid in northern Kyrgyzstan on the east side of Bishkek. This would alleviate overloading on the 220 kV lines in the north.

NEGK is state owned and is responsible for all transmission with voltages of 110 kV and above. They also have responsibility for some 35 kV transmission lines that are of strategic importance.

In 2005, USTDA provided \$186,310 in funding to the Ministry of Finance of the Kyrgyz Republic for NEGK's Southern Kyrgyzstan Transmission Upgrade Project Feasibility Study, which is now nearing completion.

A background Definitional Mission is provided for reference in Annex 2.

1.2 OBJECTIVE

The objective of this Feasibility Study is to determine the technical and economic feasibility of constructing a new 400 km, 500 kV power transmission line from the Datka 500 kV substation in southwest Kyrgyzstan to a new 500/220 kV substation at Kemin near the Kazakhstan border in north-east Kyrgyzstan. The routing and design of the new line must provide for the eventual construction of a new 500 kV substation in the southern half of the new line to connect it to the planned Kambarata Hydroelectric Project. The new line would prevent the overloading of the existing south-north transmission line, which forces electricity to be sent through alternate transmission lines in Uzbekistan and Kazakhstan. The Terms of Reference (TOR) for this Feasibility Study is attached as Annex 5.

1.3 PROPOSALS TO BE SUBMITTED

Technical proposals are solicited from interested and qualified U.S. firms. The administrative and technical requirements as detailed throughout the Request for Proposals (RFP) will apply. Specific proposal format and content requirements are detailed in Section 3.

COST will not be a factor in the evaluation and therefore, cost proposals should not be submitted; upon detailed evaluation of technical proposals, one firm will be selected for contract negotiations. The amount for the negotiated contract has been established by a USTDA grant of U.S. \$537,595 dollars.

1.4 CONTRACT FUNDED BY USTDA

The negotiated contract will be funded by USTDA in accordance with the terms and conditions of its grant to the Grantee. The contract must include certain USTDA mandatory clauses relating to nationality, taxes, payment, reporting, and other matters. The USTDA nationality requirements and the USTDA mandatory clauses are attached at Annexes 3 and 4 for reference.

Section 2: INSTRUCTIONS TO PROPOSERS

2.1 PROJECT TITLE

The project is called the "Datka-Kemin 500 kV Transmission Line Feasibility Study."

2.2 DEFINITIONS

Please note the following definitions of terms as used in this RFP.

The term "Request for Proposals" means this solicitation of a formal technical proposal including qualifications statement.

The term "Offeror" means the U.S. individual, or U.S. firm, including any and all subcontractors, which responds to the RFP and submits a formal proposal and which may or may not be successful in being awarded this procurement.

2.3 DEFINITIONAL MISSION REPORT

USTDA sponsored a Definitional Mission to address technical, financial, sociopolitical, environmental and other aspects of the proposed project. A copy of the Report is attached at Annex 2 for background information only.

2.4 EXAMINATION OF DOCUMENTS

Offerors should carefully examine this RFP. It will be assumed that Offerors have done such inspection and that through examinations, inquiries and investigation they have become familiarized with local conditions and the nature of problems to be solved during the execution of the Feasibility Study.

Offerors shall address all items as specified in this RFP. Failure to adhere to this format may disqualify an Offeror from further consideration.

Submission of a proposal shall constitute evidence that the Offeror has made all the above mentioned examinations and investigations, and is free of any uncertainty with respect to conditions which would affect the execution, and completion of the Feasibility Study.

2.5 PROJECT FUNDING SOURCE

The Feasibility Study will be funded under a grant from USTDA. The total amount of the grant is not to exceed U.S. \$537,595 dollars.

2.6 RESPONSIBILITY FOR COSTS

Offeror shall be fully responsible for all costs incurred in the development and submission of the proposal or any other cost incurred by Offeror prior to issuance of an agreement or contract. Neither USTDA nor the Grantee nor NEGK assumes any contractual obligation as a result of the issuance of this proposal request, the preparation or submission of a proposal by an Offeror, the evaluation of proposals, or final selection.

2.7 TAXES

Offerors should submit proposals which note that in Annex 4, USTDA Mandatory Contract Provisions, USTDA funds are not to be used to pay taxes or duties under the laws of host country.

2.8 CONFIDENTIALITY

NEGK will use its best efforts to preserve the confidentiality of any business proprietary or confidential information submitted by the Offeror, which is clearly designated as such by the Offeror.

2.9 ECONOMY OF PROPOSALS

Proposal documents should be prepared simply and economically, providing a comprehensive and concise description of the Offeror's capabilities to satisfy the requirements of the RFP. There is no necessity for expensive bindings, colored displays, or other promotional material unless such material is absolutely pertinent to the proposal. Emphasis should be placed on completeness and clarity of content.

2.10 SUBSTANTIVE PROPOSALS

The Offeror shall certify (a) that its proposal is genuine and is not made in the interest of, or on the behalf of, any undisclosed person, firm, or corporation, and is not submitted in conformity with, and agreement of, any undisclosed group, association, organization, or corporation; (b) that it has not directly or indirectly induced or solicited any other Offeror to put in a false proposal; (c) that it has not solicited or induced any other person, firm, or corporation to refrain from submitting a proposal; and (d) that it has not sought by collusion to obtain for himself any advantage over any other Offeror or over NEGK, the Grantee or USTDA or any employee thereof.

2.11 CONDITIONS REQUIRED FOR PARTICIPATION

Only U.S. firms are eligible to participate in this tender. However, U.S. firms may utilize subcontractors from host country for up to 20 percent of the amount of the USTDA grant. USTDA nationality requirements are detailed in Annex 3.

2.12 LANGUAGE OF PROPOSAL

All proposal documents shall be prepared and submitted in English, and only English.

2.13 PROPOSAL SUBMISSION REQUIREMENTS

The **Cover Letter** in the proposal must be addressed to:

Mr. M. Aitkulov
Deputy General Director
National Electrical Grid of Kyrgyzstan JSC
326, Jibek Jolu
720070, Bishkek
Kyrgyzstan
Phone: +996 (312) 66 10 05
Fax: +996 (312) 66 06 56

An Original and four (4) copies of your proposal must be received at the above address no later than 4:00PM, on December 21, 2007.

Proposals may be either sent by mail, overnight courier, or hand-delivered. Whether the proposal is sent by mail, courier or hand-delivered, the Offeror shall be responsible for actual delivery of the proposal to the above address before the deadline. Any proposal received after the deadline will be returned unopened.

Upon timely receipt, all proposals become the property of NEGK.

2.14 PACKAGING

Each proposal must be sealed to ensure confidentiality of the information. The proposals should be individually wrapped and sealed, and labeled for content including "original" or "copy number x"; the original and four (4) copies should be collectively wrapped and sealed, and clearly marked for content.

Neither USTDA nor the Grantee nor NEGK will be responsible for premature opening of proposals not properly labeled.

2.15 AUTHORIZED SIGNATURE

The proposal must contain the signature of a duly authorized officer or agent of the Offeror empowered with the right to bind the Offeror.

2.16 EFFECTIVE PERIOD OF PROPOSAL

The proposal shall be binding upon the Offeror for sixty (60) days after the proposal due date, and Offeror may withdraw or modify this proposal at any time prior to the due date upon written request, signed in the same manner and by the same person who signed the original proposal.

2.17 EXCEPTIONS

Firms agree by their response to the RFP announcement to abide by the procedures set forth therein. Material modifications in the TOR or responsibilities of the parties will not be accepted.

Any exceptions in the proposal shall be clearly identified, and shall include the scope of such exception, and its impact, on the procurement. NEGK shall make final determination as to the responsiveness of such exceptions and their acceptability.

2.18 OFFEROR QUALIFICATIONS

As provided in Section 3, Offerors shall submit evidence that they have relevant past experience and have previously delivered advisory and Feasibility Study services similar to those required in the TOR.

2.19 RIGHT TO REJECT PROPOSALS

NEGK reserves the right to reject any and all proposals and to accept or reject any or all of the items in the proposal, and to award the contract in whole or in part if it is deemed in the best interest of NEGK.

2.20 PRIME CONTRACTOR RESPONSIBILITY

Offerors have the option of subcontracting parts of the services they propose. The Offeror's proposal must include a description of any anticipated subcontracting arrangements, including the name, address, and qualifications of consultants and subcontractors. USTDA nationality provisions are set forth in detail in Annex 3. The successful Offeror shall cause appropriate provisions of its contract, including all mandatory USTDA clauses, to be inserted in all subcontracts ensuing to ensure fulfillment of all contractual provisions by subcontractors.

2.21 AWARD

An award resulting from this RFP shall be made to the best qualified Offeror, taking into consideration the evaluation factors set forth herein; however, the right is reserved to reject any and all proposals received and, in all cases, NEGK will be the judge as to whether a proposal has or has not satisfactorily met the requirements of this RFP.

2.22 COMPLETE SERVICES

The successful Offeror shall be required to (a) furnish all supplies, supervision, transportation, and other execution accessories, services, and facilities; (b) provide and perform all necessary labor; and (c) in accordance with good technical practice, with due diligence, and in accordance with the requirements, stipulations, provisions and conditions of this RFP and the resultant contract, execute and complete all specified work to the satisfaction of NEGK.

2.23 INVOICING AND PAYMENT

Deliverables under the contract shall be delivered on a schedule to be agreed upon in a contract with NEGK. The Contractor may submit invoices to the designated NEGK Project Director in accordance with a schedule to be negotiated and included in the contract. Upon approval of each invoice, NEGK will forward the invoice to USTDA which will process payment to the Contractor. All payments by USTDA under the Grant Agreement will be made in U.S. currency.

Section 3: PROPOSAL FORMAT AND CONTENT

To expedite proposal review and evaluation, and to assure that each proposal receives the same orderly review, all proposals must follow the format described in this section.

Proposal sections and pages shall be appropriately numbered and the proposal shall include a Table of Contents. Offerors are encouraged to submit concise and clear responses to the RFP. Proposals shall contain all elements of information requested without exception. Instructions regarding the required scope and content are given in this section. NEGK reserves the right to include any part of the selected proposal in the final contract.

The proposal shall consist of a technical proposal only. No cost proposal is required as the value of the USTDA grant is established at U.S. \$537,595 dollars.

Offerors shall submit one (1) original and four (4) copies of the proposal. Proposals received by fax cannot be accepted.

The following sections and content are required for each proposal:

- Transmittal Letter,
- Cover/Title Page,
- Table of Contents,
- Introduction and Executive Summary,
- Company Information,
- Organizational Structure, Management Plan, and Key Personnel,
- Technical Approach and Work Plan,
- Experience and Qualifications, and
- Miscellaneous.

Detailed requirements and directions for the preparation of each section are presented below.

3.1 SECTION 1: INTRODUCTION AND EXECUTIVE SUMMARY

An Executive Summary should be prepared describing the major facts or features of the proposal, including any conclusions, assumptions, and generalized recommendations the Offeror desires to make. Offerors are requested to make every effort to limit the length of the Executive Summary to no more than five (5) pages.

3.2 SECTION 2: COMPANY INFORMATION

3.2.1 Company Profile

Provide the information listed below relative to the Offeror's firm. If the Offeror is proposing to subcontract some of the proposed work to another firm(s), similar information must be provided for each subcontractor. Offerors are requested to limit the length of the Company Profile Information to one (1) page per firm.

1. Name of firm and business address, including telephone and fax numbers.
2. Year established (include former firm names and year established, if applicable).
3. Type of ownership and parent company, if any.
4. Project Manager's name, address, telephone and fax number, if different from (1).

3.2.2 Offeror's Authorized Negotiator

Provide name, title, address, telephone and fax number of the Offeror's authorized negotiator. The person cited shall be empowered to make binding commitments for the Offeror and its subcontractors, if any.

3.2.3 Negotiation Prerequisites

1. Discuss any impact of any current or anticipated commitments which may impact the ability of the Offeror or its subcontractors to complete the Feasibility Study as proposed and within the project schedule.
2. Identify any specific information which is needed from NEGK before commencing contract negotiations.

3.3 SECTION 3: ORGANIZATIONAL STRUCTURE, MANAGEMENT, AND KEY PERSONNEL

Describe the Offeror's proposed project organizational structure. Discuss how the project will be managed including the principal and key staff assignments for this Feasibility Study. Identify the Project Manager who will be the individual responsible for this project. The Project Manager must have the responsibility and authority to act on behalf of the Offeror in matters related to the proposed Feasibility Study.

Provide a listing of personnel (including subcontractors and consultants) to be engaged in the project, either U.S. or local with the following information for key staff: position in the project; pertinent experience, curriculum vitae; other relevant information. If subcontractors are to be used, the organizational relationship between the firms must be described.

A manpower schedule and the level of effort for the project period, by activities and tasks, as detailed under the Work Plan shall be submitted. A statement confirming the availability of the proposed project manager and key staff over the duration of the project must be included in the proposal.

3.4 SECTION 4: TECHNICAL APPROACH AND WORK PLAN

Describe in detail the proposed technical approach and work plan. Discuss the project requirements as perceived by the Offeror. Include a brief narrative of tasks within each activity series. For each task, specify: (1) how the task will be addressed and completed, and what type of methodology and analytical tools will be used; (2) how the task may be implemented and coordinated such that levels of effort by the participants and the associated expenses are reduced; (3) how the task will be timed for completion such that the efforts will be efficient, cost effective, and require a minimum of time to complete the study; and (4) how the timing of the task will be coordinated by a graphical schedule. Note specifically any task activities included or excluded and which may differentiate Offeror's technical approach from others. Begin with the information gathering phase and continue through delivery and approval of all required reports.

Prepare a detailed schedule of performance that describes all activities and tasks within the Technical Work Plan, including periodic reporting or review points, incremental delivery dates, and other project milestones.

Based on the Technical Work Plan, and previous project experience, explain when and where Offeror will require support from NEGK. Detail the amount of staff time required by NEGK or participating agencies and any work space or facilities needed to complete the Feasibility Study.

3.5 SECTION 5: EXPERIENCE AND QUALIFICATIONS

Provide a discussion of the Offeror's experience and qualifications which are relevant to the objectives and TOR for the Feasibility Study. If a subcontractor(s) is being used, similar information must be provided for the prime and each subcontractor firm proposed for the project. Relevant experience and qualifications of key staff proposed shall be provided including letters of commitment from the individuals proposed concerning their availability for contract performance.

As many as possible but not more than six (6) relevant and verifiable project references must be provided, including the following information:

- Project name,
- Name and address of client (indicate if joint venture),
- Client contact person (name/ position/ current phone and fax numbers),
- Period of Contract,
- Description of services provided,
- Dollar amount of Contract, and
- Status and comments.

Offerors are strongly encouraged to include in their experience summary primarily those projects that are similar to or larger in scope than the Feasibility Study as described in this RFP.

Section 4: AWARD CRITERIA

Individual proposals will be initially evaluated by a Procurement Selection Committee of representatives from NEGK. The Committee will then conduct a final evaluation and completion of ranking of qualified Offerors, and NEGK shall promptly negotiate a contract with the best qualified Offeror. If a satisfactory contract cannot be negotiated with the best qualified Offeror, negotiations will be formally terminated. Negotiations shall then be undertaken with the second most qualified Offeror and so forth.

The selection of the Contractor will be based on the following criteria:

Offeror's Experience and Expertise (10%)

- Firm's experience in performing similar feasibility studies or other closely related work, especially for projects in the Kyrgyz Republic and other post-Soviet countries.

Staff Technical Experience and Expertise (30%)

- Experience in transmission planning studies and overall project design;
- Electric transmission design experience;
- Electricity market design experience;
- Experience performing Environmental Impact Studies for hydroelectric plants and transmission lines and substations;
- Experience Cost Estimating for transmission lines; and
- EPC design experience.

Staff Financial Analysis Experience and Expertise (20%)

- Experience in preparing investment memoranda and presenting projects for financing to International Financial Institutions, particularly on electric power transmission projects.

Regional Experience and Language (10%)

- Experience in Kyrgyzstan/Central Asia; and
- Russian language capability is highly desirable as all documents are in Russian and very little English is spoken in the country. Translators can be contracted locally, but normally lack the technical language capability required.

Quality of Work Plan and Methodology (30%)

- Understanding of and responsiveness to the feasibility study Terms of Reference demonstrated in the work plan and methodology proposed;
- Staffing and project schedule; and
- Quality of the Work Plan and Methodology, including proposed analytical tools and approach.

Proposals which do not include all requested information may be considered non-responsive.

Price will not be a factor in contractor selection.

ANNEX 1
Federal Business Opportunities Announcement

Mr. M. Aitkulov, Deputy General Director, National Electrical Grid of Kyrgyzstan JSC, 326, Jibek Jolu, 720070, Bishkek, Kyrgyzstan, Phone: +996 (312) 66 10 05, Fax: +996 (312) 66 06 56

B—Kyrgyzstan: Datka-Kemin 500 kV Transmission Line Feasibility Study

POC Evangela Kunene, USTDA, 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901, Tel: (703) 875-4357, Fax: (703) 875-4009. Datka-Kemin 500 kV Transmission Line Feasibility Study. National Electrical Grid of Kyrgyzstan JSC (NEGK) invites submission of qualifications and proposal data (collectively referred to as the "Proposal") from interested U.S. firms which are qualified on the basis of experience and capability to develop a feasibility study to determine the technical and economic feasibility of constructing a new 400 km, 500 kV power transmission line from the Datka 500 kV substation in southwest Kyrgyzstan to a new 500 kV substation at Kemin in north – east Kyrgyzstan.

Endowed with significant hydropower resources, Kyrgyzstan is a net exporter of electricity, primarily to Kazakhstan, Uzbekistan and China. Exports amount to nearly 2.5 billion kilowatt hours per year. Kyrgyzstan also has the potential to export power to South Asia, assuming that the 500kV Central Asia – South Asia power line is built. However, Kyrgyzstan's energy sector is facing serious technical problems and capacity constraints, as the Kyrgyz system is old and antiquated, and winter electricity demand is twice that of pre-independence years due to growth in residential electric heating loads.

At the present time, 90% of Kyrgyzstan's power is produced in hydropower stations in southern Kyrgyzstan, while the main load centers of usage of electric power are in northern Kyrgyzstan, with the capital city of Bishkek and the concentration of industry located in this part of the country. Electricity is transmitted from southern Kyrgyzstan to northern Kyrgyzstan primarily on one 500 kV line. Due to the heavy dependence of Kyrgyzstan on electric power for residential heating, in the winter this line is overloaded. The only alternate transmission path is through Uzbekistan and Kazakhstan, involving a longer route and leading to security issues for reliable power supply and excessive wheeling charges.

In order to alleviate the overloading of the existing 500 kV line and eliminate the need for transmission through Uzbekistan, NEGK is planning to build an additional 500 kV transmission line from southern Kyrgyzstan to northern Kyrgyzstan. The routing of the line would allow interconnection with the Datka substation, the Kambarata Hydroelectric power station and the grid in northern Kyrgyzstan on the east side of Bishkek. This would alleviate overloading on the 220 kV lines in the north.

The Terms of Reference for this Feasibility Study includes:

- Task A – Confirm/Revise Draft Work Plan;
- Task B – Collect Available Data;
- Task C – Identify Alternative Rights of Way;
- Task D – Select Optimum Right of Way;
- Task E – Establish Line Capacity and Electrical Dynamics;
- Task F – Specify Transmission Line Design;

Task G – Establish Bill of Materials and Equipment Specifications;
Task H – Prepare Preliminary Environmental and Development Impact Analyses;
Task I – Estimate Project Capital and Operating Costs;
Task J – Identify the Ownership Structure;
Task K – Conduct Financial and Sensitivity Analyses; and
Task L – Prepare Final Report.

The U.S. firm selected will be paid in U.S. dollars from a \$537,595 grant to the Grantee from the U.S. Trade and Development Agency (USTDA).

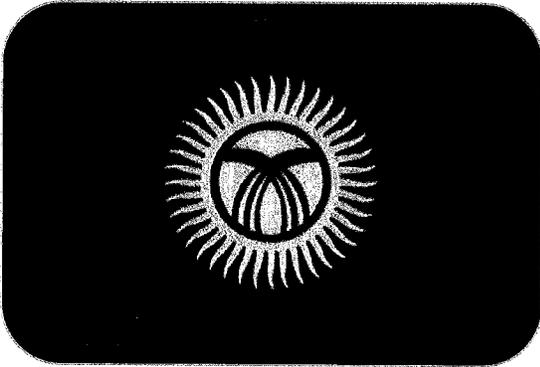
A detailed Request for Proposals (RFP), which includes requirements for the Proposal, the Terms of Reference, and a background definitional mission report are available from USTDA, at 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901. To request the RFP in PDF format, please go to:

<https://www.ustda.gov/USTDA/FedBizOpps/RFP/rfpform.asp>. Requests for a mailed hardcopy version of the RFP may also be faxed to the IRC, USTDA at 703-875-4009. In the fax, please include your firm's name, contact person, address, and telephone number. Some firms have found that RFP materials sent by U.S. mail do not reach them in time for preparation of an adequate response. Firms that want USTDA to use an overnight delivery service should include the name of the delivery service and your firm's account number in the request for the RFP. Firms that want to send a courier to USTDA to retrieve the RFP should allow one hour after faxing the request to USTDA before scheduling a pick-up. Please note that no telephone requests for the RFP will be honored. Please check your internal fax verification receipt. Because of the large number of RFP requests, USTDA cannot respond to requests for fax verification. Requests for RFPs received before 4:00 PM will be mailed the same day. Requests received after 4:00 PM will be mailed the following day. Please check with your courier and/or mail room before calling USTDA.

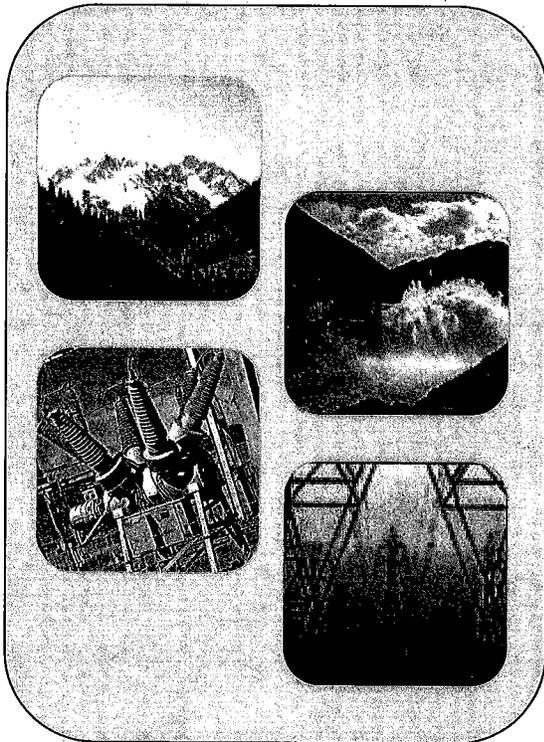
Only U.S. firms and individuals may bid on this USTDA financed activity. Interested firms, their subcontractors and employees of all participants must qualify under USTDA's nationality requirements as of the due date for submission of qualifications and proposals and, if selected to carry out the USTDA-financed activity, must continue to meet such requirements throughout the duration of the USTDA-financed activity. All goods and services to be provided by the selected firm shall have their nationality, source and origin in the U.S. or host country. The U.S. firm may use subcontractors from the host country for up to 20 percent of the USTDA grant amount. Details of USTDA's nationality requirements and mandatory contract clauses are also included in the RFP.

Interested U.S. firms should submit their Proposal in English directly to NEGK by 4:00PM LOCAL TIME (BISHKEK TIME), December 21, 2007, at the above address. Evaluation criteria for the Proposal are included in the RFP. Price will not be a factor in contractor selection, and therefore, cost proposals should NOT be submitted. NEGK reserves the right to reject any and/or all Proposals. NEGK also reserves the right to contract with the selected firm for subsequent work related to the project. NEGK is not bound to pay for any costs associated with the preparation and submission of Proposals.

ANNEX 2
Definitional Mission Report*
(for background information only)



moseley|horizon
perspective &
performance
set free



CONTRACT:
CENTRAL ASIA REGIONAL POWER
CONFERENCE CONTRACT NUMBER
USTDA-06-C-81*034

TITLE:
500KV
DATKA-KEMIN
TRANSMISSION LINE
**DEFINITIAL MISSION
REPORT**

SUBMITTED TO:
Mr. Scott Greenip
United States Trade & Development Agency
Tel: +703.875.4357
Email: sgreenip@ustda.gov

July 3, 2006

PREPARED BY:
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Mailing & Delivery Address: 1000 Wilson Boulevard, Suite 1600, Arlington, VA 22209-3901
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**INTRODUCTION**

This is a definitional mission report on a proposal submitted to the U.S. Trade and Development Agency (USTDA) on May 31, 2005 by the National Electrical Grid of Kyrgyzstan Joint Stock Company (NEGK) with a follow-up October 14, 2005. The NEGK proposal concerns a project to construct a 400 km, 500 kV power transmission line and a 500 kV to 220 kV substation.

The stated aims of the project are to provide a more reliable electricity supply to the northern region of Kyrgyzstan from domestic power generation plants located in the south, especially during higher-demand the winter months. Coincidentally, from a USTDA point of view, the Datka-Kemin transmission line is a critical link for electricity export from Kazakhstan and Kyrgyzstan to the South Asian countries of Afghanistan and Pakistan through the projected electricity corridor that will include transmission lines in and through Tajikistan and Afghanistan.

International agreement among the affected countries to participate in the establishment of an electricity corridor was reached in a meeting of representatives of the concerned governments, multi-lateral and by-lateral agencies, and the private sector in Islamabad, Pakistan, in early May 2006. The meeting resulted in the signing of a Memorandum of Understanding to that effect by representatives from the Kyrgyz Republic, Tajikistan, Afghanistan, and Pakistan at the USTDA sponsored Electricity Beyond Borders Forum in Istanbul, Turkey on June 14th, 2006. The establishment of this electricity corridor is the subject of a feasibility study for which the USTDA authorized a grant of funds to the Tajikistan Ministry of Energy during the Electricity Beyond Borders Forum.

Because of its nature and the type of services, materials and equipment that it will require, the Project in Moseley/Horizon's view conforms to the USTDA primary goal of promoting the export of U.S. goods and services and to the secondary goal of U.S. Government policy to link Central Asia to the South Asia region economically, in this case through the export of electricity.

Thus, the Project has twin goals: promoting a reliable electricity supply in Kyrgyzstan and facilitating Central Asian electricity export to South Asia. A feasibility study is required in order to take the Project from its current status to financial closure and ultimately, as the USTDA should expect, to constructing the transmission line and commissioning the operations.

In evaluating the proposed Project, Moseley/Horizon has addressed each of the fourteen USTDA requirements for a definitional mission in depth as far as it is practical to do so.



A general overview of the Kyrgyz energy sector is incorporated in the Briefing Book that Moseley/Horizon produced for the USTDA-sponsored Istanbul Electricity Beyond Borders Forum of June 2006, and which is incorporated herein by reference.

This Definitional Mission Report compiles information and content drawn from primary sources for information including documents from the U.S. Trade & Development Agency, the U.S. Agency for International Development, the U.S. Central Intelligence Agency, the World Bank, the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), Government Agencies of Kyrgyzstan, and observations by Moseley/Horizon personnel during their visit to Kyrgyzstan in October 2005 and February 2006. A number of credible Internet related and miscellaneous sources were also consulted.

Specific sources of information include the following:

1. Meetings in Kyrgyzstan with officials of National Electrical Grid of Kyrgyzstan Joint Stock Company.
2. Discussions with USTDA, and other parties working in the Region.
3. The Definitional Mission Report for Hydroelectric Power Generation Projects in Tajikistan and Kyrgyzstan, Kyrgyzstan Energy Sector, produced by CJ Aron Associates, Inc.
4. Reports of United States Agency for International Development focused on the development of Central Asian Republics.
5. Reports of International Financing Institutions including World Bank Report 33877: Central Asia Regional Electricity Export Potential Study (REEPS) (December 2004) and Asian Development Bank: Regional Economic Co-operation in Central Asia (December 2000.)
6. Yearbook 2004, National Electrical Grid of Kyrgyzstan, 2004
7. USTDA Definitional Mission Report on Central Asia Power Sector Development Program, Moseley Horizon, Inc., June 5, 2006.
8. Briefing Book, Electricity Beyond Borders Conference on Central and South Asia: Afghanistan, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan, Moseley Horizon, Inc. June 12-14, 2006.



1. EXECUTIVE SUMMARY

Moseley/Horizon presents herewith its report of a definitional mission for considering and evaluating a proposal submitted by fax on May 31, 2005 and by a follow-up fax on October 14, 2005 to the U.S. Trade and Development Agency (USTDA) by the National Electrical Grid of Kyrgyzstan Joint Stock Company (NEGK).

The project includes the construction of a 400 km, 500 kV power transmission line, a 500 kV to 220 kV substation, and related activities. From the Kyrgyz point of view, the proposed project aims at increasing internal power transmission capacity while bypassing Uzbekistan.

From a USTDA point of view, the project is a critical link for power export from Kyrgyzstan to South Asia through a 500 kV electricity corridor that will connect surplus electricity from Kazakhstan, Kyrgyzstan, and Tajikistan to supply growing demand in Afghanistan and Pakistan. The establishment of this corridor is the subject of a feasibility study for which the USTDA announced a grant of funds to the Tajikistan Ministry of Energy during the recent Electricity Beyond Borders Forum, held in Istanbul, Turkey, in June 2006.

Moseley/Horizon finds that the Project is required to rationalize south-north electricity flows in Kyrgyzstan's national grid. Additionally that it is an essential element of a Central Asia-South Asia (CA-SA) electricity trade initiative that enjoys strong IFI and U.S. support. Specifically the Project:

- Meets the USTDA requirement for providing opportunities for the export of U.S. goods and services.
- Supports U.S. Government policy for linking the countries of Central Asia to the countries of South Asia, in this case through the export of electricity.
- Contributes to urgently needed strengthening of Kyrgyzstan's electricity sector through redressing electricity shortages in the north of the country while surplus electricity supplies are available in the south of the country.
- Complements and is an essential follow-up to Southern Kyrgyzstan Transmission Upgrade Program, which promotes energy security by eliminating the need to transmit power originated and consumed in Kyrgyzstan through the Uzbek transmission grid. Thus the Project is certain to receive strong Kyrgyz governmental support.



- Increase significantly electricity export potential to neighboring countries, since its implementation is expected to eliminate technical constraints in the grid and since it will include provisions at the appropriate time to connect the output from the planned Kambarata Hydrogeneration Station to the 500 kV national grids.

The preliminary estimated cost of implementing and commissioning the project is US\$ 190 million. Based on this preliminary estimate, opportunities could be generated for U.S. suppliers of equipment and services to compete on a level playing field in a market that Moseley/Horizon estimates could be as much as US\$ 76 million in value.

The project sponsor would be National Electric Grid of Kyrgyzstan, Joint Stock Company, which is the company in charge of the entire transmission system in Kyrgyzstan. Due to potential tax consequences for NESK, the grantee may need to be Kyrgyz Ministry of Finance.

Despite its importance as an element of the CA-SA electricity trade initiative and stand-alone attractiveness as an investment, a bankable feasibility study is an absolute prerequisite to achieving financial closure for the Project. Moseley/Horizon estimates that the cost of a feasibility study would be US\$ 537,595. By awarding a grant to cover this cost, USTDA would be supporting a process that otherwise might not be attainable considering the limited resources available to NEGK and the cost of other related projects.

Implementation of the project will lead to construction activities and a demand for equipment and services that can be provided from the United States. Major equipment items may involve high voltage step-up and step-down transformers, conductors, high capacity switchgear, high capacity metering devices, and control instrumentation including SCADA (Supervisory Control and Data Acquisition). Services involve provision of design, environmental assessments, engineering, construction, and commissioning functions.

The expectation for the value of exports of US equipment and services is several orders of magnitude larger than the estimated cost of the feasibility study. Such a potential is reasonable to expect from the nature of the physical facilities that will ultimately be required, which are well within the capability of U.S. industry.

Based on the data, information, and analyses in this report, Moseley/Horizon concludes that the Project as described in Section 2 merits financial support of the U.S. Trade and Development Agency through its normal practices for negotiating grants.



2. PROJECT DESCRIPTION

The key elements of the 500 kV Datka-Kemin Transmission Line Project are:

- a. A 500 kV AC power transmission line of approximately 400 kilometers in length and with a design capacity of 1,500 megawatts.
- b. A 500 kV to 220 kV substation at Kemin
- c. Provision for one additional 500 kV to 220 kV substation.

The transmission line will run entirely within Kyrgyzstan from the Datka 500 kV substation in the southwest to a new 500 kV to 220 kV substation at Kemin near the Kazakhstan border in north-central Kyrgyzstan. The Datka substation is part of the Southern Kyrgyzstan Transmission Upgrade Project. The Kemin substation that is part of this project will connect the new 500 kV line to existing 220 kV lines. The routing and design of the new line must provide for the eventual construction of a new 500 kV substation in the southern half of the new line to connect it to the planned Kamarata Hydroelectric Project.

The existing 220kV lines to which the new line will be connected through the Kemin substation will connect the new line to the Kazakh Power Transmission Grid and constitute an important by-pass of the Uzbekistan Power Transmission Grid.

Details concerning the existing power transmission grid are found in the map in Attachment A. Indicative routing of the new line and locations of the Datka, Kamarata, and Kemin substations are found in the map in Attachment B.

It is anticipated that the new line and substation will eventually be key elements of the planned Central Asia-South Asia Power Transmission Corridor project that was the subject of the Central Asia-South Asia Electricity Trade Conference in Islamabad in May 2006 and USTDA sponsored Electricity Beyond Borders Forum held in Istanbul in June 2006. Based on Moseley/Horizon's Definitional Mission Report for the Central Asia Power Sector Development Program, the USTDA has funded a grant to the Government of Tajikistan in support of initial Transmission Corridor project study costs.

Since the line is to serve a double purpose, the transmission capacity of the line will be required to accommodate electricity flows that exist in the present and those that will arise at various times in the future. Transmission tower design will be required to accommodate initial cable loads as well as those that may occur in the future through the addition of new circuits.



The Kyrgyz request to the USTDA to fund a feasibility study for the Datka-Kemin Transmission Line arose as a reaction to the Kyrgyz electric sector's serious infrastructure limitations. It was built in the Soviet era and for the last 30 years, especially since the breakup of the former Soviet Union, neither major investments nor technology improvements have occurred.

Although the country's energy needs can be met by its domestic generation potential, major constraints in the national transmission grid limit the ability to transmit abundant electricity supplies in the south to high demand areas in Bishkek and other northern areas during high-demand winter months. This results in the overloading of national transmission circuits, insecure and high-cost flow of electricity through Uzbekistan's transmission lines, and/or interruptions in electricity supply in northern Kyrgyzstan including Bishkek. The construction of the new line and substation will remove these constraints.

The main centers of power consumption are located in the north of the country, whereas 90% of power generation facilities are located in the South. The need thus exists to transmit large volumes of power from the south to the north. A portion of the existing Soviet era 500 kV transmission line passes through Uzbekistan. This poses an energy security risk for Kyrgyzstan and results in Uzbekistan charging Kyrgyzstan a transit fee for the transfer of its electricity to domestic load centers in the north. The construction of the Datka-Kemin transmission line will eliminate the energy security risk while significantly increasing north-south power transmission capacity.

Kyrgyzstan's exploitable hydroelectric resources are about 20 times as much as domestic demand. The Government is committed to developing this potential and has defined plans and strategies to (a) bring the Kyrgyz electric sector up to international standards, (b) increase power export to neighboring countries in Central Asia and (c) penetrate growing markets in South Asia such as Afghanistan and Pakistan. The 500 kV Datka-Kemin Transmission Line can play an important role in the establishment of an electricity corridor to South Asia.

NEGK began the "South Kyrgyzstan Electrical Improvement Program," to rehabilitate and strengthen the transmission grid in the South. The Islamic Development Bank and The Kuwait Fund for Arab Economic Development financed the first phase. This has been successfully completed.

The second phase of the Improvement Program includes the construction and replacement of 220 kV lines in the South region and also the construction of the 500/220 kV substation at Datka to which the proposed new line would connect. The second phase project including the Datka substation is the subject of an active USTDA grant to cover the cost of its feasibility study. Bidding for the feasibility study closed in June 2006.



The 500 kV Datka-Kemin Transmission Line Project that is the subject of this Definitional Mission can be considered to be the 3rd and culminating phase of the current South Kyrgyzstan Transmission System Improvement Program. The Project requires a feasibility study that will serve as the basis to achieve its financial closure. The Terms of Reference for the feasibility study is provided in Section 12 of this report.



3. PROJECT SPONSOR'S CAPABILITIES & COMMITMENT

NEGK, the project's sponsor, is a government-owned joint stock company that was established in 2001 to own and operate the national power transmission grid (transmission lines and related substations with voltages of 100 kV and above).

NEGK also owns and operates some 35 kV transmission lines that are of strategic importance.

NEGK was created as a result of legal reform and of several other steps taken by the Kyrgyz government toward the rehabilitation and modernization of the Electric Sector.

NEGK together with its sister electricity generation and distribution companies have defined and are undertaking several projects to enhance the country's electricity sector.

The seven joint stock companies (JSCs) that own and operate the Kyrgyz power sector are as follows:

- "Power Plants of Kyrgyzstan" - Owns and operates all power plants.
- "National Electrical Grid of Kyrgyzstan" (NEGK) – Owns and operates the national power transmission grid (system),
- Severelectro, Vostokelectro, Oshelectro, and Jalabadelectro. – own and operate the power distribution system of their respective region.
- Bishkekteploset - Owns and operates the district heating network of Bishkek

NEGK's main physical assets include high voltage substations and transmission lines at 35 kV, 100 kV, 220 kV, and 500 kV. As of June 1, 2004., the national grid consisted of 4,353 km of transmission lines at 110kV, 1,624 km at 220 KV, and 541 km at 500 kV. As of the same date, NEGK owned and operated 172 substations at 110 KV, 14 at 220 kV, and two at 500 kV. The installed capacity of the substations totaled 8,499 MVA. NEGK has approximately 2,400 employees of which about 800 are managers and specialists and 1,600 are field workers. Ninety percent of managers and specialists have higher-level education. Over half of the field workers have high-level and special education. In general, 50 % of staff have ten or more years of experience.

The organizational structure of NEGK is as shown in Figure 1 below.

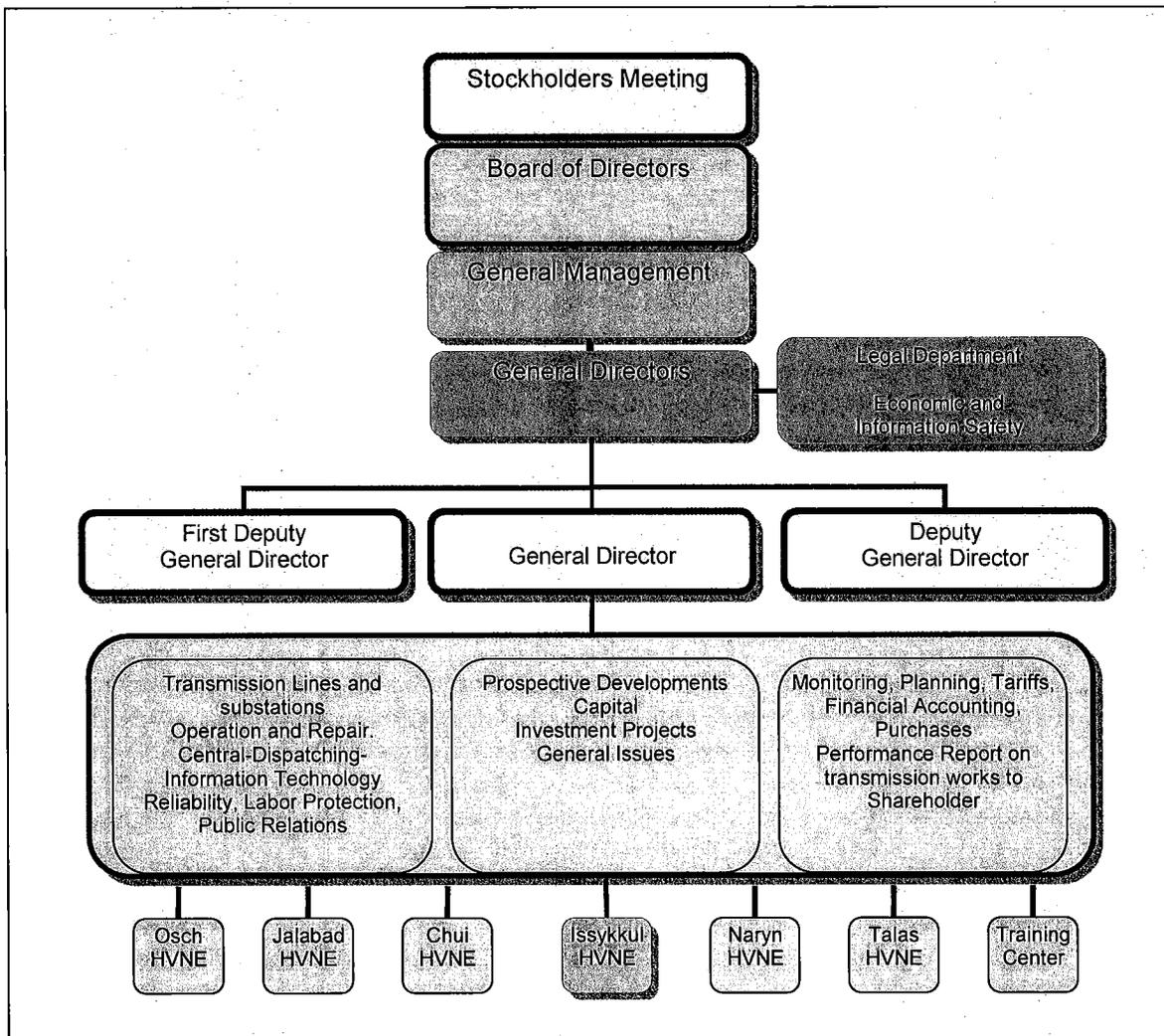


Figure 1: NEGK Organizational Structure

At the present time, NEGK's main focus is on the resolution of south to north electricity flows, especially during winter months when demand in the north is highest. Toward this end, NEGK began the South Kyrgyzstan Transmission Improvement Program to rehabilitate and strengthen 220 kV transmission lines in this region. The now completed first phase of the Improvement Program included the construction of the 131 km Alay-Aigultask 220 kV transmission line, the construction of the 220 kV Aigultash Substation and rehabilitation of the 220 kV Alay and 110 kV Batken substations. This phase 1 was financed by the Islamic Development Bank and the Kuwait Fund for Arab Economic Development.



The second phase of the Upgrade Program in the South involves the construction of a 500/220 kV substation at Datka with interconnection to the existing 500 kV Transmission Line and the 220 kV network and replacement of the older 220 kV network, which is in need of rehabilitation. The still un-funded project is of very high priority for NEGK and must be completed prior to or coincidentally with the 500 kV Datka-Kemin Transmission Line project that is the subject of this report.

Moseley/Horizon finds NEGK to be fully committed to the 500 kV Datka-Kemin Transmission Line project and adequately qualified to successfully manage its implementation. Consequently Moseley-Horizon recommends that NEGK be the designated Project Sponsor and made responsible for managing the requested project grant if it is authorized by USTDA. As was done in the Southern Kyrgyzstan Transmission Upgrade Project, the grant for this new project could be provided to the Kyrgyz Ministry of Finance, who in turn would delegate authority to NEGK to undertake the implementation of the grant agreement.



4. IMPLEMENTATION FINANCING

A number of multilateral banks and bilateral donor agencies have been involved in the improvement of the Kyrgyz power sector over the last decade. The World Bank (WB) has assumed a leadership role among the multilateral donors in reforming the Kyrgyz Energy Sector and is working to address complex issues such as private sector investment, energy pricing, and other structural reforms necessary to bring the energy sector to international standards.

Together with the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD) and others, the WB works on structural reforms to shore up the energy sector, supports distribution companies through the development of plans to reduce theft of electricity by improved metering, billing & collections, and helps to improve management practices thereby improving overall fiscal efficiency. Current World Bank support of the Kyrgyz electricity sector includes US\$10 million for the rehabilitation of heat and thermal power plants and \$5 million for loss reduction and other power distribution improvements.

As regards power transmission, NEGK began the South Kyrgyzstan Electrical Improvement Program to rehabilitate and strengthen the transmission grid in the South. The first phase of the Project (involving the construction of new substations and transmission lines) has been financed by the Islamic Development Bank and the Kuwait Fund for Arab Economic Development. The second phase of the project (involving the construction of a 500/220 kV substation at Datka and the rehabilitation and construction of 220 kV lines) is the subject of a USTDA grant that was formally announced on November 22, 2005 to fund the corresponding feasibility study.

Current efforts demonstrate a solid commitment from the multilateral and bilateral donor community to the Kyrgyz power sector. USTDA support of the program could lead to EX-IM Bank and OPIC support and help assure opportunities for the export of US goods and services.

From an equity standpoint, two possibilities for implementation can be visualized. The first one is public investment under loan or grant arrangements with one or more IFIs. The benefits of the Project are in line with governmental goals of a) bringing the Kyrgyz power system up to international standards and b) increasing the possibilities for exporting electricity to neighboring countries in Central Asia and to growing economies in South Asia. This project is expected to score extremely high on most of the requirements for inclusion in Kyrgyzstan's Public Investment Program.

The second option on equity financing is in relation with private investment. AES, a major global power company headquartered in Arlington, Virginia, is likely to undertake



a Program addressing a set of activities to export electricity from Kazakhstan, Kyrgyzstan, and Tajikistan to Afghanistan and Pakistan by means of establishing a 500 kV transmission corridor between Kazakhstan and Pakistan. The Datka-Kemin transmission line is an important link of this corridor and can be critical to the success of the AES Program. According to a press announcement on May 30th, 2006, AES is planning a US\$ 1 billion investment in facilities in a first stage that will involve the export of electricity from Tajikistan to Afghanistan and Pakistan. The second stage of the AES Program involves exports of electricity originating in Kazakhstan and transmitted through Kyrgyzstan and Tajikistan.

The activities being undertaken by AES are also being addressed in a larger scope by the World Bank as well as the Asian Development Bank, which is reported to be financing some reconstruction and rehabilitation work. The involvement of these international financing institutions in the region indicates a stated willingness, or potential interest in giving serious consideration for loan financing in the Program, with AES, in turn, as an equity participant.

Another factor that can influence consideration of loans from the financing institutions is the ratio of equity investment to the total capital cost of the project. It is likely that the financing institutions will consider maximizing the loan financing on the thoroughness of the feasibility study. The more thorough and credible the feasibility study is in the eyes of the financing institutions the lower the ratio of equity investment to total capital cost is likely to be. The importance of the ratio lies in the sensitivity of the transmission cost of electricity to the ratio.

Table 1 below shows the results that have been produced from an in-house computerized financial model. The Table produces results for a range of ratio of equity to capital costs from 0.2 to 0.5 and compares this sensitivity to a range of capital costs from 80% of the base case to 120%.

The comparison is based on the following significant inputs.

<i>Base Capital Cost for Project (Estimated)</i>	US\$ 190 million
<i>Capacity Factor:</i>	60%
<i>Construction Period:</i>	3 years
<i>Income tax Rate:</i>	35%
<i>Interest Rate for Long-Term Loan:</i>	7%
<i>Term of Loan:</i>	20 years
<i>Annual Operating Cost:</i>	US\$ 5.7 million
<i>Transmission Loss:</i>	5%.



In all cases the internal rate of return on equity is close to 25% and the ratios of net present value of the investment to the equity invested in all cases are greater than 1.00, as expected.

**Table 1: Electricity Wheeling Charges Based on Preliminary Financial Analysis
500 kV Datka-Kemin Transmission Line Project
(in US cents/kWh)**

Item		Estimated Total Capital Cost: US\$ 190 million		
		80% of Estimated Capital Cost (US\$152 million)	100% of Estimated Capital Cost (US\$190 Million)	120% of Capital Cost (US\$228 million)
		(US cents/kWh)	(US cents/kWh)	(US cents/kWh)
Ratio of Equity to Total Capital Cost	20%	0.356	0.445	0.534
	30%	0.410	0.513	0.615
	40%	0.464	0.580	0.696
	50%	0.518	0.648	0.778

The results show that the transmission costs are as sensitive to the ratio of equity to total capital cost as they are to the accuracy of the capital cost. For instance, at the capital cost base, the increase of equity from a ratio of 20% to 50% increases the transmission cost of electricity by 47%. At each value of the ratio, the increase in electricity price from 80% of the base capital cost to 120% of the base is about 50%. This analysis, however illustrative, indicates the importance of the two factors (equity/capital cost ratios and accuracy of the capital investment estimates) in the feasibility stage. It has been assumed that both domestic and exported electricity will pay the same transmission line use fee or tariff.

During those times of the year when the south to north electricity flow requirements exceed the operational loading parameters of its own transmission circuits, Kyrgyz must transport domestic-use electricity flows through the Uzbek transmission grid. As in the case of natural gas, these flows generate a variety of Kyrgyz-Uzbek disputes some caused by the varying and uncertain wheeling charges that Uzbekistan imposes unilaterally on Kyrgyzstan. These costs and the inherent risk of the flow electricity being interrupted are two sound and indisputable justifications for the new Datka-Kemin Line.

A more detailed analysis should break down wheeling charges into two components:

- a) the demand component that would provide for recovering fixed costs of the line and
- b) the energy component that would provide for recovering variable costs including technical losses.



Additionally more solid information concerning south-north electricity flows through Uzbekistan should be gathered and used in analyzing the project and exploring alternatives to it. The additional information should include year-by year tabulations of Uzbek wheeling fees and Kyrgyz, Kazakh, and Tajik experience in negotiating and implementing transmission line use agreements with Uzbekistan.

Given the above, it is our opinion that the Project proposed by NEGK offers attractive economic and financial prospects since considerable and active interest by donors and international financing institutions exists in the improvement of Kyrgyzstan's national electricity transmission grid and the Project *per se* because of its many benefits is in line with governmental goals. Additionally a competent organization exists which owns the grid and can manage efforts to secure financing for this critical link in the transmission corridor that will permit electricity trade between Central and South Asia. This will benefit the receiving countries through supplies of low cost electricity. This will also benefit supply countries such as Kyrgyzstan through foreign exchange earnings and local enhanced economic activity. At the same time, private sector investment should be attractive given that the cost data developed above are based on a 25% internal rate of return on equity, a rate that should be attractive to most investors in the region.



5. U.S. EXPORT POTENTIAL

The objectives for this section are (a) to identify the U.S. organizations that could provide equipment and services for the implementation of the proposed Project and (b) to develop preliminary estimates of the value of equipment and services that could be exported from the U.S. during implementation. The U.S. organizations are listed below in categories of equipment and services. It is only practical at this time to see the total capital cost of the Project and the allocation to equipment and services as preliminary estimates. The final capital cost of the Project is an output of the Feasibility Study that is to be conducted as per the Terms of Reference in Section 12.

According to information that NEGK provided Moseley/Horizon during meetings in Bishkek on February 27, 2006, the total estimated capital cost for the implementation of the 400 km, 500 kV Datka-Kemin transmission line is \$170 million and the capital cost for the construction of the Kemin substation, \$20 million. Thus, the estimated cost of the proposed project totals \$190 million.

Based on this last figure, it is reasonable to allocate this cost to categories of costs in an implementation program. A preliminary allocation is as follows:

- About 10% of the total capital cost estimate may be allocated to engineering design, procurement, supervision of construction, and supervision of the commissioning of the facilities. Thus, the value of services that could be provided by U.S. organizations is about \$19 million.
- Of the remaining 90% of the total capital cost estimate, a conservative judgment indicates that about one third may be allocated to equipment that could be competitively supplied from the United States, one third to equipment and materials that can be supplied locally (structural steel, insulators, concrete, reinforcing bars, etc.), and one third to construction labor and field facilities. Thus, the value of equipment that could be supplied from the United States is estimated to be \$57 million.

Thus, the total value of equipment and services that could be supplied by U.S. organizations and from U.S. sources is about \$76 million (19 + 57). In our opinion, competitive strength of U.S. firms in the supply of equipment is likely to reside in equipment items of high unit cost and in technology intensive items. Accordingly, the expectation is that procurement opportunities for U.S. firms and manufactures lie in high voltage step-up and step-down transformers, high voltage switchgear, high voltage metering devices, and supervisory control and data acquisition systems (SCADA).



US companies that could be involved in the export of US equipment and services according to the nature of the proposed Project are listed below and on the following pages. The source for the information is the December 2004 report of CJ Aron Associates, Inc. from a definitional mission concerned with Hydroelectric Power Generation Projects in Tajikistan and Kyrgyzstan.

Transformers:

Waukesha Electric
 400 S. Prairie Avenue
 Waukesha, WI 53186-5940
 800-835-2732
 262/547-O121 (P)
 262/521-0196 (F)
 Sales Department

Virginia Transformer
 220 Glade View Dr,
 Roanoke, VA 24012
 (540) 345-9892, Sales Department

Transmission

Eaton Electrical
 1000 Cherrington Parkway
 Moon Township, PA 15108-4312
 Telephone (412) 893-3300
 Fax (412) 893-2140
 Bill Vasiladiotis
 williamvasiladiotis@eaton.com
www.eatonelectrical.com

Substation:

Square D/ Schneider Electric
 415 South Roselle Road,
 Palatine, IL 60067
 888-778-2733 Sales Department

Controls:

Siemens-Westinghouse
 4400 Alafaya Trail
 Orlando, FL 32826-2399
 +1 407/736-6718
 Melanie Forbrick

ABB Midwest United States Region
 ABB Inc., Automation Technology
 Products
 BCPRD US Sales
 16250 W Glendale Drive
 New Berlin WI
 53151-2858 USA
 Tel: (262) 780-8301
 Fax Number (262) 780-5100
 Carl Larsson

Phoenix Controls
 586 Fulling Mill Road
 Middletown, PA 17057
 Tel. (717) 944-1300
 Fax: (717) 944-1625
 Customer Support

L&S Electric
 5101 Mesker Street
 P.O. Box 740
 Schofield, WI 54476
 Phone: (715) 359.3155
 Fax: (715) 355.5931
 Ron Hahn
 rhahn@iselectric.com
www.iselectric.com



Automated Control Systems, Inc.
3305 Main Street, Suite 201
Vancouver, Washington 98663
Telephone (360) 737-6654 ext.205
Fax (360) 737-6673
Daniel K. Perrier, PE
Danperrier@automation-software.com
www.automationsoftware.com

Welding and Fabrication:

Thermadyne International
16052 Swingley Ridge Road, Suite 300
St. Louis, MO 63017
Phone: (636) 728-3000
Sales Department

The Lincoln Electric Company
22801 St. Clair Ave.
Cleveland, OH 44117
Telephone: 216.481.8100
General Fax: 216.486.1751
Sales Department

Laser Technologies, Inc.
1061 North Raddant Road
Batavia, Ill 60510
Telephone (630) 761-1200
Fax (630) 761-1250
Keri Alwin
kalwin@lasertechnologiesinc.com
www.lasertechnologiesinc.com

Equipment:

Mack Trucks, Inc.
P.O. Box M
Allentown, PA 18105
Fax: (610) 709-3699
Sales Department

Caterpillar
www.cat.com

GM Trucks
www.gmbuypower.com

Consulting Services

Black & Veatch
8400 Ward Parkway, P.O. Box 8405
Kansas City, MO 64114
Telephone (913) 364-2933
Fax (913) 458-3730
Carlos Araoz
araozc@bv.com
www.bv.com

MWH Global, Inc.
175 West Jackson Street
Chicago, Illinois 60606
Telephone (312) 831-3000
Fax (312) 831-3999
Norm Bishop
Norman.A.Bishop@mwhglobal.com
www.mwhglobal.com

ECI
7800 East Dorado Place, Suite 100
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6. FOREIGN COMPETITION & MARKET ENTRY ISSUES

Foreign competition will be strong from both Europe and Asia. Countries offering the highest level of competition will likely be:

- Russia – RAO UES and Subsidiaries
- China – Harbin, Dong Fang
- Japan – Mitsubishi Heavy Industries (MHI)
- Germany - Siemens
- Austria - Voith
- France – Alston, EDF
- Norway - Norhydro
- Sweden – Vattenfall
- Switzerland – ABB

Most European manufacturers are capable of manufacturing equipment in a number of different locations. Large companies such as Voith, Siemens, Alston, ABB, etc. maintain manufacturing capability in Europe, North America, South America, and China. Often, the source of financing dictates the location of equipment manufacture.

Russia maintains an extremely close relationship with the Kyrgyzstan Power Sector, and therefore it can represent the strongest competitor for U.S. suppliers. However, due to the fact that U.S. donors and business groups work in the electric sector of Kyrgyzstan and other countries of Central Asia, U.S. suppliers will be more familiar with the procurement process.

Key suppliers in Russia include:

1. Eltek Energy
2. Dalnaya Svyaz State Enterprise- cables
3. Zavod Krupnykh Elektrychnykh Mashyn, Tel. (812) 346-5845, www.zkem.ru
4. Privod, www.privod.lsv.ru
5. Promarmatura Inc., www.insulators.ru

International companies with Russian subsidiaries include:

1. Lucent
2. Alcatel
3. Siemens
4. IskraTel
5. Huawei Technologies
6. NEC



In addition, transport distances for equipment from the U.S. to Kyrgyzstan are much longer than from European and East Asian sources, which also reflect in cost competitiveness. On the other hand, weakness in the U.S. dollar could be helpful in the competition.

Perhaps the most important factor that can influence the extent to which U.S. equipment will ultimately be used in the construction of the proposed Project is the interest that the Ex-Im Bank and OPIC may have in financing exports to Kyrgyzstan at the time procurement activities begin.

So far, interest in the Kyrgyz power industry has come from the Islamic Development Bank, EBRD, SECO, KfW and also largely from the World Bank and the Asian Development Bank whose requirements are for strict international competition in projects for which they provide funding. The use of international competitive bidding under IFI procurement rules and guidelines will assure that U.S. suppliers of goods and services will have ample opportunity to compete.



7. DEVELOPMENTAL IMPACT

The developmental impact is presented in two categories: Primary Developmental Impact and Alternatives.

7.1 PRIMARY DEVELOPMENTAL IMPACT

Projected beneficial impacts from the completion of this project include:

- From the point of view of the interests of USTDA, the Datka-Kemin transmission line project is a critical link in the chain that would establish an electricity corridor from Kazakhstan to Pakistan. As such it suits USTDA objectives of providing opportunities for the export of U.S. goods and services and also responds to the U.S. policy of promoting economic cooperation between the Central Asian republics and the countries of South Asia.
- In this respect, the economy of Kyrgyzstan will benefit from increased opportunities to earn foreign exchange through the export of electricity and fees earned for the transmission of electricity from Kazakhstan through its territory.

From the point of view of efficient operation of the Kyrgyz national grid, the Project will increase the transmission capacity required to provide reliable electricity to the north of the country, where major load centers are located, from generation in the south of the country. Thus, it will help to correct unbalanced loads produced especially in wintertime when peak demand is three times that of the peak summertime load, thus decreasing the risk of load shedding and blackouts.

Specifically, only the Toktogul – Frunzenskaya transmission line currently connects the electricity grid in the north with the south at 500 kV. Because of low capacity, 220 kV transmission lines in the Chui region in the north currently do not provide reliable electricity supply, which consequently prevents the 500 kV Toktogul–Frunzenskaya line from operating at full capacity. The proposed Project, by providing an alternative route to transmit electricity to the North, can be expected to significantly relieve the 220 kV system and thus provide reliable electricity to the Chui Region and to the North in general. This latter benefit should be carefully analyzed and quantified under the detailed feasibility study.



- The Project can be considered to complement the Southern Kyrgyzstan Transmission Upgrade Project, which eliminates the need to transmit electricity that is generated and also consumed in the country, through the Uzbekistan transmission grid, thereby providing security of supply
- The proposed project will allow in the future the transport of electricity from the planned Kambarata Hydropower Project to domestic load centers and for export to markets in neighboring countries and in South Asia. The implementation of the transmission line will include provisions for interconnecting future electricity supplies from Kambarata to the Datka-Kemin transmission line.

There would be a number of secondary beneficial impacts from the construction of the Datka-Kemin Project. These include:

Infrastructure & Industrialization

The estimated length of the 500 kV transmission line included in the project is 400 kilometers. Its design capacity will be 1500 MW. At a load factor of 60%, it will transmit 7,884,000,000 kilowatt-hours/year. The economic activity resultant from the construction of the transmission facilities economic will derive significant benefits for Kyrgyzstan. This includes employment generation from the construction and ultimate operation of this infrastructure. This also includes lower cost and more reliable electricity that will provide an economic stimulus for the Kyrgyz industrial sector. Additionally, the need to bring equipment and materials to the construction sites is expected to result in improvements in the local transportation infrastructure. It's also worth noting that the operational needs of the installations could spur improvements to the communications systems of the country.

Market-Oriented Reforms

Kyrgyzstan is in the early stages of reforming the electric sector to function as a market oriented and self-sufficient entity. Although the development of the proposed project is not expected to produce any reforms to the current legal framework or to enhancing a market economy in itself, it does act as a spur to further market-oriented reforms in the electricity sector.

Human Capacity Building

Implementation of this Project will benefit locally available resources to support project design, procurement, construction, and operation. This will result in three tangible benefits: (1) reduced costs through the utilization of lower-cost local services; and (2) increased human resource capability through effective best-practice knowledge transfer, and 3) stimulation of local private enterprise through the use of local firms for specific activities. Additionally, the proposed Project will provide Kyrgyz government officials with opportunities to better understand and develop additional experience with IFI funding requirements and procedures.



Based on observed staffing of existing facilities in Kyrgyzstan and similar countries, it is estimated that the project will generate an average of approximately 300 temporary local jobs during the 3 to 5 project implementation-construction period. The operation and maintenance of the 400 km high voltage transmission will likely require an average annual work force of 100 engineers, linemen, mechanics, substation operators, drivers, warehousemen, clerks, security guards, and other labor categories.

Technology Transfer and Productivity Improvement

Kyrgyz power facilities are old and outmoded. Replacement high voltage power transmission technology is mature and commercially available. The implementation of the Project will bring the latest technology to the transmission sector and assist Kyrgyz personnel in updating their experience in line with international standards.

Depending largely of government job-creation and protection policies and practices, the use of higher tech equipment in substations, especially automated operations and load monitoring, metering, and data storage equipment, could result in modest increases in the productivity operations and maintenance personnel

7.2 ALTERNATIVES

No other project in the Kyrgyz power sector is expected to provide the same function or result in the benefits expected from the 500 kV Datka-Kemin transmission line.

The Project addresses the three main issues that the Kyrgyz transmission currently faces:

- (a) Increasing reliable electricity transmission from the south to the north including the by-pass of Uzbekistan,
- (b) Decreasing overload conditions in transmission lines in the south, and
- (c) Reducing technical losses and risk of load shedding and blackouts.

Additionally, the project includes provisions to incorporate the planned Kambarata hydropower plant thereby increasing electricity supply to serve domestic demand and potential export markets in neighboring countries.



8. IMPACT ON THE ENVIRONMENT

Environmental impacts arise from the construction and operation of high voltage transmission lines. In general, the primary impact is the allocation of land to the right of way, which removes this land from other productive uses. It also produces a significant negative sociological impact if villages exist in prospective rights of way and populations have to be relocated, perhaps under objection. The transmission lines also represent a form of "landscape pollution."

During the feasibility study stage, the following tasks are to be accomplished with regard to environmental requirements.

- Review local specific environmental standards applicable to the electricity sector and assess their effectiveness;
- Examine the present environmental, safety, and quality standards that are applicable to the power transmission sector, including the institutional arrangements for their enforcement;
- Recommend suitable measures for the monitoring and compliance of the prescribed standards; and
- Propose measures to minimize the environmental effect from developing the transmission line.

The definitive route for the Datka-Kemin transmission line is yet to be determined by the outcome of the Feasibility Study. Environmental assessments will be required for each possible route. The impact of the construction of the Datka-Kemin Project on current environmental conditions along the route is to be assessed before construction starts. This assessment is to take into account the following considerations as appropriate.

1. Impact On Soil
2. Impact On Surface Water
3. Impact On Biodiversity And Loss Of Habitat
4. Impact On Ambient Air Quality
5. Noise
6. Vibration
7. Waste
8. Electromagnetic Radiation Impacts
9. Visual Impacts On Landscape
10. Occupational Health And Safety



11. Cultural And Ethnical Impacts
12. Social And Economic Impacts
13. Decommissioning Impacts

Because IFIs will likely finance the lion's share of the cost of the project their environmental requirements will have to be satisfied. The project appears to Moseley/Horizon to be quite typical and extraordinary environmental compliance challenges or problems to be unlikely.

**9. IMPACT ON U.S. LABOR**

The prospective impact on U.S. labor of the proposed Project is governed by the provisions of the Foreign Operations, Export Financing and Related Programs Appropriations legislation, which restricts U.S. foreign assistance from being used to provide:

- (a) any financial incentive to a business enterprise currently located in the United States for the purpose of inducing such an enterprise to relocate outside of the United States if such incentive is likely to reduce the number of employees of such business enterprise because United States production is being replaced by such enterprise outside the United States;
- (b) assistance to any project or activities that contributes to the violation of internationally recognized workers rights; and
- (c) direct assistance for establishing or expanding production of any commodity for export by any country other than the United States, if the commodity is likely to be in surplus on world markets at the time the resulting productive capacity is expected to become operative and if the assistance will cause substantial injury to United States producers of the same, similar, or competing commodity.

The commodity of concern in the 500 kV Datka-Kemin Project is electricity in a location sufficiently distant from the electricity generation facilities in the United States such that it is technically not feasible to export U.S. generated electricity to the Kyrgyz market. Likewise this technical limitation will assure that no substantial injury to U.S. producers of electricity will occur. The expectation is that the international financing institutions will have standards for programs they finance that require preservation of workers rights, who are engaged in the program activities.

On the other hand, given the nature of the financing being requested of the USTDA for a foreign Program, a successful outcome promises benefits to U.S. labor to the extent that U.S. exports of equipment and services result.



10. QUALIFICATIONS

The Contractor to perform the feasibility study is to be selected from interested and qualified U.S. firms through competitive procurement. A good number of U.S. firms possess complete transmission project capabilities with high quality standards and provide consulting and construction services. The following are key capabilities the Feasibility Study Contractor should demonstrate in its proposal:

Technical Studies

- Knowledge of Kyrgyz electric market, law and regulations
- Experience in transmission planning studies and overall project design
- Experience in the design of electrical transmission lines
- Experience in power market assessment
- Experience in environmental impact studies for high voltage transmission lines and substations; knowledge of local and IFI's environmental standards
- Experience in cost estimating for high voltage transmission lines and substations
- EPC design experience

Financial Studies

- Experience in economic and financial evaluation; experience in preparing investment memoranda and presenting projects for financing by International Financing Institutions

Regional Experience and Language

- Experience in Central Asia's power industry
- Russian language capability highly desirable. Reports and other documents must be provided in both English and Russian.

In the bidding process, the Grantee should consider that if subcontractors are to be used, they should demonstrate similar capabilities in the fields they will be involved.



Moseley/Horizon suggests the following criteria to evaluate proposals under the bidding process.

**Table 2. Award Criteria for Feasibility Study Contractor
 500 kV Datka-Kemin Transmission Line Project**

Qualification	Points
Offeror's experience and expertise conducting feasibility studies or other closely related work in similar power markets of the former Soviet Union.	10
Staff's technical and financial experience and expertise.	40
Regional experience and language	20
Quality of work plan and methodology proposed (as required in Section 12)	30
Total Points	100



11. JUSTIFICATION

NEGK is seeking grant-funding support from the USTDA to finance the Feasibility Study for the proposed transmission Project, whose successful outcome would allow the Project to reach financial closure.

Kyrgyzstan is endowed with significant hydro resources yet most of it is still unexploited. The installed electricity generation capacity is large enough not only to meet domestic demand but also to provide significant electricity for export. As such, Kyrgyzstan is in a critical position to support the USTDA interest in the establishment of an electricity corridor to link the surplus electricity supplies to the electricity deficient South Asian countries of Afghanistan and Pakistan. Nonetheless, since most generation and transmission facilities were built during Soviet times, these are in serious need of modernization, rehabilitation, and integration through the construction of new transmission linkages. Since independence, only marginal investments have been made in the sector.

The need for maintenance and new investment in the electricity sector became apparent in the country as installations reached the end of their useful lives and as serious constraints in the national grid began to account for load shedding and outages. In order to reverse this situation in 1998 and 1999, the government set out the legal basis for privatization of the electricity sector, defined goals to bring the sector to international standards, set a goal to achieve electricity self-sufficiency, and set a goal to become a major electricity exporter. Toward these ends, important investments are required in the near term in order to expand the national electric grid and rehabilitate existing power plants. The Datka-Kemin Project fits the goals mentioned above. The beneficial development impact has already been previously presented.

The expansion of the national electrical grid is a government high priority to achieve electricity self-sufficiency and increase electricity exports. The 500 kV Datka-Kemin Transmission Line Project supports Kyrgyzstan's national goals and will likely receive high level government support to be included in the Kyrgyz investment plan for the public sector in the coming years. The Project is well known by the multilateral lenders and donors, therefore it is reasonable to expect that the Project will receive a high level of support from the IFIs during the financing implementation stage. A feasibility study is required to secure this support. The terms of reference for this feasibility study are presented in Section 12 beginning on the next page.



12. TERMS OF REFERENCE

A feasibility study is required in order to take the Project, as described previously in Section 2, from its current status to financial closure and ultimately, as the USTDA should expect, to constructing the transmission line and commissioning the operations.

All reports including maps, diagrams, charts and tables that these terms of reference require be prepared shall be prepared in professional-level English and Russian. The original and one copy of each such report, maps, and other documents shall be presented in Russian and English to the Grantee with one copy in each language to USTDA.

Table 3 lists the thirteen tasks that comprise the work of preparing and submitting a feasibility study in the depth required to achieve financial closure for the project.

Detailed requirements for each task follow below.

Table 3
List of Tasks

Task Number	Title
1	Confirm/Revise Draft Work Plan presented with proposal.
2	Collect Available Data
3	Identify Alternative Rights of Way
4	Select Optimum Right of Way
5	Establish Line Capacity and Electrical Dynamics
6	Specify Transmission Line Design
7	Establish Bill of Materials and Equipment Selection
8	Prepare Environmental Impact Study
9	Prepare Procurement Bid Documents
10	Estimate Project Capital and Operating Cost
11	Conduct Financial and Sensitivity Analyses
12	Identify the Ownership Structure
13	Complete and Submit Final Report

TASK 1 – CONFIRM/REVISE DRAFT WORK PLAN

The Request for Proposals shall require each Bidder under the RFP to include a draft work plan. The Contractor, as a first effort before undertaking any other Task, shall consult with its Kyrgyz counterparts as needed to revise and finalize the draft work plan that was presented with its proposal under the RFP. The final work plan shall be comprehensive and cover the performance of the last 12 Tasks listed in Table 3.

The objective of the final (confirmed) work plan shall be to foresee as far as practical all of the specific activities that will be involved in the execution of the Tasks defined above.



The work plan shall specify

- 1) how the activities in each Task will be addressed and completed, and what type of methodology and analytical tools are to be used;
- 2) how selected Tasks may be implemented and coordinated such that levels of effort by the participants and the associated expenses are reduced;
- 3) how the Tasks will be sequenced and timed for completion such that the efforts will be efficient, cost effective, and require a minimum of time to complete the study; and
- 4) how the timing of the Tasks will be coordinated by a graphical schedule.

Additionally, the final work plan shall identify the staffing and staff qualifications assembled for undertaking the Tasks. The roles for subcontractors (if any) shall also be identified as part of the work plan.

Deliverable: The Final (confirmed) Work Plan shall be delivered to the Grantee to serve as a basis for its monitoring of the contractor's progress.

TASK 2 – COLLECT AVAILABLE DATA

The Contractor shall collect from the Grantee, electricity sector companies, governmental regulating agencies, and others as appropriate, all technical, legal, and environmental information available. The Grantee is required to collect and provide all pre-feasibility study information and data the Contractor will require.

The Contractor shall assess the validity of the information and data in terms of usefulness as inputs to the Tasks defined by these Terms of references. Examples of information and data include environmental law, characteristics of relevant national electrical grid components, results of previous explorations of routing between Datka and Kemin, status of the construction of the Datka substation, and timing prospects for the construction of the Kamarata facilities. With respect to the future Kamarata facilities, the Contractor shall determine the justification for locating the substation along the Datka-Kemin line and provision of a connection for a future substation.

The Contractor shall also, under Task 2, review and assess the legal framework under which the feasibility study will be developed, including but not limited to analysis of Kyrgyz law on private investment as this may affect NEGK, environmental law, and energy law. As a minimum, the analysis shall cover legal requirements for new transmission projects, concessions with respect to private investment, electricity export rights and/or restrictions, transmission wheeling, tariffs, and all other factors that could substantially impact on the feasibility of the project. The results shall be analyzed in terms of identifying critical legal constraints and needs for changes in the law to overcome these constraints.



Additionally more solid information concerning south-north electricity flows through Uzbekistan should be gathered and used in analyzing the project and exploring alternatives to it. The additional information gathered should include year-by year tabulations of Uzbek wheeling fees and Kyrgyz, Kazakh, and Tajik experience in negotiating and implementing transmission line use agreements with Uzbekistan.

TASK 3 – IDENTIFY ALTERNATIVE RIGHTS OF WAY

The Contractor shall visit the area where the proposed Kemin substation is expected to be located and travel the prospective line route as agreed to with the Grantee. In addition, the Contractor shall investigate and employ reasonable methods for characterizing alternatives rights of way. Examples are the use of helicopters and video imaging, satellite imagery, and other technological devices, which may produce information and data to identify practical alternative routings. The depth of details shall be such that credible costs estimates will be practical for each alternative routing.

The deliverable for Task 3 shall be a map showing the prospective right of way and the topographic features to be overcome for each alternative. The Contractor shall take advantage of satellite imagery to the maximum practical extent. If it should prove more cost effective by reducing time in the field for personnel, the Contractor shall consider the use of helicopters and video camera records for the identification of alternatives.

TASK 4 – SELECT OPTIMUM RIGHT OF WAY

At this point the results so far shall have identified several alternatives for routing the transmission line. The Contractor shall compare these alternatives in terms of total length of the line, difficulty of access to erection sites, application of eminent domain, impact on construction schedule, severity of environmental impacts, preliminary estimates of capital investment, and other such considerations. Based on the results of these comparisons, the Contractor shall recommend the routing for the line.

For the recommended line routing, the Contractor shall prepare aerial surveys adequate to obtain 1:20,000 scale mapping of the entire transmission line route and shall perform geotechnical studies for transmission tower siting. The geotechnical studies should consider the most cost effective alternatives sufficient to reliably design at least six different foundations types, which shall be used ultimately by the Engineering, Procurement, and Construction contractor on a tower-by-tower basis during field engineering.

The Contractor shall prepare and submit a memorandum on the optimum line routing and Kemin substation location, presenting a complete analysis of benefits and issues for the options and shall summarize the reasons for selection of the preferred routing.



TASK 5 – ESTABLISH LINE CAPACITY AND ELECTRICAL DYNAMICS

The Contractor shall recommend the optimum line capacity that reflects (1) the domestic supply demand situation in the Kyrgyz Republic and (2) the impact on the line capacity of its incorporation in the electricity corridor to link the Central Asian Republics with Afghanistan and Pakistan.

The determination of line capacity shall foresee the transmission of the Kambarata output and the provision in the line design to accommodate this additional capacity by, for example, increase in the conductor capacity or by tower design to permit addition of a new circuit in the future.

The Contractor shall review main parameters of the National Electrical Grid and with information provided by the Grantee pertaining load forecasts, conduct dynamic electrical studies of the impact of the transmission line will be on the transmission grid currently and in the future. Studies shall include load flow analysis, evaluation of voltage variations, short-circuits analysis, equipment loadings, active and reactive power margins, energy losses, etc.

TASK 6 – SPECIFY TRANSMISSION LINE DESIGN

From the data and information so far collected, the Contractor shall prepare drawings and conceptual layouts in AutoCAD or other design software to show the selected project details to the depth that international financing institutions may require. The drawings shall incorporate the results of the field investigations and the preliminary design used for comparing alternative routings. Drawings shall locate the Project terminals and routing, show the line in plan and profile, locate substations including the connection to Kambarata if appropriate, and provide a single line diagram. In addition, drawings shall show tower designs, foundation designs, and general arrangement for the Kemin substation.

The Contractor shall prepare a report of the Conceptual Design and Drawings to the Grantee, including all developed drawings, charts, and research.

TASK 7 – ESTABLISH BILL OF MATERIALS AND EQUIPMENT SPECIFICATIONS

The Contractor shall establish, as far as practical, bills of all materials (type, quantity, unit cost, and total cost) required by the selected line route and the Kemin substation, indicating local availability from the main local suppliers. For all materials, equipment and services required during implementation, the contractor shall prepare a list of potential U.S. suppliers.



The Contractor shall also select, size, and specify all equipment necessary for the project according to system requirements. Major equipment to be selected shall include voltage transformers, switchgear, conductors, circuit breakers, control systems such as SCADA, tower structures, foundation materials, and substation structures.

In recommending the loading capacity of the 500 kV Dakta-Kemin line, the Contractor shall consider and take into account as appropriate the loading capacity of all existing and planned new lines of the Kyrgyz transmission system and the transmission systems of Tajikistan and Kazakhstan.

TASK 8 – PRELIMINARY ENVIRONMENTAL IMPACT ANALYSIS.

The Contractor shall review and assess pertinent Kyrgyz laws, regulations, and directives that apply to the construction of substations and transmission lines. The contractor shall also summarize codes and standards and prepare a preliminary Environmental Impact Study according to the requirements of the most interested IFIs and in agreement with any applicable provisions of Kyrgyzstan legislation.

The Contractor shall perform a preliminary environmental impact assessment that covers the following impacts, among others, from biodiversity and loss of habitat, electromagnetic radiation, landscape visualization, and relocation of population through eminent domain.

Consistent with the general requirements stated in the second paragraph of this Section, the Contractor shall provide the Grantee the preliminary environmental assessment report, including ecological aspects of transmission lines and substations construction and including all developed drawings, charts, and research.

TASK 9: ESTIMATE PROJECT CAPITAL AND OPERATING COSTS

Drawing on the knowledge basis and outputs of all other Tasks including Task 7, the Contractor shall prepare a capital cost estimate for the proposed project employing the optimal routing, itemizing in sufficient detail all major and auxiliary equipment. For each equipment, as far as practical, the contractor shall itemize installation, transport and all duties costs to facilitate review of equipment bids during bidding phase. The cost estimates for both the Kemin Substation and the transmission line shall also detail indirect costs such as owner's costs, insurance, inspection and supervision, financing costs, legal costs, import and other taxes, value added taxes (VAT), if applicable, and shipping costs.

The format and the method for completing the capital cost estimate shall conform to the requirements of the international financial institutions.



The Contractor shall also estimate the operating cost for the line and take into account the total annual transmission of energy, the pattern of this transmission, operating staff costs, maintenance, insurance, and taxes due on the operations.

Costs should be estimated to within $\pm 25\%$ of the actual costs.

TASK 10: IDENTIFY THE OWNERSHIP STRUCTURE

The Contractor shall identify an ownership structure for the project, which appears to be the most effective in the management of the Datka-Kemin line from the point of view that the line serves two purposes. It is a key factor in balancing supply and demand for domestic consumption in the Kyrgyz Republic. It is also a key link in the chain for the export of Central Asian electricity to South Asia. In this respect, recognition shall be given to the prospect that the intent of the line to promote transmission of electricity from the south to the north of Kyrgyzstan will change. Ultimate operation of the line would entail the north of the country being supplied by electricity from Kazakhstan with equivalent generation of electricity in the south being liberated for export to South Asia.

TASK 11: CONDUCT FINANCIAL AND SENSITIVITY ANALYSES

The Contractor shall prepare a detailed financial analysis suited to measures of financial attractiveness employed by private investors and international loan financing institutions. Interest during construction shall be incorporated in the analysis. The capital and operating costs determined above shall be a basis for the analysis. The Contractor shall develop the likely short-term and long-term revenue streams that will be generated by the completed and commissioned project and identify the sources of the revenue. The revenue streams will come from two sources: one for the transport of electricity destined for domestic consumption and the other for the transport of electricity destined for export.

The Contractor shall consider a common carrier mode of operation, or an alternative that is acceptable to the Grantee and other prospective key stakeholders including the World Bank and/or other IFIs. The Contractor shall account for line losses and the value of electricity that would represent a charge for the transmission through Kyrgyz territory of electricity originating in Kazakhstan or some other country. The objective shall be to determine the minimum revenue required to yield an attractive rate of return. A main output of this analysis shall be the minimum wheeling charges for which the project is feasible. Wheeling charges shall be broken down in its fixed and variable components in accordance with generally accepted international accounting practices and/or norms acceptable to the World Bank and/or other possible IFI backers of the project. The period of the analysis shall be 15 years and/or other periods acceptable to the World Bank and/or other possible IFI backers of the project.



The contractor shall conduct sensitivity analysis taking into account the main parameters that could affect the financial viability of the Project. Of specific importance shall be the accuracy of the construction costs for the Project, since the costs of materials will have been determined through a bidding process. Other parameters for sensitivity analysis shall be based on Contractor's judgment of the validity of assumptions that may have been made in the preparation of the capital and operating cost estimates. Equity/loan ratios are likely to be a significant parameter for sensitivity analysis.

The Contractor shall prepare a financial memorandum suitable for presentation to international financing institutions that includes a financing plan most advantageous for the Grantee, and supported by appropriate documentation.

Consist with the general requirements stated in the second paragraph of this Section, the Contractor shall provide the Grantee two copies of the financial assessment report, financial investment memorandum, and the financing options report in Russian and two copies of each in English.

TASK 12: PREPARE FINAL REPORT

The objective of the final report is to provide the Grantee with a report that can be used (a) to reorganize the planning for the functioning of the line and (b) to apply to international lenders and donor agencies to secure construction financing for the project.



13. STUDY BUDGET

The study budget is presented on the following pages in the format that conforms to the USTDA specifications.

The basis for estimating the budget is the assignment of the following classifications of personnel to perform all efforts required by the terms of reference in Section 12. The burdened daily rate for each classification of personnel used for estimating the budgets is as follows. Establishing a base salary for each classification and multiplying each rate by a factor of 2.08 have determined the rates. This factor represents a 100% Contractor's overhead and an 8% fee on the burdened rate.

Project Manager	\$1,264
Project Engineer	\$1,144
Civil Engineer	\$1,144
Electrical Engineer	\$1,144
Mechanical Engineer	\$1,144
Environmental Engineer	\$1,144
Cost Estimator	\$ 936
Economist/Financial Analyst	\$1,144
Lawyer	\$2,080
Geologist	\$1,144

In addition, allocations of cost are made in the budget table for contracting local support and office expenses to the extent of 10% of the total personnel cost. The U.S. Government per diem rate of US\$233 as posted for Kyrgyzstan on the State Department website as of May 1, 2006 has been used to estimate lodging and incidental expenses. The basis for all other expenses shown is allocations of funds based on judgment. Actual estimates of expenses are used to which a fee of 2% has been applied to cover the handling of these expenses.

The total estimate for undertaking the activities included in the Terms of Reference is US\$ 537,595.



**Table 4: Feasibility Study Budget
500 kV Datka-Kemin Transmission Line Project**

Task Name	Position	Total Person Days	Daily Rate (US\$)	Total (US\$)
Table 4				
Budget Estimate by Task in Terms of Reference				
Task 1.	Project Manager	2	1,264	2,528
Confirm/Revise Draft Work Plan Presented with Proposal	Project Engineer	2	1,144	2,288
	Civil Engineer	1	1,144	1,144
	Electrical Engineer	1	1,144	1,144
	Mechanical; Engineer	1	1,144	1,144
	Environmental Eng'r	1	1,144	1,144
	Cost Estimator	1	936	936
	Economist/Fin.Analyst	1	1,144	1,144
	Lawyer	1	2,080	2,080
	Geologist	1	1,144	1,144
Task Subtotal		12		14,696
Local Subcontracts				2,939
Task Total				17,635
Task 2	Project Manager	1	1,264	1,264
Collect Available Data	Project Engineer	1	1,144	1,144
	Lawyer	5	2,080	10,400
	Task Subtotal	7		12,808
Local Subcontracts				2,562
Task Total				15,370
Task 3	Project Manager	5	1,264	6,320
Identify Alternative Rights of Way	Project Engineer	10	1,144	11,440
	Civil Engineer	15	1,144	17,160
	Electrical Engineer	5	1,144	5,720
	Environmental Eng'r	15	1,144	17,160
	Geologist	10	1,144	11,440
	Task Subtotal	60		69,240
Local Subcontracts				13,848
Task Total				83,088
Task 4	Project Manager	2	1,264	2,528
Select Optimum Right of Way	Project Engineer	5	1,144	5,720
	Civil Engineer	3	1,144	3,432
	Electrical Engineer	2	1,144	2,288
	Mechanical; Engineer	2	1,144	2,288
	Environmental Eng'r	3	1,144	3,432
	Cost Estimator	3	936	2,808
	Economist/Fin.Analyst	2	1,144	2,288
	Lawyer	1	2,080	2,080
	Geologist	1	1,144	1,144
	Task Subtotal	24		28,008
Local Subcontracts				5,602
Task Total				33,610
Task 5	Project Manager	2	1,264	2,528
Establish Line Capacity and Electrical Dynamics	Project Engineer	3	1,144	3,432
	Electrical Engineer	15	1,144	17,160
	Task Subtotal	20		23,120
Local Subcontracts				4,624
Task Total				27,744



Table 4: Feasibility Study Budget (cont'd)
500 kV Datka-Kemin Transmission Line Project

53	Task 6	Project Manager	2	1,264	2,528	53
54	Specify Transmission Line Design	Project Engineer	10	1,144	11,440	54
55		Civil Engineer	5	1,144	5,720	55
56		Electrical Engineer	5	1,144	5,720	56
57		Mechanical; Engineer	2	1,144	2,288	57
58		Environmental Eng'r	1	1,144	1,144	58
59		Cost Estimator	3	936	2,808	59
60		Geologist	1	1,144	1,144	60
61	Task Subtotal		29		32,792	61
62	Local Subcontracts				6,558	62
63	Task Total				39,350	63
64	Task 7	Project Manager	1	1,264	1,264	64
65	Establish Bill/Materials/Equipment Specifications	Project Engineer	2	1,144	2,288	65
66		Civil Engineer	10	1,144	11,440	66
67		Electrical Engineer	10	1,144	11,440	67
68		Mechanical; Engineer	3	1,144	3,432	68
69		Cost Estimator	15	936	14,040	69
70	Task Subtotal		41		43,904	70
71	Local Subcontracts				8,781	71
72	Task Total				52,685	72
73	Task 8	Project Manager	1	1,264	1,264	73
74	Preliminary Environmental Impact Analysis	Project Engineer	3	1,144	3,432	74
75		Civil Engineer	2	1,144	2,288	75
76		Electrical Engineer	2	1,144	2,288	76
77		Environmental Eng'r	10	1,144	11,440	77
78		Lawyer	1	2,080	2,080	78
79	Task Subtotal		19		22,792	79
80	Local Subcontracts				4,558	80
81	Task Total				27,350	81
82	Task 9	Project Manager	1	1,264	1,264	82
83	Estimate Project Capital and Operating Costs	Project Engineer	2	1,144	2,288	83
84		Electrical Engineer	3	1,144	3,432	84
85		Civil Engineer	3	1,144	3,432	85
86		Economist/Fin.Analyst	10	1,144	11,440	86
87		Cost Estimator	10	936	9,360	87
88		Task Subtotal		29		31,216
89	Local Subcontracts				6,243	89
90	Task Total				37,459	90
91	Task 10	Project Manager	3	1,264	3,792	91
92	Identify the Ownership Structure	Lawyer	5	2,080	10,400	92
93		Task Subtotal	8		14,192	93
94	Local Subcontracts				2,838	94
95	Task Total				17,030	95
96	Task 11	Project Manager	1	1,264	1,264	96
97	Conduct Financial and Sensitivity Analyses	Project Engineer	2	1,144	2,288	97
98		Economist/Fin.Analyst	10	1,144	11,440	98
99		Cost Estimator	1	936	936	99
100		Task Subtotal	14		15,928	100
101	Local Subcontracts				3,186	101
102	Task Total				19,114	102



500 kV Datka-Kemin Transmission Line Project

Table 4: Feasibility Study Budget (cont'd)
500 kV Datka-Kemin Transmission Line Project

103	Task 12	Project Manager	3	1,264	3,792	103	
104	Complete and Submit Final Report	Project Engineer	10	1,144	11,440	104	
105		Civil Engineer	2	1,144	2,288	105	
106		Electrical Engineer	2	1,144	2,288	106	
107		Mechanical; Engineer	1	1,144	1,144	107	
108		Environmental Eng'r	2	1,144	2,288	108	
109		Cost Estimator	1	936	936	109	
110		Economist/Fin. Analyst	5	1,144	5,720	110	
111		Lawyer	2	2,080	4,160	111	
112		Geologist	1	1,144	1,144	112	
113	Task Subtotal		29		35,200	113	
114	Local Subcontracts				7,040	114	
115	Task Total				42,240	115	
116	Total Professional Services Cost					116	
117	U.S. Personnel				343,896	117	
118	Local Subcontracts				68,779	118	
119	Total				412,675	119	
120	Other Direct Costs						120
121							121
122	Item	Function	Number	Unit Cost	Total	122	
123	International Air Travel (Number of trips)	US/Kyrgyzstan/US	12	2,500	30,000	123	
124	Per diem	All Kyrgyzstan	240	233	55,920	124	
125	Interpreters	Interpreting	240	75	18,000	125	
126	Helicopter Rental	Aerial Survey	3	3,000	9,000	126	
127	Vehicle Rental (allocation)	Field travel			6,000	127	
128	Communications (allocation)	Fax, Telephone, e-mail			3,000	128	
129	Report Production (allocation)	Materials.services			3,000	129	
130	Subtotal, Other Direct Costs				124,920	130	
131	Fee				0	131	
132	Total, Other Direct Costs				124,920	132	
133	Total Budget				\$537,595	133	



14. OBSERVATIONS & RECOMMENDATIONS

Based on the data, information, and analyses above, Moseley/Horizon concludes that it is justified for the U.S. Trade and Development Agency to provide an appropriate level of grant funding to the proposed Project through its normal practices for negotiating grants. The National Electrical Grid of Kyrgyzstan (NEGK) would be the ultimate Grantee of the funding for the conduct of the feasibility study, although the U.S. TDA might prefer the receiver of the Grant to be the Kyrgyzstan Ministry of Finance as was done in a previous situation.

The grounds for Moseley/Horizon's conclusion are summarized in four points:

1. The Project represents a critical link in the establishment of a reliable electricity corridor for the export of surplus Central Asia electricity to Afghanistan and Pakistan. Moreover, the Project is of high priority for the Grantee as it will help accomplish Kyrgyz Government goals of
 - a. Equalizing the supply of electricity to all of the regions of the country while eliminating dependence on the Uzbekistan transmission system.
 - b. Increasing power export to neighboring markets by accessing growing demand markets in South Asia such as in Afghanistan and Pakistan, and,
 - c. Helping to bring its electricity sector up to international standards.
2. The Project conforms to the USTDA primary goal of promoting the export of U.S. goods and services and to the secondary goal of linking the Central Asia Region to the South Asia Region economically, in this case through the export of electricity in the transmission corridor. The total value of U.S. origin equipment and services that could be supplied from U.S. sources is estimated at US\$ 76 million.
3. Because of the unique benefits for the Kyrgyz power system, the project is expected to receive strong support from the Kyrgyz Government. The perspectives for implementation financing are also appealing, as a major U.S. Power Company is almost certain to undertake preliminary activities to develop the transmission corridor through a separate grant from the USTDA. Participation by USTDA through funding support will lend additional credibility to the Project, especially with US-based financing agencies such as the EX-IM Bank and OPIC.
4. The Project represents a critical investment in improving the Kyrgyz electricity sector as it addresses effectively the issue of low power transmission capacity to the North of the country, where major load centers are located. Since this bottleneck is expected to worsen in the coming years as winter demand continues



to increase due to electrical heating consumption, the project is of high priority for the Grantee.

5. The Request for Proposals issued under a grant resulting from this Definitional Report should require all Bidders to submit a draft work plan with their respective proposal that describes their understanding of study requirements and lays out their approach to performing the remaining 12 Tasks listed in Table 3 of Section 12 (Terms of Reference) of this report.

The objective of said draft work plan shall be to foresee as far as practical all of the specific activities that will be involved in the execution of the Tasks defined below. The draft work plan shall specify

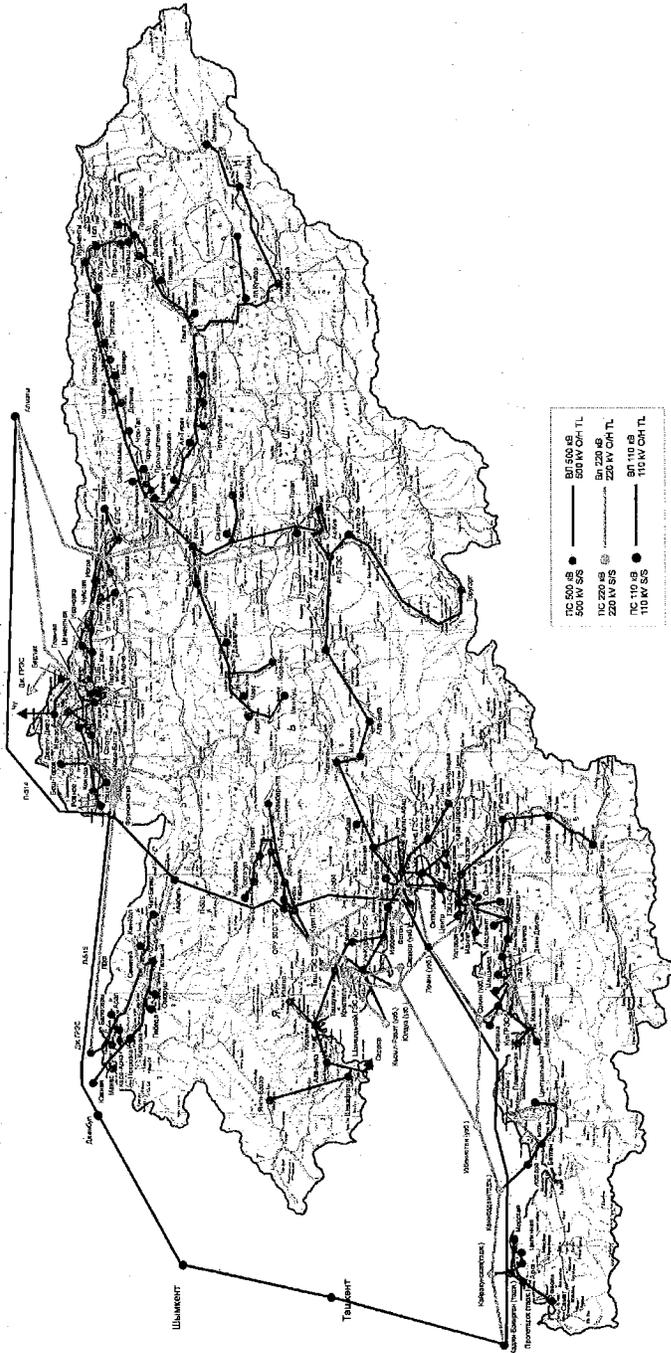
- (1) how the activities in each Task will be addressed and completed, and what type of methodology and analytical tools are to be used
- (2) how selected Tasks may be implemented and coordinated such that levels of effort by the participants and the associated expenses are reduced
- (3) how the Tasks will be timed for completion such that the efforts will be efficient, cost effective, and require a minimum of time to complete the study and
- (4) how the timing of the Tasks will be coordinated by a graphical schedule.

Additionally the draft work plan shall identify the staffing and staff qualifications assembled for undertaking the Tasks. The roles for subcontractors (if any) shall also be identified as part of the work plan.



ANNEX 1: MAP OF KYRGYZSTAN'S NATIONAL GRID

СХЕМА ОСНОВНОЙ ЭЛЕКТРИЧЕСКОЙ СЕТИ ЭНЕРГОСИСТЕМЫ КЫРГЫЗСКОЙ РЕСПУБЛИКИ
THE CIRCUIT OF THE BASIC POWER NETWORK OF ENERGY SYSTEM OF THE KYRGYZ REPUBLIC



A N N E X 3
USTDA NATIONALITY, SOURCE, AND ORIGIN REQUIREMENTS



**U.S. TRADE AND DEVELOPMENT AGENCY
Arlington, VA 22209-2131**

NATIONALITY, SOURCE, AND ORIGIN REQUIREMENTS

The purpose of USTDA's nationality, source, and origin requirements is to assure the maximum practicable participation of American contractors, technology, equipment and materials in the prefeasibility, feasibility, and implementation stages of a project.

USTDA STANDARD RULE (GRANT AGREEMENT STANDARD LANGUAGE):

Except as USTDA may otherwise agree, each of the following provisions shall apply to the delivery of goods and services funded by USTDA under this Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from host country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for implementation of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in host country are not subject to the above restrictions. USTDA will make available further details concerning these standards of eligibility upon request.

NATIONALITY:

1) Rule

Except as USTDA may otherwise agree, the Contractor for USTDA funded activities must be either a U.S. firm or a U.S. individual. Prime contractors may utilize U.S. subcontractors without limitation, but the use of host country subcontractors is limited to 20% of the USTDA grant amount.

2) Application

Accordingly, only a U.S. firm or U.S. individual may submit proposals on USTDA funded activities. Although those proposals may include subcontracting arrangements with host country firms or individuals for up to 20% of the USTDA grant amount, they may not include subcontracts with third country entities. U.S. firms submitting proposals must ensure that the

professional services funded by the USTDA grant, to the extent not subcontracted to host country entities, are supplied by employees of the firm or employees of U.S. subcontractor firms who are U.S. individuals.

Interested U.S. firms and consultants who submit proposals must meet USTDA nationality requirements as of the due date for the submission of proposals and, if selected, must continue to meet such requirements throughout the duration of the USTDA-financed activity. These nationality provisions apply to whatever portion of the Terms of Reference is funded with the USTDA grant.

3) Definitions

A "U.S. individual" is (a) a U.S. citizen, or (b) a non-U.S. citizen lawfully admitted for permanent residence in the U.S. (a green card holder).

A "U.S. firm" is a privately owned firm which is incorporated in the U.S., with its principal place of business in the U.S., and which is either (a) more than 50% owned by U.S. individuals, or (b) has been incorporated in the U.S. for more than three (3) years prior to the issuance date of the request for proposals; has performed similar services in the U.S. for that three (3) year period; employs U.S. citizens in more than half of its permanent full-time positions in the U.S.; and has the existing capability in the U.S. to perform the work in question.

A partnership, organized in the U.S. with its principal place of business in the U.S., may also qualify as a "U.S. firm" as would a joint venture organized or incorporated in the United States consisting entirely of U.S. firms and/or U.S. individuals.

A nonprofit organization, such as an educational institution, foundation, or association may also qualify as a "U.S. firm" if it is incorporated in the United States and managed by a governing body, a majority of whose members are U.S. individuals.

SOURCE AND ORIGIN:

1) Rule

In addition to the nationality requirement stated above, any goods (e.g., equipment and materials) and services related to their shipment (e.g., international transportation and insurance) funded under the USTDA Grant Agreement must have their source and origin in the United States, unless USTDA otherwise agrees. However, necessary purchases of goods and project support services which are unavailable from a U.S. source (e.g., local food, housing and transportation) are eligible without specific USTDA approval.

2) Application

Accordingly, the prime contractor must be able to demonstrate that all goods and services purchased in the host country to carry out the Terms of Reference for a USTDA Grant Agreement that were not of U.S. source and origin were unavailable in the United States.

3) Definitions

“Source” means the country from which shipment is made.

“Origin” means the place of production, through manufacturing, assembly or otherwise.

Questions regarding these nationality, source and origin requirements may be addressed to the USTDA Office of General Counsel.

ANNEX 4
USTDA Grant Agreement, Including Mandatory Contract Clauses

GRANT AGREEMENT

This Grant Agreement is entered into between the Government of the United States of America, acting through the U.S. Trade and Development Agency ("USTDA") and the Government of the Kyrgyz Republic, represented by the Ministry of Finance ("Grantee"). USTDA agrees to provide the Grantee under the terms of this Agreement US\$537,595 ("USTDA Grant") to fund the cost of goods and services required for a feasibility study ("Study") on the proposed Datka-Kemin Transmission Line project ("Project") in the Kyrgyz Republic ("Host Country"). The parties hereto agree that the National Electrical Grid of Kyrgyzstan JSC will be the Executive agency for implementation of this Grant Agreement with ensuring duties and obligations contained therein and in Annex II hereof.

1. USTDA Funding

The funding to be provided under this Grant Agreement shall be used to fund the costs of a contract between the Grantee and the U.S. firm selected by the Grantee ("Contractor") under which the Contractor will perform the Study ("Contract"). Payment to the Contractor will be made directly by USTDA on behalf of the Grantee with the USTDA Grant funds provided under this Grant Agreement.

2. Terms of Reference

The Terms of Reference for the Study ("Terms of Reference") are attached as Annex I and are hereby made a part of this Grant Agreement. The Study will examine the technical, financial, environmental, and other critical aspects of the proposed Project. The Terms of Reference for the Study shall also be included in the Contract.

3. Standards of Conduct

USTDA and the Grantee recognize the existence of standards of conduct for public officials, and commercial entities, in their respective countries. The parties to this Grant Agreement and the Contractor shall observe these standards, which include not accepting payment of money or anything of value, directly or indirectly, from any person for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the Study.

4. Grantee Responsibilities

The Grantee shall undertake its best efforts to provide reasonable support for the Contractor, such as local transportation, office space, and secretarial support.

5. USTDA as Financier

(A) USTDA Approval of Competitive Selection Procedures

Selection of the U.S. Contractor shall be carried out by the Grantee according to its established procedures for the competitive selection of contractors with advance notice of the procurement published online through *Federal Business Opportunities* (www.fedbizopps.gov). Upon request, the Grantee will submit these contracting procedures and related documents to USTDA for information and/or approval.

(B) USTDA Approval of Contractor Selection

The Grantee shall notify USTDA at the address of record set forth in Article 17 below upon selection of the Contractor to perform the Study. Upon approval of this selection by USTDA, the Grantee and the Contractor shall then enter into a contract for performance of the Study. The Grantee shall notify in writing the U.S. firms that submitted unsuccessful proposals to perform the Study that they were not selected.

(C) USTDA Approval of Contract Between Grantee and Contractor

The Grantee and the Contractor shall enter into a contract for performance of the Study. This contract, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing. To expedite this approval, the Grantee (or the Contractor on the Grantee's behalf) shall transmit to USTDA, at the address set forth in Article 17 below, a photocopy of an English language version of the signed contract or a final negotiated draft version of the contract.

(D) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of the contract and any amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of funding the Study and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Grantee or USTDA from asserting any right they might have against the

Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Grantee or USTDA.

(E) Grant Agreement Controlling

Regardless of USTDA approval, the rights and obligations of any party to the contract or subcontract thereunder must be consistent with this Grant Agreement. In the event of any inconsistency between the Grant Agreement and any contract or subcontract funded by the Grant Agreement, the Grant Agreement shall be controlling.

6. Disbursement Procedures

(A) USTDA Approval of Contract Required

USTDA will make disbursements of Grant funds directly to the Contractor only after USTDA approves the Grantee's contract with the Contractor.

(B) Contractor Invoice Requirements

The Grantee should request disbursement of funds by USTDA to the Contractor for performance of the Study by submitting invoices in accordance with the procedures set forth in the USTDA Mandatory Clauses in Annex II.

7. Effective Date

The parties have provisionally agreed to the terms and conditions set forth herein as of the date of signature. The effective date of this Grant Agreement ("Effective Date") shall be the date the Grantee has notified USTDA in writing that all procedures of the Kyrgyz Republic that are necessary for this Grant Agreement to become binding upon the Grantee have been implemented.

8. Study Schedule

(A) Study Completion Date

The completion date for the Study, which is December 31, 2008, is the date by which the parties estimate that the Study will have been completed.

(B) Time Limitation on Disbursement of USTDA Grant Funds

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this Grant Agreement for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

9. USTDA Mandatory Clauses

All contracts funded under this Grant Agreement shall include the USTDA mandatory clauses set forth in Annex II to this Grant Agreement. All subcontracts funded or partially funded with USTDA Grant funds shall include the USTDA mandatory clauses, except for clauses B(1), G, H, I, and J.

10. Use of U.S. Carriers

(A) Air

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

(B) Marine

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

11. Nationality, Source and Origin

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

12. Taxes

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country. Neither the Grantee nor the Contractor (as defined in Article 1 hereof) will seek reimbursement from USTDA for such taxes, tariffs, duties, fees or other levies. This provision does not provide for any immunity from the payment of taxes from funds other than USTDA funds.

13. Cooperation Between Parties and Follow-Up

The parties will cooperate to assure that the purposes of the Grant Agreement are accomplished. For five (5) years following receipt by USTDA of the Final Report (as defined in Clause I of Annex II), the Grantee agrees to respond to any reasonable inquiries from USTDA about the status of the Project.

14. Implementation Letters

To assist the Grantee in the implementation of the Study, USTDA may, from time to time, issue implementation letters that will provide additional information about matters covered by the Grant Agreement. The parties may also use jointly agreed upon implementation letters to confirm and record their mutual understanding of matters covered by the Grant Agreement.

15. Recordkeeping and Audit

The Grantee agrees to maintain books, records, and other documents relating to the Study and the Grant Agreement adequate to demonstrate implementation of its responsibilities under the Grant Agreement, including the selection of contractors, receipt and approval of contract deliverables, and approval or disapproval of contractor invoices for payment by USTDA. Such books, records, and other documents shall be separately maintained for three (3) years after the date of the final disbursement by USTDA. The Grantee shall afford USTDA or its authorized representatives the opportunity at reasonable times to review books, records, and other documents relating to the Study and the Grant Agreement.

16. Representation of Parties

For all purposes relevant to the Grant Agreement, the Government of the United States of America will be represented by the U. S. Ambassador to Host Country or USTDA and Grantee will be represented by the General Director of National Electrical Grid of Kyrgyzstan JSC. The parties hereto may, by written notice, designate additional representatives for all purposes under the Grant Agreement.

17. Addresses of Record for Parties

Any notice, request, document, or other communication submitted by either party to the other under the Grant Agreement shall be in writing or through a wire or electronic medium which produces a tangible record of the transmission, such as a telegram, cable or facsimile, and will be deemed duly given or sent when delivered to such party at the following:

To: Mr. S. Avazov
General Director
National Electrical Grid of Kyrgyzstan JSC
326, Jibek Jolu
720070, Bishkek
Kyrgyz Republic

Phone: +996 (312) 66 10 01
Fax: +996 (312) 66 06 56 or 66 16 09
Email: nesk@elcat.kg

To: U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209-3901
USA

Phone: (703) 875-4357
Fax: (703) 875-4009

All such communications shall be in English, unless the parties otherwise agree in writing. In addition, the Grantee shall provide the Commercial Section of the U.S. Embassy in Host Country with a copy of each communication sent to USTDA.

Any communication relating to this Grant Agreement shall include both of the following sets of fiscal data:

Amount: \$273,166
Appropriation No.: 112/71001
Activity No.: 2007-81001A
Reservation No.: 078101001

Grant No.: GH078101001
Amount: \$264,429
Appropriation No.: 113/81001
Activity No.: 2007-81001A
Reservation No.: 078101002
Grant No.: GH078101002

18. Termination Clause

Either party may terminate the Grant Agreement by giving the other party thirty (30) days advance written notice. The termination of the Grant Agreement will end any obligations of the parties to provide financial or other resources for the Study, except for payments which they are committed to make pursuant to noncancellable commitments entered into with third parties prior to the written notice of termination.

19. Non-waiver of Rights and Remedies

No delay in exercising any right or remedy accruing to either party in connection with the Grant Agreement shall be construed as a waiver of such right or remedy.

20. U.S. Technology and Equipment

By funding this Study, USTDA seeks to promote the project objectives of the Host Country through the use of U.S. technology, goods, and services. In recognition of this purpose, the Grantee agrees that it will allow U.S. suppliers to compete in the procurement of technology, goods and services needed for Project implementation.

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IN WITNESS WHEREOF, the Government of the United States of America and the Government of the Kyrgyz Republic, each acting through its duly authorized representative, have caused this Agreement to be signed in the English and Russian languages in their names and delivered as of the day and year written below. The English language version shall govern.

**For the Government of the
United States of America**

By: Mely van der

Date: 9/19/2007

**For the Government of the Kyrgyz
Republic**

By: [Signature]

Date: 9/19/2007

Witnessed:

By: M. Wunsford

Witnessed:

By: [Signature]

Annex I -- Terms of Reference

Annex II -- USTDA Mandatory Clauses

Annex I

Terms of Reference

In order to alleviate the overloading of the existing south-north 500 kilovolt (kV) transmission line in Kyrgyzstan and eliminate the need for transmission through Uzbekistan, the National Electrical Grid of Kyrgyzstan JSC (NEGK) is planning to build an additional 500kV transmission line from southern Kyrgyzstan to northern Kyrgyzstan. The routing of the line would allow interconnection with the Datka substation (the modernization of which is one subject of a separately-funded Southern Kyrgyzstan Transmission Upgrade FS), the Kambarata Hydroelectric power station and the grid in northern Kyrgyzstan east of Bishkek. Because the existing 500kV line connects with the grid in northern Kyrgyzstan on the west side of Bishkek, this would alleviate overloading on the 220kV lines in the north.

The new 500kV line would also likely be part of the Central Asia – South Asia 500kV transmission line project connecting Kazakhstan with Pakistan. This latter project is the subject of the Central Asia Power Sector Development Program Feasibility Study that USTDA partially funded in June 2006 with an \$800,000 grant to the Tajikistan Ministry of Energy, which will be performed by AES. This Study is needed regardless of the routing of the Central Asia – South Asia 500kV line and will not substantially duplicate the Central Asia Power Sector Development Program feasibility study. However, the Contractor shall attempt to contact AES, Inc. to ensure that the two feasibility studies do not conflict; however, notwithstanding (i) any communications between AES and the Contractor, or (ii) any work performed by anyone in connection with the Central Asia Power Sector Development Program Feasibility Study, the Contractor shall fully perform all of these Terms of Reference.

The results of the Study should provide NEGK valuable information that can be used if the Project is taken to financial closure and ultimately to implementation, construction of the transmission line and commissioning of operations.

All reports including maps, diagrams, charts and tables that these terms of reference require be prepared shall be prepared in professional-level English and Russian. The original and one copy of each such report, maps, and other documents shall be presented in Russian and English to the Grantee with one copy in English to USTDA.

TASK 1 – CONFIRM/REVISE DRAFT WORK PLAN

The Study Request for Proposals (RFP) shall require each bidder under the RFP to include a draft work plan in that bidder's proposal. The Contractor, as a first effort before undertaking any other Task, shall consult with its Kyrgyz counterparts as needed to revise and finalize the draft work plan that was presented with its proposal under the RFP. The final work plan shall be comprehensive and cover the performance of the 12 Tasks listed below.

The objective of the final (confirmed) work plan shall be to foresee as far as practical all

of the specific activities that will be involved in the execution of the additional Tasks defined below.

The work plan shall specify:

- 1) how the activities in each Task described below will be addressed and completed, and what type of methodology and analytical tools are to be used;
- 2) how selected Tasks may be implemented and coordinated such that levels of effort by the participants and the associated expenses are reduced;
- 3) how the Tasks will be sequenced and timed for completion such that the efforts will be efficient, cost effective, and require a minimum of time to complete the study; and,
- 4) how the timing of the Tasks will be coordinated by a graphical schedule.

Additionally, the final work plan shall identify the staffing and staff qualifications assembled for undertaking the Tasks. The roles for subcontractors (if any) shall also be identified as part of the work plan. The final work plan must provide that the Contractor shall fully perform all provisions of Tasks 2 through 12 below, and the final work plan may not be inconsistent with these Terms of Reference in any way.

Deliverable: The Contractor shall deliver the Final (confirmed) Work Plan to NEGK.

TASK 2 – COLLECT AVAILABLE DATA

The Contractor shall collect from NEGK, electricity sector companies, governmental regulating agencies, and others as appropriate, all relevant technical, legal, and environmental information available. NEGK is required to collect and submit to the Contractor all such information and studies relevant to the Project that NEGK possesses. The information will be provided at no cost to the Contractor.

The Contractor shall assess the validity of the information and data in terms of usefulness as inputs to the Tasks defined by these Terms of Reference. Examples of information and data include environmental laws, characteristics of relevant national electrical grid components, results of previous explorations of routing between Datka and Kemin, status of the construction of the Datka substation, and timing prospects for the construction of the Kambarata facilities. With respect to the future Kambarata facilities, the Contractor shall determine the justification for locating the substation along the Datka-Kemin line and provision of a connection for a future substation.

The Contractor shall also, under Task 2, review and assess the legal framework under which the feasibility study will be developed including, but not limited to, analysis of Kyrgyz law on private investment as this may affect NEGK, environmental law, and energy law. As a minimum, the analysis shall cover legal requirements for new transmission projects, concessions with respect to private investment, electricity export rights and/or restrictions, transmission wheeling, tariffs, and all other factors that could substantially impact on the feasibility of the project. The results shall be analyzed in terms of identifying critical legal constraints and needs for changes in the law to overcome these constraints.

Additionally, more reliable information concerning south-north electricity flows through Uzbekistan shall be gathered and used in analyzing the project and exploring alternatives to it. The additional information gathered shall include year-by year tabulations of Uzbek wheeling fees and Kyrgyz, Kazakh, and Tajik experience in negotiating and implementing transmission line use agreements with Uzbekistan.

TASK 3 – IDENTIFY ALTERNATIVE RIGHTS OF WAY

The Contractor shall visit the area where the proposed Kemin substation is expected to be located and travel the prospective line routes as agreed to with NEGK. As one alternative, the Contractor shall consider a line route through Shamsi pass. In addition, the Contractor shall investigate and employ reasonable methods for characterizing alternative rights of way. Examples are the use of helicopters and video imaging, satellite imagery, and other technological devices, which may produce information and data to identify practical alternative routings. The depth of detail shall be such that credible costs estimates will be practical for each alternative routing.

The deliverable for Task 3 shall be a map showing the prospective rights of way and the topographic features to be overcome for each alternative. The Contractor shall take advantage of satellite imagery to the maximum practical extent. If it should prove more cost effective by reducing time in the field for personnel, the Contractor shall consider the use of helicopters and video camera records for the identification of alternatives.

Deliverable: The Contractor shall deliver to NEGK a map showing the prospective rights of way and the topographic features to be overcome for each alternative.

TASK 4 – SELECT OPTIMUM RIGHT OF WAY

Based on the results of Tasks 1-3, the Contractor shall have already identified several alternatives for routing the transmission line. The Contractor shall compare these alternatives in terms of total length of the line, difficulty of access to erection sites, application of eminent domain, impact on construction schedule, severity of environmental impacts, preliminary estimates of capital investment, and other such considerations. Based on the results of these comparisons, the Contractor shall recommend the routing for the line.

For the recommended line routing, the Contractor shall prepare aerial surveys adequate to obtain 1:20,000 scale mapping of the entire transmission line route and shall perform geotechnical studies for transmission tower siting. The geotechnical studies shall consider the most cost-effective alternatives sufficient to reliably design at least six different foundations types, which shall be used ultimately by the Engineering, Procurement, and Construction contractor on a tower-by-tower basis during field engineering.

Deliverable: The Contractor shall prepare and submit a memorandum on the optimum line routing and Kemin substation location, presenting a complete analysis of benefits and issues for the options and shall summarize the reasons for selection of the preferred routing.

TASK 5 – ESTABLISH LINE CAPACITY AND ELECTRICAL DYNAMICS

The Contractor shall recommend the optimum line capacity that reflects (1) the domestic supply demand situation in the Kyrgyz Republic and (2) the impact on the line capacity of its incorporation in the electricity corridor to link the Central Asian Republics with Afghanistan and Pakistan.

The determination of line capacity shall foresee the transmission of the Kambarata output and the provision in the line design to accommodate this additional capacity by, for example, increase in the conductor capacity or by tower design to permit addition of a new circuit in the future.

The Contractor shall review main parameters of the Kyrgyz Republic National Electrical Grid and with information provided by NEGK pertaining to load forecasts, conduct dynamic electrical studies of the impact of the transmission line on the transmission grid currently and in the future. The Contractor shall study the following at a minimum as part of this Task: load flow, voltage variations, short-circuits, equipment loadings, active and reactive power margins, and energy losses.

TASK 6 – SPECIFY TRANSMISSION LINE DESIGN

From the data and information so far collected, the Contractor shall prepare drawings and conceptual layouts in AutoCAD or other design software to show the selected project details to the depth that international financing institutions may require. The drawings shall incorporate the results of the field investigations and the preliminary design used for comparing alternative routings. Drawings shall locate the Project terminals and routing, show the line in plan and profile, locate substations including the connection to Kambarata if appropriate, and provide a single line diagram. In addition, drawings shall show tower designs, foundation designs, and general arrangement for the Kemin substation.

Deliverable: The Contractor shall prepare a report of the Conceptual Design and Drawings to NEGK, including all developed drawings, charts, and research.

TASK 7 – ESTABLISH BILL OF MATERIALS AND EQUIPMENT SPECIFICATIONS

The Contractor shall establish, as far as practical, bills of all materials (type, quantity, unit cost, and total cost) required by the selected line route and the Kemin substation, indicating local availability from the main local suppliers. For all materials, equipment and services required during implementation, the Contractor shall prepare a list of potential U.S. suppliers.

The Contractor shall also select, size, and specify all equipment necessary for the project according to system requirements. Major equipment to be selected shall include voltage transformers, switchgear, conductors, circuit breakers, control systems such as SCADA, tower structures, foundation materials, and substation structures.

In recommending the loading capacity of the 500 kV Datka-Kemin line, the Contractor shall consider and take into account as appropriate the loading capacity of all existing and

planned new lines of the Kyrgyz Republic transmission system and the transmission systems of Tajikistan and Kazakhstan.

Deliverable: The Contractor shall prepare and deliver to NEGK a Bill of Materials and Equipment Specifications Report with the results of this Task.

TASK 8 – PREPARE PRELIMINARY ENVIRONMENTAL AND DEVELOPMENT IMPACT ANALYSIS

The Contractor shall review and assess pertinent Kyrgyz laws, regulations, and directives that apply to the construction of substations and transmission lines. The Contractor shall also summarize codes and standards and prepare a preliminary Environmental Impact Analysis according to the requirements of the most interested international financial institutions (IFIs) and in agreement with any applicable provisions of Kyrgyzstan legislation.

The Contractor shall perform a preliminary environmental impact assessment that covers at a minimum the following impacts: biodiversity and loss of habitat, disturbance to wildlife (especially to migratory birds), destruction of vegetation, ground disturbance, electromagnetic radiation, landscape visualization, noise impacts, and relocation of population through eminent domain. The Contractor shall prepare a preliminary environmental impact analysis with reference to local requirements and those of multi-lateral lending agencies (such as the World Bank). This review shall identify potential negative impacts, discuss the extent to which they can be mitigated, and develop plans for a full environmental impact assessment if and when the Project moves forward to the implementation stage.

The assessment of Development Impact is an important aspect of the Study. The Contractor shall perform a Development Impact Analysis that shall cover the following developmental impacts:

- **Infrastructure and Industrialization**

Describe how the implementation of the Proposed Project contributes to the improvement and security of the physical, financial and social infrastructure of the country, including length of transmission lines, amount of electric power able to be transmitted, number of substations, and estimation of reduced overload or new capacity;

- **Market-Oriented Reforms**

Describe how the Project will encourage more transparent regulatory systems and institutions, privatization of state-owned economic entities, promotion of greater competition in noncompetitive economic sectors, lowering of non-tariff barriers to trade, strengthening of intellectual property rights and modernizing international trade systems and regulations;

- **Human Capacity Building**

Describe how implementation of the Project will contribute to human capacity building, either through creation of new jobs or through significant training of personnel;

- **Technology Transfer and Productivity Improvement**

Describe new technologies that will be introduced as a result of the Project, contributing to the improvement of processes, stimulating greater economic productivity or allowing for more efficient use of resources.

Deliverables: The Contractor shall provide NEGK the preliminary environmental assessment report, including ecological aspects of transmission lines and substations construction and including all developed drawings, charts, and research. The Contractor shall also provide NEGK a development impact analysis report including the results of the analysis above.

TASK 9: ESTIMATE PROJECT CAPITAL AND OPERATING COSTS

Drawing on the knowledge basis and outputs of all preceding Tasks, particularly Task 7, the Contractor shall prepare a capital cost estimate for the proposed project employing the optimal routing, itemizing in sufficient detail all major and auxiliary equipment. For each piece of equipment, as far as practical, the contractor shall itemize installation, transport and all duties costs to facilitate review of equipment bids during the bidding phase. The cost estimates for both the Kemin substation and the transmission line shall also detail indirect costs such as owner's costs, insurance, inspection and supervision, financing costs, legal costs, import and other taxes, value added taxes (VAT), if applicable, and shipping costs.

The format and the method for completing the capital cost estimate shall conform to the requirements of the IFIs.

The Contractor shall also estimate the operating cost for the line and take into account the total annual transmission of energy, the pattern of this transmission, operating staff costs, maintenance, insurance, and taxes due on the operations.

Costs shall be estimated to within $\pm 25\%$ of the actual costs.

Deliverable: The Contractor shall prepare and deliver to NEGK a Project Capital and Operating Cost Report with the results of the work of this Task.

TASK 10: IDENTIFY THE OWNERSHIP STRUCTURE

The Contractor shall identify an ownership structure for the project, which appears to be the most effective in the management of the Datka-Kemin line from the point of view that the line serves two purposes. It is a key factor in balancing supply and demand for domestic consumption in the Kyrgyz Republic. It is also a key link in the chain for the export of Central Asian electricity to South Asia. In this respect, recognition shall be

given to the prospect that the intent of the line to promote transmission of electricity from the south to the north of Kyrgyzstan will change. It is contemplated that the line might eventually be made part of the planned Central Asia – South Asia transmission corridor and would therefore have to accommodate both northerly and southerly flows of electricity. NEGK will provide the Contractor the latest information concerning this possibility, and the Contractor shall take such information into account when conducting the Study.

Deliverable: The Contractor shall prepare and deliver to NEGK an Ownership Structure Report with the recommended ownership structure.

TASK 11: CONDUCT FINANCIAL AND SENSITIVITY ANALYSES

The Contractor shall prepare a detailed financial analysis suited to measures of financial attractiveness employed by private investors and international loan financing institutions. Interest during construction shall be incorporated in the analysis. The capital and operating costs determined in Task 9 shall be a basis for the analysis. The Contractor shall develop the likely short-term and long-term revenue streams that will be generated by the completed and commissioned project and identify the sources of the revenue. The revenue streams will come from two sources: one for the transport of electricity destined for domestic consumption and the other for the transport of electricity destined for export. The Contractor shall consider a common carrier mode of operation, or an alternative that is acceptable to NEGK and other prospective key stakeholders including the World Bank and/or other IFIs. The Contractor shall account for line losses and the value of electricity that would represent a charge for the transmission through Kyrgyz territory of electricity originating in Kazakhstan or some other country. The objective shall be to determine the minimum revenue required to yield an attractive rate of return. A main output of this analysis shall be the minimum wheeling charges for which the project is feasible. Wheeling charges shall be broken down in fixed and variable components in accordance with generally accepted international accounting practices and/or norms acceptable to the World Bank and/or other possible IFI backers of the project. The period of the analysis shall be 15 years and/or other periods acceptable to the World Bank and/or other possible sources of debt and equity financing.

The Contractor shall conduct sensitivity analysis taking into account the main parameters that could affect the financial viability of the Project. Of specific importance shall be the accuracy of the construction costs for the Project, since the costs of materials would be determined through a bidding process that would take place during project implementation. Other parameters for sensitivity analysis shall be based on Contractor's judgment of the validity of assumptions that may have been made in the preparation of the capital and operating cost estimates. Debt to equity ratios are likely to be a significant parameter for sensitivity analysis.

The Contractor shall prepare a financial memorandum suitable for presentation to IFIs that includes a financing plan most advantageous for NEGK, and supported by appropriate documentation.

Deliverable: The Contractor shall provide NEGK two copies of the financial assessment report, financial investment memorandum, and the financing options report in Russian and two copies of each in English.

TASK 12: PREPARE FINAL REPORT

The objective of the final report is to provide NEGK with a report that can be used (a) to plan for the functioning of the line and (b) to apply to international lenders and donor agencies to secure construction financing for the project.

The Contractor shall prepare and deliver to NEGK and USTDA a substantive and comprehensive final report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the tasks as listed in this Terms of Reference, and shall include all deliverables and documents that have been provided to NEGK. The Final Report shall be prepared in accordance with Clause I of Annex II of the Grant Agreement. The Contractor shall identify prospective U.S. sources of supply in the Final Report in accordance with Clause I of Annex II of the Grant Agreement.

Each of the tasks must be distinctly set forth in a substantive and comprehensive manner. The Final Report shall contain an executive summary. NEGK shall be provided with six (6) copies of the Final Report on CD-ROM. The CD-ROM version of the Final Report shall include Adobe Acrobat readable copies of all documents; source files for all drawings on AutoCAD or Visio format; and source files for all documents in MS Office 2000, or later version.

Notes:

- (1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.**
- (2) The Contractor and NEGK shall be careful to ensure that the public version of the Final Report contains no security or confidential information.**
- (3) NEGK and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.**

Annex II

USTDA Mandatory Contract Clauses

A. USTDA Mandatory Clauses Controlling

The parties to this contract acknowledge that this contract is funded in whole or in part by the U.S. Trade and Development Agency ("USTDA") under the Grant Agreement between the Government of the United States of America acting through USTDA and the Government of the Kyrgyz Republic represented by the Ministry of Finance ("Client"), dated _____ ("Grant Agreement"). The parties hereto acknowledge that the Client has delegated the authority to enter into this contract to the National Electrical Grid of Kyrgyzstan JSC and the National Electrical Grid of Kyrgyzstan JSC shall perform all duties and obligations contained herein on behalf of the Client. The Client has selected _____ ("Contractor") to perform the feasibility study ("Study") for the Datka-Kemin Transmission Line project ("Project") in the Kyrgyz Republic ("Host Country"). Notwithstanding any other provisions of this contract, the following USTDA mandatory contract clauses shall govern. All subcontracts entered into by Contractor funded or partially funded with USTDA Grant funds shall include these USTDA mandatory contract clauses, except for clauses B(1), G, H, I, and J. In addition, in the event of any inconsistency between the Grant Agreement and any contract or subcontract thereunder, the Grant Agreement shall be controlling.

B. USTDA as Financier

(1) USTDA Approval of Contract

All contracts funded under the Grant Agreement, and any amendments thereto, including assignments and changes in the Terms of Reference, must be approved by USTDA in writing in order to be effective with respect to the expenditure of USTDA Grant funds. USTDA will not authorize the disbursement of USTDA Grant funds until the contract has been formally approved by USTDA or until the contract conforms to modifications required by USTDA during the contract review process.

(2) USTDA Not a Party to the Contract

It is understood by the parties that USTDA has reserved certain rights such as, but not limited to, the right to approve the terms of this contract and amendments thereto, including assignments, the selection of all contractors, the Terms of Reference, the Final Report, and any and all documents related to any contract funded under the Grant Agreement. The parties hereto further understand and agree that USTDA, in reserving any or all of the foregoing approval rights, has acted solely as a financing entity to assure the proper use of United States Government funds, and that any decision by USTDA to exercise or refrain from exercising these approval rights shall be made as a financier in the course of financing the Study and shall not be construed as making USTDA a party to the contract. The parties hereto understand and agree

that USTDA may, from time to time, exercise the foregoing approval rights, or discuss matters related to these rights and the Project with the parties to the contract or any subcontract, jointly or separately, without thereby incurring any responsibility or liability to such parties. Any approval or failure to approve by USTDA shall not bar the Client or USTDA from asserting any right they might have against the Contractor, or relieve the Contractor of any liability which the Contractor might otherwise have to the Client or USTDA.

C. Nationality, Source and Origin

Except as USTDA may otherwise agree, the following provisions shall govern the delivery of goods and services funded by USTDA under the Grant Agreement: (a) for professional services, the Contractor must be either a U.S. firm or U.S. individual; (b) the Contractor may use U.S. subcontractors without limitation, but the use of subcontractors from Host Country may not exceed twenty percent (20%) of the USTDA Grant amount and may only be used for specific services from the Terms of Reference identified in the subcontract; (c) employees of U.S. Contractor or U.S. subcontractor firms responsible for professional services shall be U.S. citizens or non-U.S. citizens lawfully admitted for permanent residence in the U.S.; (d) goods purchased for performance of the Study and associated delivery services (e.g., international transportation and insurance) must have their nationality, source and origin in the United States; and (e) goods and services incidental to Study support (e.g., local lodging, food, and transportation) in Host Country are not subject to the above restrictions. USTDA will make available further details concerning these provisions upon request.

D. Recordkeeping and Audit

The Contractor and subcontractors funded under the Grant Agreement shall maintain, in accordance with generally accepted accounting procedures, books, records, and other documents, sufficient to reflect properly all transactions under or in connection with the contract. These books, records, and other documents shall clearly identify and track the use and expenditure of USTDA funds, separately from other funding sources. Such books, records, and documents shall be maintained during the contract term and for a period of three (3) years after final disbursement by USTDA. The Contractor and subcontractors shall afford USTDA, or its authorized representatives, the opportunity at reasonable times for inspection and audit of such books, records, and other documentation.

E. U.S. Carriers

(1) Air

Transportation by air of persons or property funded under the Grant Agreement shall be on U.S. flag carriers in accordance with the Fly America Act, 49 U.S.C. 40118, to the extent service by such carriers is available, as provided under applicable U.S. Government regulations.

(2) Marine

Transportation by sea of property funded under the Grant Agreement shall be on U.S. carriers in accordance with U.S. cargo preference law.

F. Workman's Compensation Insurance

The Contractor shall provide adequate Workman's Compensation Insurance coverage for work performed under this Contract.

G. Reporting Requirements

The Contractor shall advise USTDA by letter as to the status of the Project on March 1st annually for a period of two (2) years after completion of the Study. In addition, if at any time the Contractor receives follow-on work from the Client, the Contractor shall notify USTDA and designate the Contractor's contact point including name, telephone, and fax number. Since this information may be made publicly available by USTDA, any information which is confidential shall be designated as such by the Contractor and provided separately to USTDA. USTDA will maintain the confidentiality of such information in accordance with applicable law.

H. Disbursement Procedures

(1) USTDA Approval of Contract

Disbursement of Grant funds will be made only after USTDA approval of this contract. To make this review in a timely fashion, USTDA must receive from either the Client or the Contractor a photocopy of an English language version of a signed contract or a final negotiated draft version to the attention of the General Counsel's office at USTDA's address listed in Clause M below.

(2) Payment Schedule Requirements

A payment schedule for disbursement of Grant funds to the Contractor shall be included in this Contract. Such payment schedule must conform to the following USTDA requirements: (1) up to twenty percent (20%) of the total USTDA Grant amount may be used as an advance payment; (2) all other payments, with the exception of the final payment, shall be based upon contract performance milestones; and (3) the final payment may be no less than fifteen percent (15%) of the total USTDA Grant amount, payable upon receipt by USTDA of an approved Final Report in accordance with the specifications and quantities set forth in Clause I below. Invoicing procedures for all payments are described below.

(3) Contractor Invoice Requirements

USTDA will make all disbursements of USTDA Grant funds directly to the Contractor. The Contractor must provide USTDA with an ACH Vendor Enrollment Form (available from USTDA) with the first invoice. The Client shall request disbursement of funds by USTDA to the Contractor for performance of the contract by submitting the following to USTDA:

(a) Contractor's Invoice

The Contractor's invoice shall include reference to an item listed in the Contract payment schedule, the requested payment amount, and an appropriate certification by the Contractor, as follows:

(i) For an advance payment (if any):

"As a condition for this advance payment, which is an advance against future Study costs, the Contractor certifies that it will perform all work in accordance with the terms of its Contract with the Client. To the extent that the Contractor does not comply with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA. "

(ii) For contract performance milestone payments:

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(iii) For final payment:

"The Contractor has performed the work described in this invoice in accordance with the terms of its contract with the Client and is entitled to payment thereunder. Specifically, the Contractor has submitted the Final Report to the Client, as required by the Contract, and received the Client's approval of the Final Report. To the extent the Contractor has not complied with the terms and conditions of the Contract, including the USTDA mandatory provisions contained therein, it will, upon USTDA's request, make an appropriate refund to USTDA."

(b) Client's Approval of the Contractor's Invoice

(i) The invoice for an advance payment must be approved in writing by the Client.

(ii) For contract performance milestone payments, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and the terms and conditions of the USTDA Grant Agreement."

(iii) For final payment, the following certification by the Client must be provided on the invoice or separately:

"The services for which disbursement is requested by the Contractor have been performed satisfactorily, in accordance with applicable Contract provisions and terms and conditions of the USTDA Grant Agreement. The Final Report submitted by the Contractor has been reviewed and approved by the Client. "

(c) USTDA Address for Disbursement Requests

Requests for disbursement shall be submitted by courier or mail to the attention of the Finance Department at USTDA's address listed in Clause M below.

(4) Termination

In the event that the Contract is terminated prior to completion, the Contractor will be eligible, subject to USTDA approval, for reasonable and documented costs which have been incurred in performing the Terms of Reference prior to termination, as well as reasonable wind down expenses. Reimbursement for such costs shall not exceed the total amount of undisbursed Grant funds. Likewise, in the event of such termination, USTDA is entitled to receive from the Contractor all USTDA Grant funds previously disbursed to the Contractor (including but not limited to advance payments) which exceed the reasonable and documented costs incurred in performing the Terms of Reference prior to termination.

I. USTDA Final Report

(1) Definition

"Final Report" shall mean the Final Report described in the attached Annex I Terms of Reference or, if no such "Final Report" is described therein, "Final Report" shall mean a substantive and comprehensive report of work performed in accordance with the attached Annex I Terms of Reference, including any documents delivered to the Client.

(2) Final Report Submission Requirements

The Contractor shall provide the following to USTDA:

(a) One (1) complete version of the Final Report for USTDA's records. This version shall have been approved by the Client in writing and must be in the English language. It is the responsibility of the Contractor to ensure that confidential information, if any, contained in this version be clearly marked. USTDA will maintain the confidentiality of such information in accordance with applicable law.

and

(b) Three (3) copies of the Final Report suitable for public distribution ("Public Version"). The Public Version shall have been approved by the Client in writing and must be in the English language. As this version will be available for public distribution, it must not contain any confidential information. If the report in (a) above contains no confidential information, it may be used as the Public Version (provided USTDA receives a total of four (4) copies). In any event, the Public Version must be informative and contain sufficient Project detail to be useful to prospective equipment and service providers.

The Contractor shall also provide one (1) copy of the Public Version of the Final Report to the Foreign Commercial Service Officer or the Economic Section of the U.S. Embassy in Host Country for informational purposes.

(3) Final Report Presentation

All Final Reports submitted to USTDA must be paginated and include the following:

(a) The front cover of every Final Report shall contain the name of the Client, the name of the Contractor who prepared the report, a report title, USTDA's logo, USTDA's mailing and delivery addresses, and the following disclaimer:

"This report was funded by the U.S. Trade and Development Agency (USTDA), an agency of the U. S. Government. The opinions, findings,

conclusions or recommendations expressed in this document are those of the author(s) and do not necessarily represent the official position or policies of USTDA. USTDA makes no representation about, nor does it accept responsibility for, the accuracy or completeness of the information contained in this report."

(b) The inside front cover of every Final Report shall contain USTDA's logo, USTDA's mailing and delivery addresses, and USTDA's mission statement. Camera-ready copy of USTDA Final Report specifications will be available from USTDA upon request.

(c) The Contractor and any subcontractor that performs work pursuant to the Grant Agreement must be clearly identified in the Final Report. Business name, point of contact, address, telephone and fax numbers shall be included for Contractor and each subcontractor.

(d) The Final Report, while aiming at optimum specifications and characteristics for the Project, shall identify the availability of prospective U.S. sources of supply. Business name, point of contact, address, telephone and fax numbers shall be included for each commercial source.

(e) The Final Report shall be accompanied by a letter or other notation by the Client which states that the Client approves the Final Report. A certification by the Client to this effect provided on or with the invoice for final payment will meet this requirement.

J. Modifications

All changes, modifications, assignments or amendments to this contract, including the appendices, shall be made only by written agreement by the parties hereto, subject to written USTDA approval.

K. Study Schedule

(1) Study Completion Date

The completion date for the Study, which is December 31, 2008, is the date by which the parties estimate that the Study will have been completed.

(2) Time Limitation on Disbursement of USTDA Grant Funds

Except as USTDA may otherwise agree, (a) no USTDA funds may be disbursed under this contract for goods and services which are provided prior to the Effective Date of the Grant Agreement; and (b) all funds made available under the Grant Agreement must be disbursed within four (4) years from the Effective Date of the Grant Agreement.

L. Business Practices

The Contractor agrees not to pay, promise to pay, or authorize the payment of any money or anything of value, directly or indirectly, to any person (whether a governmental official or private individual) for the purpose of illegally or improperly inducing anyone to take any action favorable to any party in connection with the Study. The Client agrees not to receive any such payment. The Contractor and the Client agree that each will require that any agent or representative hired to represent them in connection with the Study will comply with this paragraph and all laws which apply to activities and obligations of each party under this Contract, including but not limited to those laws and obligations dealing with improper payments as described above.

M. USTDA Address and Fiscal Data

Any communication with USTDA regarding this Contract shall be sent to the following address and include both sets of fiscal data listed below:

U.S. Trade and Development Agency
1000 Wilson Boulevard, Suite 1600
Arlington, Virginia 22209-3901
USA

Phone: (703) 875-4357
Fax: (703) 875-4009

Fiscal Data:

Amount:	\$273,166
Appropriation No.:	112/71001
Activity No.:	2007-81001A
Reservation No.:	078101001
Grant No.:	GH078101001

Amount:	\$264,429
Appropriation No.:	113/81001
Activity No.:	2007-81001A
Reservation No.:	078101002
Grant No.:	GH078101002

N. Definitions

All capitalized terms not otherwise defined herein shall have the meaning set forth in the Grant Agreement.

O. Taxes

USTDA funds provided under the Grant Agreement shall not be used to pay any taxes, tariffs, duties, fees or other levies imposed under laws in effect in Host Country. Neither the Client nor the Contractor (as defined in Clause A of Annex II) will seek reimbursement from USTDA for such taxes, tariffs, duties, fees or other levies. This provision does not provide for any immunity from the payment of taxes from funds other than USTDA funds.

ANNEX 5
Terms of Reference
(from USTDA Grant Agreement)

Annex I

Terms of Reference

In order to alleviate the overloading of the existing south-north 500 kilovolt (kV) transmission line in Kyrgyzstan and eliminate the need for transmission through Uzbekistan, the National Electrical Grid of Kyrgyzstan JSC (NEGK) is planning to build an additional 500kV transmission line from southern Kyrgyzstan to northern Kyrgyzstan. The routing of the line would allow interconnection with the Datka substation (the modernization of which is one subject of a separately-funded Southern Kyrgyzstan Transmission Upgrade FS), the Kambarata Hydroelectric power station and the grid in northern Kyrgyzstan east of Bishkek. Because the existing 500kV line connects with the grid in northern Kyrgyzstan on the west side of Bishkek, this would alleviate overloading on the 220kV lines in the north.

The new 500kV line would also likely be part of the Central Asia – South Asia 500kV transmission line project connecting Kazakhstan with Pakistan. This latter project is the subject of the Central Asia Power Sector Development Program Feasibility Study that USTDA partially funded in June 2006 with an \$800,000 grant to the Tajikistan Ministry of Energy, which will be performed by AES. This Study is needed regardless of the routing of the Central Asia – South Asia 500kV line and will not substantially duplicate the Central Asia Power Sector Development Program feasibility study. However, the Contractor shall attempt to contact AES, Inc. to ensure that the two feasibility studies do not conflict; however, notwithstanding (i) any communications between AES and the Contractor, or (ii) any work performed by anyone in connection with the Central Asia Power Sector Development Program Feasibility Study, the Contractor shall fully perform all of these Terms of Reference.

The results of the Study should provide NEGK valuable information that can be used if the Project is taken to financial closure and ultimately to implementation, construction of the transmission line and commissioning of operations.

All reports including maps, diagrams, charts and tables that these terms of reference require be prepared shall be prepared in professional-level English and Russian. The original and one copy of each such report, maps, and other documents shall be presented in Russian and English to the Grantee with one copy in English to USTDA.

TASK 1 – CONFIRM/REVISE DRAFT WORK PLAN

The Study Request for Proposals (RFP) shall require each bidder under the RFP to include a draft work plan in that bidder's proposal. The Contractor, as a first effort before undertaking any other Task, shall consult with its Kyrgyz counterparts as needed to revise and finalize the draft work plan that was presented with its proposal under the RFP. The final work plan shall be comprehensive and cover the performance of the 12 Tasks listed below.

The objective of the final (confirmed) work plan shall be to foresee as far as practical all

of the specific activities that will be involved in the execution of the additional Tasks defined below.

The work plan shall specify:

- 1) how the activities in each Task described below will be addressed and completed, and what type of methodology and analytical tools are to be used;
- 2) how selected Tasks may be implemented and coordinated such that levels of effort by the participants and the associated expenses are reduced;
- 3) how the Tasks will be sequenced and timed for completion such that the efforts will be efficient, cost effective, and require a minimum of time to complete the study; and,
- 4) how the timing of the Tasks will be coordinated by a graphical schedule.

Additionally, the final work plan shall identify the staffing and staff qualifications assembled for undertaking the Tasks. The roles for subcontractors (if any) shall also be identified as part of the work plan. The final work plan must provide that the Contractor shall fully perform all provisions of Tasks 2 through 12 below, and the final work plan may not be inconsistent with these Terms of Reference in any way.

Deliverable: The Contractor shall deliver the Final (confirmed) Work Plan to NEGK.

TASK 2 – COLLECT AVAILABLE DATA

The Contractor shall collect from NEGK, electricity sector companies, governmental regulating agencies, and others as appropriate, all relevant technical, legal, and environmental information available. NEGK is required to collect and submit to the Contractor all such information and studies relevant to the Project that NEGK possesses. The information will be provided at no cost to the Contractor.

The Contractor shall assess the validity of the information and data in terms of usefulness as inputs to the Tasks defined by these Terms of Reference. Examples of information and data include environmental laws, characteristics of relevant national electrical grid components, results of previous explorations of routing between Datka and Kemin, status of the construction of the Datka substation, and timing prospects for the construction of the Kamarata facilities. With respect to the future Kamarata facilities, the Contractor shall determine the justification for locating the substation along the Datka-Kemin line and provision of a connection for a future substation.

The Contractor shall also, under Task 2, review and assess the legal framework under which the feasibility study will be developed including, but not limited to, analysis of Kyrgyz law on private investment as this may affect NEGK, environmental law, and energy law. As a minimum, the analysis shall cover legal requirements for new transmission projects, concessions with respect to private investment, electricity export rights and/or restrictions, transmission wheeling, tariffs, and all other factors that could substantially impact on the feasibility of the project. The results shall be analyzed in terms of identifying critical legal constraints and needs for changes in the law to overcome these constraints.

Additionally, more reliable information concerning south-north electricity flows through Uzbekistan shall be gathered and used in analyzing the project and exploring alternatives to it. The additional information gathered shall include year-by-year tabulations of Uzbek wheeling fees and Kyrgyz, Kazakh, and Tajik experience in negotiating and implementing transmission line use agreements with Uzbekistan.

TASK 3 – IDENTIFY ALTERNATIVE RIGHTS OF WAY

The Contractor shall visit the area where the proposed Kemin substation is expected to be located and travel the prospective line routes as agreed to with NEGK. As one alternative, the Contractor shall consider a line route through Shamsi pass. In addition, the Contractor shall investigate and employ reasonable methods for characterizing alternative rights of way. Examples are the use of helicopters and video imaging, satellite imagery, and other technological devices, which may produce information and data to identify practical alternative routings. The depth of detail shall be such that credible costs estimates will be practical for each alternative routing.

The deliverable for Task 3 shall be a map showing the prospective rights of way and the topographic features to be overcome for each alternative. The Contractor shall take advantage of satellite imagery to the maximum practical extent. If it should prove more cost effective by reducing time in the field for personnel, the Contractor shall consider the use of helicopters and video camera records for the identification of alternatives.

Deliverable: The Contractor shall deliver to NEGK a map showing the prospective rights of way and the topographic features to be overcome for each alternative.

TASK 4 – SELECT OPTIMUM RIGHT OF WAY

Based on the results of Tasks 1-3, the Contractor shall have already identified several alternatives for routing the transmission line. The Contractor shall compare these alternatives in terms of total length of the line, difficulty of access to erection sites, application of eminent domain, impact on construction schedule, severity of environmental impacts, preliminary estimates of capital investment, and other such considerations. Based on the results of these comparisons, the Contractor shall recommend the routing for the line.

For the recommended line routing, the Contractor shall prepare aerial surveys adequate to obtain 1:20,000 scale mapping of the entire transmission line route and shall perform geotechnical studies for transmission tower siting. The geotechnical studies shall consider the most cost-effective alternatives sufficient to reliably design at least six different foundations types, which shall be used ultimately by the Engineering, Procurement, and Construction contractor on a tower-by-tower basis during field engineering.

Deliverable: The Contractor shall prepare and submit a memorandum on the optimum line routing and Kemin substation location, presenting a complete analysis of benefits and issues for the options and shall summarize the reasons for selection of the preferred routing.

TASK 5 – ESTABLISH LINE CAPACITY AND ELECTRICAL DYNAMICS

The Contractor shall recommend the optimum line capacity that reflects (1) the domestic supply demand situation in the Kyrgyz Republic and (2) the impact on the line capacity of its incorporation in the electricity corridor to link the Central Asian Republics with Afghanistan and Pakistan.

The determination of line capacity shall foresee the transmission of the Kambarata output and the provision in the line design to accommodate this additional capacity by, for example, increase in the conductor capacity or by tower design to permit addition of a new circuit in the future.

The Contractor shall review main parameters of the Kyrgyz Republic National Electrical Grid and with information provided by NEGK pertaining to load forecasts, conduct dynamic electrical studies of the impact of the transmission line on the transmission grid currently and in the future. The Contractor shall study the following at a minimum as part of this Task: load flow, voltage variations, short-circuits, equipment loadings, active and reactive power margins, and energy losses.

TASK 6 – SPECIFY TRANSMISSION LINE DESIGN

From the data and information so far collected, the Contractor shall prepare drawings and conceptual layouts in AutoCAD or other design software to show the selected project details to the depth that international financing institutions may require. The drawings shall incorporate the results of the field investigations and the preliminary design used for comparing alternative routings. Drawings shall locate the Project terminals and routing, show the line in plan and profile, locate substations including the connection to Kambarata if appropriate, and provide a single line diagram. In addition, drawings shall show tower designs, foundation designs, and general arrangement for the Kemin substation.

Deliverable: The Contractor shall prepare a report of the Conceptual Design and Drawings to NEGK, including all developed drawings, charts, and research.

TASK 7 – ESTABLISH BILL OF MATERIALS AND EQUIPMENT SPECIFICATIONS

The Contractor shall establish, as far as practical, bills of all materials (type, quantity, unit cost, and total cost) required by the selected line route and the Kemin substation, indicating local availability from the main local suppliers. For all materials, equipment and services required during implementation, the Contractor shall prepare a list of potential U.S. suppliers.

The Contractor shall also select, size, and specify all equipment necessary for the project according to system requirements. Major equipment to be selected shall include voltage transformers, switchgear, conductors, circuit breakers, control systems such as SCADA, tower structures, foundation materials, and substation structures.

In recommending the loading capacity of the 500 kV Datka-Kemin line, the Contractor shall consider and take into account as appropriate the loading capacity of all existing and

planned new lines of the Kyrgyz Republic transmission system and the transmission systems of Tajikistan and Kazakhstan.

Deliverable: The Contractor shall prepare and deliver to NEGK a Bill of Materials and Equipment Specifications Report with the results of this Task.

TASK 8 – PREPARE PRELIMINARY ENVIRONMENTAL AND DEVELOPMENT IMPACT ANALYSIS

The Contractor shall review and assess pertinent Kyrgyz laws, regulations, and directives that apply to the construction of substations and transmission lines. The Contractor shall also summarize codes and standards and prepare a preliminary Environmental Impact Analysis according to the requirements of the most interested international financial institutions (IFIs) and in agreement with any applicable provisions of Kyrgyzstan legislation.

The Contractor shall perform a preliminary environmental impact assessment that covers at a minimum the following impacts: biodiversity and loss of habitat, disturbance to wildlife (especially to migratory birds), destruction of vegetation, ground disturbance, electromagnetic radiation, landscape visualization, noise impacts, and relocation of population through eminent domain. The Contractor shall prepare a preliminary environmental impact analysis with reference to local requirements and those of multi-lateral lending agencies (such as the World Bank). This review shall identify potential negative impacts, discuss the extent to which they can be mitigated, and develop plans for a full environmental impact assessment if and when the Project moves forward to the implementation stage.

The assessment of Development Impact is an important aspect of the Study. The Contractor shall perform a Development Impact Analysis that shall cover the following developmental impacts:

- **Infrastructure and Industrialization**

Describe how the implementation of the Proposed Project contributes to the improvement and security of the physical, financial and social infrastructure of the country, including length of transmission lines, amount of electric power able to be transmitted, number of substations, and estimation of reduced overload or new capacity;

- **Market-Oriented Reforms**

Describe how the Project will encourage more transparent regulatory systems and institutions, privatization of state-owned economic entities, promotion of greater competition in noncompetitive economic sectors, lowering of non-tariff barriers to trade, strengthening of intellectual property rights and modernizing international trade systems and regulations;

- **Human Capacity Building**

Describe how implementation of the Project will contribute to human capacity building, either through creation of new jobs or through significant training of personnel;

- **Technology Transfer and Productivity Improvement**

Describe new technologies that will be introduced as a result of the Project, contributing to the improvement of processes, stimulating greater economic productivity or allowing for more efficient use of resources.

Deliverables: The Contractor shall provide NEGK the preliminary environmental assessment report, including ecological aspects of transmission lines and substations construction and including all developed drawings, charts, and research. The Contractor shall also provide NEGK a development impact analysis report including the results of the analysis above.

TASK 9: ESTIMATE PROJECT CAPITAL AND OPERATING COSTS

Drawing on the knowledge basis and outputs of all preceding Tasks, particularly Task 7, the Contractor shall prepare a capital cost estimate for the proposed project employing the optimal routing, itemizing in sufficient detail all major and auxiliary equipment. For each piece of equipment, as far as practical, the contractor shall itemize installation, transport and all duties costs to facilitate review of equipment bids during the bidding phase. The cost estimates for both the Kemin substation and the transmission line shall also detail indirect costs such as owner's costs, insurance, inspection and supervision, financing costs, legal costs, import and other taxes, value added taxes (VAT), if applicable, and shipping costs.

The format and the method for completing the capital cost estimate shall conform to the requirements of the IFIs.

The Contractor shall also estimate the operating cost for the line and take into account the total annual transmission of energy, the pattern of this transmission, operating staff costs, maintenance, insurance, and taxes due on the operations.

Costs shall be estimated to within $\pm 25\%$ of the actual costs.

Deliverable: The Contractor shall prepare and deliver to NEGK a Project Capital and Operating Cost Report with the results of the work of this Task.

TASK 10: IDENTIFY THE OWNERSHIP STRUCTURE

The Contractor shall identify an ownership structure for the project, which appears to be the most effective in the management of the Datka-Kemin line from the point of view that the line serves two purposes. It is a key factor in balancing supply and demand for domestic consumption in the Kyrgyz Republic. It is also a key link in the chain for the export of Central Asian electricity to South Asia. In this respect, recognition shall be

given to the prospect that the intent of the line to promote transmission of electricity from the south to the north of Kyrgyzstan will change. It is contemplated that the line might eventually be made part of the planned Central Asia – South Asia transmission corridor and would therefore have to accommodate both northerly and southerly flows of electricity. NEGK will provide the Contractor the latest information concerning this possibility, and the Contractor shall take such information into account when conducting the Study.

Deliverable: The Contractor shall prepare and deliver to NEGK an Ownership Structure Report with the recommended ownership structure.

TASK 11: CONDUCT FINANCIAL AND SENSITIVITY ANALYSES

The Contractor shall prepare a detailed financial analysis suited to measures of financial attractiveness employed by private investors and international loan financing institutions. Interest during construction shall be incorporated in the analysis. The capital and operating costs determined in Task 9 shall be a basis for the analysis. The Contractor shall develop the likely short-term and long-term revenue streams that will be generated by the completed and commissioned project and identify the sources of the revenue. The revenue streams will come from two sources: one for the transport of electricity destined for domestic consumption and the other for the transport of electricity destined for export. The Contractor shall consider a common carrier mode of operation, or an alternative that is acceptable to NEGK and other prospective key stakeholders including the World Bank and/or other IFIs. The Contractor shall account for line losses and the value of electricity that would represent a charge for the transmission through Kyrgyz territory of electricity originating in Kazakhstan or some other country. The objective shall be to determine the minimum revenue required to yield an attractive rate of return. A main output of this analysis shall be the minimum wheeling charges for which the project is feasible. Wheeling charges shall be broken down in fixed and variable components in accordance with generally accepted international accounting practices and/or norms acceptable to the World Bank and/or other possible IFI backers of the project. The period of the analysis shall be 15 years and/or other periods acceptable to the World Bank and/or other possible sources of debt and equity financing.

The Contractor shall conduct sensitivity analysis taking into account the main parameters that could affect the financial viability of the Project. Of specific importance shall be the accuracy of the construction costs for the Project, since the costs of materials would be determined through a bidding process that would take place during project implementation. Other parameters for sensitivity analysis shall be based on Contractor's judgment of the validity of assumptions that may have been made in the preparation of the capital and operating cost estimates. Debt to equity ratios are likely to be a significant parameter for sensitivity analysis.

The Contractor shall prepare a financial memorandum suitable for presentation to IFIs that includes a financing plan most advantageous for NEGK, and supported by appropriate documentation.

Deliverable: The Contractor shall provide NEGK two copies of the financial assessment report, financial investment memorandum, and the financing options report in Russian and two copies of each in English.

TASK 12: PREPARE FINAL REPORT

The objective of the final report is to provide NEGK with a report that can be used (a) to plan for the functioning of the line and (b) to apply to international lenders and donor agencies to secure construction financing for the project.

The Contractor shall prepare and deliver to NEGK and USTDA a substantive and comprehensive final report of all work performed under these Terms of Reference ("Final Report"). The Final Report shall be organized according to the tasks as listed in this Terms of Reference, and shall include all deliverables and documents that have been provided to NEGK. The Final Report shall be prepared in accordance with Clause I of Annex II of the Grant Agreement. The Contractor shall identify prospective U.S. sources of supply in the Final Report in accordance with Clause I of Annex II of the Grant Agreement.

Each of the tasks must be distinctly set forth in a substantive and comprehensive manner. The Final Report shall contain an executive summary. NEGK shall be provided with six (6) copies of the Final Report on CD-ROM. The CD-ROM version of the Final Report shall include Adobe Acrobat readable copies of all documents; source files for all drawings on AutoCAD or Visio format; and source files for all documents in MS Office 2000, or later version.

Notes:

- (1) The Contractor is responsible for compliance with U.S. export licensing requirements, if applicable, in the performance of the Terms of Reference.**
- (2) The Contractor and NEGK shall be careful to ensure that the public version of the Final Report contains no security or confidential information.**
- (3) NEGK and USTDA shall have an irrevocable, worldwide, royalty-free, non-exclusive right to use and distribute the Final Report and all work product that is developed under these Terms of Reference.**