



**United States Energy Association  
Request for Proposal: FACTS for Reactive Power Compensation – Kazakhstan Electricity Grid Operating Company (KEGOC)**

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**REQUEST FOR PROPOSAL – FACTS for Reactive Power Compensation – Kazakhstan Electricity Grid Operating Company (KEGOC)**

**Closing date of RFP:** November 1, 2021

**Implementing Agency:** United States Energy Association (USEA)

**Funding Agency:** United States Agency for International Development (USAID)

**Award Ceiling:** \$150,000 (one hundred fifty thousand US Dollars)

The United States Energy Association is inviting prospective organizations or individuals through this Request for Proposal (RFP) to submit proposals for implementing a project on Flexible Alternating Current Transmission System (FACTS) for reactive power compensation for the Kazakhstan Electricity Grid Operating Company.

Proposals are due by 17:00 hours EST of the closing date. Please submit all proposals with a read receipt to Ms. Marina N. Barnett, Senior Program Coordinator, at [mbarnett@usea.org](mailto:mbarnett@usea.org). Proposals must be in digital format (PDF).

As this is a USAID-funded program, the RFP follows USAID Procurement Regulations and Laws. All bidder details will be kept confidential.

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**I. INTRODUCTION**

The United States Energy Association is a nonprofit, apolitical, nonlobbying organization founded in 1924. USEA’s mission has two pillars of equal importance. USEA serves as a resource, by convening energy stakeholders to share policy, scientific, and technological information to foster the advancement of the entire energy sector. Internationally, USEA promotes energy development by expanding access to safe, affordable, and environmentally acceptable energy in partnership with the U.S. Government.

Through a cooperative agreement with the USAID Bureau for Economic Growth, Education and Environment (E3), USEA implements the Energy Utility Partnership Program (EUPP), available to all USAID-assisted countries and USAID Missions. EUPP supports the efforts in USAID-assisted developing countries to increase environmentally sustainable energy production and to improve the operational efficiency and increased financial viability of their utilities and related institutions, with the goal of increasing the access of these countries to safe, reliable, affordable and environmentally sound energy services.

In Central Asia, EUPP works to create an enabling environment for the regional transfer to cleaner, more reliable power supply and encourage establishment of an integrated power market.

## II. BACKGROUND

The currently installed power generation capacity in the Republic of Kazakhstan is approximately 22,936 MW with the available capacity of 19,329 MW. Coal is the dominant source of generation, accounting for 81.1% of total projected generation and 74% of thermal generation. However, the Government of Kazakhstan has an ambitious goal of 50% renewable generation by 2050, with intermediate targets of 6% by 2025, and 10% by 2030.

Kazakhstan has over 44,490 miles of high-voltage transmission lines, mainly of 500 and 220 kV. The Kazakhstan Electricity Grid Operating Company Joint Stock Company is the national transmission grid operator. KEGOC owns and operates 374 overhead power lines (16,715 miles), 80 electrical substations of 35-1,150 kV with an installed transformer capacity of 38,246 MVA. In 2019, KEGOC reported 43.97 billion kWh in electricity transmission, 97.06 billion kWh in technical dispatching of electricity production and consumption in the grid, and 188.77 billion kWh in balancing of electricity production and consumption.

The main asset of the company is the National Power Grid that provides connections between various regions of the country, as well as with the power systems of the neighboring states of Russia, Kyrgyzstan and Uzbekistan, and delivers electricity from power plants to major wholesale consumers.

## III. IMPLEMENTATION AND APPROACH

The purpose of this RFP is to solicit proposals from various candidate organizations or individuals, conduct a fair evaluation, and select the organization deemed most suitable to undertake the project.

### Award Ceiling

USEA is constrained by a \$150,000 budget for this project. This amount excludes travel expenses as no travel is anticipated and the project will be implemented remotely.

### USEA Involvement

USEA will be involved in all the activities under a subcontract agreement between USEA and the Consultant in the following ways:

- Review and approval of proposed activities
- Review and approval of deliverables
- Approval of invoices for payment

### Subcontract Agreement Management and Oversight

A subcontract agreement between USEA and the Consultant shall be subject to all USAID Special Terms and Conditions, including all mandatory FAR Flow-Down clauses, where applicable, and the provisions included in 2CFR200 and 2CFR700. All bidders are strongly encouraged to review these provisions prior to submitting a proposal.

- Standard Provisions for U.S. Nongovernmental Organizations: <https://www.usaid.gov/sites/default/files/documents/1868/303maa.pdf>
- 2CFR200: <https://www.gpo.gov/fdsys/pkg/CFR-2014-title2-vol1/pdf/CFR-2014-title2-vol1-part200.pdf>
- 2CFR700: <https://www.gpo.gov/fdsys/pkg/CFR-2015-title2-vol1/pdf/CFR-2015-title2-vol1-part700.pdf>

Subcontract agreement management, oversight and payment will be carried out by USEA.

### Non-Disclosure Agreement

Depending on data requirements, consultants might be requested to sign a Non-Disclosure Agreement (NDA) with KEGOC.

#### IV. SCOPE OF WORK

**Purpose:** The purpose of this program is to prepare KEGOC to implement Flexible Alternating Current Transmission System (FACTS) technology to enhance the stability of the system and increase the transfer capacity of the National Power Grid. Implementation of FACTS technology would result in improved quality and efficiency of power transmission with reduced delivery costs, contributing to increased reliability and resiliency of Kazakhstan's National Power Grid.

**Objective:** The objective of this program is to conduct a feasibility study of FACTS technology for reactive power compensation in the Kazakhstan power grid.

**Tasks:** The following three issues caused KEGOC to consider implementing FACTS technology for reactive power compensation and should be considered when designing and conducting this feasibility study:

- 1) There is an unacceptable increase in voltage levels that follows disconnection of a reactor for maintenance at the 500 kV Aurora Substation.
- 2) There is a significant change in transit flows between the power systems of Siberia and the Urals (Russia), which necessitate frequent switching of reactors at the 500 kV Sokol Substation, the EGPP Substation, and the TsGPP Substation. This frequent switching leads to deterioration of the insulating quality of switching equipment and equipment failure.
- 3) There are increased voltage levels at the 220 kV transit Uralskaya-Aktauskaya TPS Substation due to the lack of reactive power sources at the 220 kV Inder Substation affecting generation and reception of reactive power.

Based on these considerations, the tasks to be performed by the Consultant under this Scope of Work shall include the following:

**Task 1:** Develop solutions for voltage issues at KEGOC substations and for transfer capacity issues at the North-South overhead power transmission lines (OHTL) and the North-East-South OHTL parts of the grid.

**Subtask 1.1.** Conduct analysis and provide assessments of the current conditions at the 500 kV Aurora Substation, the 500 kV Sokol Substation, the 500 kV EGPP Substation, the 500 kV TsGPP Substation, the 220 kV transit Uralskaya-Aktauskaya TPS Substation, the 500 kV North-South overhead power lines (OHTL) and the 500 kV North-East-South OHTLs based on the following data and documents to be provided by KEGOC:

- 1) Data on actual capacity and power balances;
- 2) Current and prospective network diagram of the 220-500 kV Kazakhstan power grid;
- 3) Data on technical characteristics of OHTLs and substation equipment within the Kazakhstan network, including losses disaggregated by the last 5 years and facilities;
- 4) Maximum normative wind speed pressure and normative ice wall thickness with 1 in every 25 years repeatability;
- 5) Data on substations within the Kazakhstan power network;
- 6) The Annual Report of the National Dispatch Center of the System Operator;
- 7) Possible transit and export volumes of power flows;
- 8) Data on forecast balances of capacity and power through 2030;
- 9) Current protocols for operational maintenance, principles and settings of the emergency automation of the Kazakhstan power grid;
- 10) Protocols for modes of parallel operation with the Urals power grid and the Siberia power grid (Russia).

"Conduct analysis" in this Subtask 1.1. implies analyzing the actual voltage levels based on SCADA measurements in order to develop solutions to resolve the existing discrepancies with the voltage level

requirements, and performing computational modeling, if necessary. KEGOC utilizes DlgSILENT PowerFactory software for network modeling.

**Subtask 1.2.** Based on the analyses and assessments described above, develop and present options for technical and technological solutions – by FACTS or any other technologies, depending on which technology promises the most optimal solution – for reactive power compensation at the 500 kV Aurora Substation, the 500 kV Sokol Substation, the 500 kV EGPP Substation, the 500 kV TsGPP Substation, the 220 kv transit Uralskaya-Aktauskaya TPS Substation; and for increasing transfer capacity of the 500 kV North-South OHTL and the 500 kV North-East-South OHTLs. The presentation must include a review of strengths and weaknesses of the proposed solutions, and technical and economic justifications. The presentation must also provide an evaluation of at least three appropriate FACTS devices and a suggestion of an optimal option.

**Subtask 1.3.** Present these analyses, assessments and solutions to KEGOC engineers and executives via an online meeting.

**Task 2:** Provide a comprehensive review of currently available FACTS technologies and devices and suggest an optimal technology for implementation in Kazakhstan. Unlike Subtask 1.2, which requires a suggestion of an optimal technology to solve specific voltage issues, Task 2 shall suggest an optimal technology for implementation throughout the KEGOC system (if different from the one proposed in Subtask 1.2).

**Subtask 2.1.** Perform calculations of electrical modes for winter maximum and summer minimum loads, taking into account planned development of generating capacities and power grid facilities. Summer modes must include shutdown scenarios of up to two elements simultaneously (emergency shutdowns in repair schemes).

**Subtask 2.2.** Perform calculations of short-circuit currents in the adjacent network and assess the impact of FACTS devices parameters on levels of short-circuit currents.

**Subtask 2.3.** Assess the impact on the static and dynamics stability of the network.

**Subtask 2.4.** Calculate the volume of network losses for the suggested FACTS devices and describe how it affects selection of the suggested FACTS devices.

**Subtask 2.5.** Provide technological and economic rationale for selection of the suggested FACTS devices, including performance characteristics and energy saving benefits.

**Subtask 2.6.** Present these calculations and assessments and a review of currently available FACTS technologies and devices to KEGOC engineers and executives via an online meeting.

**Task 3:** Develop an installation plan, including the following:

**Subtask 3.1.** Determine the scope of installation of additional substation equipment, indicating the number of additional devices, their characteristics and which substations should host the devices.

**Subtask 3.2.** Provide an overview of equipment manufacturers and selection criteria.

**Subtask 3.3.** Provide an aggregated calculation of installation costs (for FACTS equipment only).

**Subtask 3.4.** Present this installation plan to KEGOC engineers and executives via an online meeting.

**Deliverables:** Based on the Scope of Work, the following deliverables and products shall be submitted:

**Task 1:** **Deliverable 1.** Satisfactory submission of a **draft** report on options for technical and technological solutions for reactive power compensation at the 500 kV Aurora Substation, the 500 kV Sokol Substation, the 500 kV EGPP Substation, the 500 kV TsGPP Substation, the 220 kv transit Uralskaya-Aktauskaya TPS Substation; and for increasing transfer capacity of the 500 kV North-South OHTL and the 500 kV North-East-South OHTLs. Digital copies of a comprehensive **draft** report – in English and in Russian – shall be submitted to USEA and KEGOC for their review. The report shall include all items listed in Task 1 (Subtasks 1.1 through 1.3).

**Deliverable 2.** Satisfactory submission of the **final** report on solutions to reactive power compensation – in English and in Russian – shall be submitted to USEA and KEGOC. The report shall incorporate updates and responses to USEA and KEGOC’s comments.

**Task 2:** **Deliverable 3.** Satisfactory submission of a **draft** report on currently available FACTS technologies and devices, and on the suggested optimal technology for implementation throughout KEGOC’s system. The report must include all items listed in Task 2 (Subtasks 2.1 through 2.6). Digital copies of the draft report– in English and in Russian – shall be submitted to USEA and KEGOC for their review.

**Deliverable 4.** Satisfactory submission of the **final** report on currently available FACTS technologies and devices, and on the suggested optimal technology for implementation throughout KEGOC’s system. The report shall incorporate updates and responses to USEA and KEGOC’s comments.

**Tasks 3:** **Deliverable 5.** Satisfactory submission of a **draft** installation plan including all items listed in Task 3 (Subtasks 3.1. through 3.4.). Digital copies of the draft installation plan – in English and in Russian – shall be submitted to USEA and KEGOC for their review.

**Deliverable 6.** Satisfactory submission of the **final** installation plan. The final installation plan shall incorporate updates and responses to USEA and KEGOC’s comments.

**Reporting:** The consultant will report to USEA.

**Schedule:** The project is expected to begin in January 2022 and take approximately 9 months to complete. These tentative assignment dates are provided solely for information purposes and the benefit of bidders. Modification of these assignment dates will not constitute a change in scope.

## V. PROPOSAL CONTENT

The proposal must follow the structure outlined below, contain the following components, and be within page limitations. Failure to follow the outline and page limits prescribed or exclusion of any of the required items will impact the proposal’s scoring. Maximum proposal limit 50 pages (inclusive of cover page and annexes).

Cover letter			
	Description	Notes	Maximum page limit
	Must include bidder’s current Data Universal Numbering System (D-U-N-S) number	Proposals without a DUNS number will not be considered and need not apply.	2 pages
	Provide status of System of Award		

	Management (SAM) registration		
<b>Technical proposal</b>			
<b>Subject heading</b>	<b>Description</b>	<b>Notes</b>	<b>Maximum page limit</b>
<b>Understanding of the issues</b>	Demonstration of an understanding of the issues outlined in the SoW		1 page
<b>Technical approach</b>	Approach to implementing the SoW		4 pages
<b>Schedule of tasks</b>	Proposed schedule of tasks and deliverables to complete the SoW		2 pages
<b>Team assignments &amp; Bio sketches</b>	<p>For each member of the team:</p> <p>1<sup>st</sup>: Summary of work to be performed by/assignment of each individual proposed</p> <p>2<sup>nd</sup>: (Immediately following the assignment) Short bio sketch that highlights the individual's direct experience with the subject matter</p>	The bidder can propose a consortium of multiple organizations and/or individuals; however, one organization must be identified as the lead organization who will enter into contract with USEA and be in compliance with the SAM and DUN registration noted in this RFP.	<p>1 page per person total</p> <p>½ page for assignment per person, followed by ½ page for bio sketch</p>
<b>Financial proposal</b>			
<b>Subject heading</b>	<b>Description</b>	<b>Notes</b>	<b>Maximum page limit</b>
<b>Summary of costs</b>	Line-item budget excluding labor with detailed justification of all costs associated with the project, including direct and indirect costs (printing, administrative supplies, etc.).	<p>Must be in USD</p> <p>Must be inclusive of taxes (if applicable)</p>	2 pages
<b>Labor fees</b>	Anticipated labor costs, broken down by the number of man-hours and fully loaded daily rate for each individual proposed for this project	<p>Must include names and titles of the individuals</p> <p>Must be in USD</p> <p>Must be inclusive of taxes &amp; fees (if applicable)</p> <p>All salary information will be kept confidential</p>	2 pages

Annex			
	Description	Notes	Maximum page limit
Annex 1	Proof of System of Award Management (SAM) registration	<p>Please note that <a href="#">SAM registration</a> is a 10-step process and can take several weeks to complete. Please refer to this <a href="#">guide</a> for more information. If a bidder has not completed the SAM registration process by the proposal submission due date, USEA will accept a proposal if it includes a PDF copy of an email from "<a href="mailto:notification@sam.gov">notification@sam.gov</a>" to the bidder stating that the bidder "successfully submitted the entity registration for NAME OF COMPANY in the U.S. Government's System for Award Management (SAM)".</p> <p>Proposals without proof of SAM registration or an email from <a href="mailto:notification@sam.gov">notification@sam.gov</a> stating acceptance of SAM application, will not be considered and need not apply.</p>	
Annex 2	Curricula Vitae	Summary of relevant experience of each proposed team member for (not beyond) the past 10 years. Relevant experience should be listed chronologically (starting with the most recent).	2 pages per person
Annex 3	USAID Contractor Employee Biographical Data Sheet	Completed USAID Contractor Employee Biographical Data Sheet forms for each employee proposed for this project <a href="https://www.usaid.gov/sites/default/files/AID1420-17.doc">https://www.usaid.gov/sites/default/files/AID1420-17.doc</a>	1 page per person
Annex 4	Organization experience	Summary of the company's or companies' background and experience with similar projects	5 pages

## VI. EVALUATION CRITERIA

**All bidders are required to provide a DUNS number and maintain a current SAM registration. Proposals without a DUNS number or proof of SAM registration will not be considered.** Selection of an offer for a subcontract award will be based on an evaluation of proposals against qualifications, subject matter expertise, technical approach and budget justification. Proposals shall first be evaluated from a technical standpoint (qualifications, subject matter expertise and technical approach) without regard to proposed budget justification. For those proposals determined to be technically acceptable, budget justification will be evaluated.

Evaluation Criteria:

- 20%: Experience with similar projects (for each consultant & the organization in general)
- 25%: Subject matter expertise (education and professional experience)
- 25%: Technical approach
- 30%: Cost

## VII. QUESTIONS AND CLARIFICATIONS

All questions and clarification requests related to this RFP should be submitted via email to Ms. Marina N. Barnett, Senior Program Coordinator, at [mbarnett@usea.org](mailto:mbarnett@usea.org) no later than October 15, 2021. All questions and answers will be posted on USEA's website.

**END OF RFP**