United States Energy Association
Power Africa: A U.S. Government-Led Partnership to Increase Sub-Saharan Africa's Access to Energy
Request for Proposal: Eastern Africa Power System Modeling and Network Studies

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REQUEST FOR PROPOSAL – Eastern Africa Power System Modeling and Network Studies

Closing date of RFP:	**April 2, 2019**
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 providing training on the national load flow modeling, advanced contingency analyses and reactive power for Burundi's utility REGIDESO, the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and the Eastern Africa Power Pool (EAPP); developing an accurate and validated operational model that reflects the current state of the Burundi power infrastructure; and performing detailed load flow and security analyses focusing on impediments to fully evacuating electricity produced by the generating stations associated with the Burundi Power network.

This is an activity implemented by USEA under the United States Agency for International Development (USAID) Power Africa Initiative.

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. 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.

I. INTRODUCTION

The United States Energy Association, headquartered in Washington, DC, is an association of public and private energy-related organizations, corporations, and government agencies. USEA represents the broad interests of the U.S. energy sector by increasing the understanding of energy issues, both domestically and internationally.

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.

USEA conducts a number of activities under the EUPP mechanism for Power Africa - a U.S. Government-led partnership to increase Sub-Saharan Africa's access to energy. Power Africa uses a wide range of U.S. government tools to support investment in Africa's energy sector. From policy and regulatory best practices, to pre-feasibility studies and capacity building, to long-term financing, insurance, guarantees, credit enhancements and technical assistance, Power Africa provides coordinated support to help African partners expand their generation capacity and access.

II. BACKGROUND

Countries in East Africa, while endowed with substantial energy resources, continue to experience significant constraints in economic growth caused by very low levels of access to electricity. Connecting the electric grids of Burundi, Democratic Republic of Congo, Kenya, Rwanda, Uganda and Tanzania will contribute to increased accessibility by allowing for electricity to be easily moved from source to demand, reducing national costs of infrastructure projects and electricity prices, improving national systems' reliability, and promoting regional power markets.

In Burundi, several generation and transmission projects have been launched to meet the growing energy demand in the country, as well as in the region, and to become part of the interconnected system. These projects include:

1. Ongoing Rusumo Falls Hydro Power Station (a shared 80MW power plant between, Burundi, Rwanda and Tanzania on River Kagera);
2. Ongoing Jiji (31.5MW) and Mulembwe (16.5MW) Hydropower Plants in Burundi;
3. Rusumo – Gitega 220kV transmission line;
4. Rwanda (Kigoma) – Burundi (Gitega) 220kV interconnection lines and associated 220/30kV substations;
5. Ruzizi III Hydro Power Station (a shared 147MW power plant between, Burundi, Rwanda and DRC on River Ruzizi);
6. DRCongo (Kamanyola) from Ruzizi 3 – Burundi (Bujumbura) 220kV interconnection line;
7. Gitega-Horezo (Burundi) – Kigoma (Tanzania) transmission lines.

To ensure that Burundi and the neighboring countries receive full benefits of these inter-connected systems and transmission lines, there is need for adequate human resource capacity and tools for power system planning and operation of the Burundi transmission network. It is also imperative that the regional institutions, involved in fostering regional interconnectivity, such as NELSAP and EAPP, are provided with tools for efficient and precise advanced network modeling and long-term planning.

III. IMPLEMENTATON 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 budget does **not** include travel and logistical expenses that USEA will be responsible for (see Section on USEA Responsibilities).

USEA Responsibilities

USEA will be responsible for all logistical arrangements for the participants and consultants. This includes arrangement and costs for the following (for each of the three trainings, one workshop and one technical meeting/data collection trip):

- Economy-class roundtrip international flights to Bujumbura, Burundi, and Nairobi, Kenya, for up to 2 consultants per trip;

- Per diem (meals and lodging) for up to 2 consultants per trip to include all travel and training days and maximum of 1 full day of rest prior to start of activity (Note: Lodging to be provided according to U.S. government regulations);
- Reimbursement of visa fees;
- Reimbursement of vaccinations (if needed) and travel medication costs;
- International health insurance for the duration of the travel to Burundi and Kenya;
- Ground transportation to/from the airport;
- Local transportation to sites outside of Bujumbura;
- Security services in Burundi (if needed);
- Meeting space and AV;
- Printing/photocopying of handout materials.

Subcontract Agreement Management and Oversight

A subcontract agreement between USEA and the winning bidder 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.

IV. SCOPE OF WORK

Purpose: The purpose of this program is two-fold: 1) to enhance the capacity of Burundi and its utility, REGIDESO, for safe, reliable and efficient operation of the national network, as well as near-term planning; and 2) to increase NELSAP and EAPP planning staff's capacity for advanced network modeling and long-term planning.

Objectives: The objectives of this program shall include the following:

- To provide Burundi with an accurate and validated operational model that reflects the current state of the power infrastructure;
- To enhance REGIDESO's capacity for carrying out safe, reliable and efficient operation of their grid;
- To enhance REGIDESO's capacity, including human resources and technical tools, for understanding and operating their network with reliability, security and efficiency;
- To enhance REGIDESO's capacity for understanding and analyzing the impact of various disturbances that may occur in the internal network of Burundi, as well as in other power systems outside of their territory, due to interconnections and operations of the cross-boundary power plants like Rusumo and Ruzizi III;
- To assist REGIDESO with developing a comprehensive plan for dealing with any system disturbances in accordance with regional grid codes;
- To increase NELSAP and EAPP planning staff's capacity for advanced modeling and long-term planning.

Tasks: The tasks to be performed within this Scope of Work shall include:

Task 1: Conducting a 3-day training workshop (Workshop 1) on collecting data necessary for the development of the operational load flow model.

Task 2: Conducting a 4-day technical meeting (site visits) to collect and verify data from various power plants.

Task 3: Conducting a 5-day training program (Training 1), including all necessary theoretical and practical elements, to prepare REGIDESO to develop and/or improve its national load flow models for the existing network topology. The program will include the following tentative topics. Final topics will be confirmed upon selection.

- Introduction to basic principles of transmission system modeling;
- Performing load flow analyses;
- Modeling power plant components for stability studies;
- Validation procedures;
- Data requirements for various models and stability studies.

Task 4: Developing a real-time, operational load flow model for REGIDESO's current network topology, starting with the mid-term planning model developed for REGIDESO under the Eastern Africa Transmission Partnership (EATP) in 2015. The models will be developed to represent two characteristic regimes (peak and off-peak) and three hydrology scenarios for each regime (wet, average and dry). Identifying network elements in the current network topology, and collecting and verifying the parameters for each element. Fine-tuning and validating the operational load flow model to ensure its fidelity to the current network topology (steel in the ground).

As necessary, updating the operational load flow model to account for network development upgrades forecasted for near-term commissioning.

Task 5: Conducting a second 5-day training program (Training 2) to further enhance REGIDESO, NELSAP and Eastern Africa Power Pool (EAPP) planning personnel's modeling and analytical capacity. The training will be organized in Nairobi, Kenya, and include the following tentative topics. Final topics will be confirmed upon selection.

- Introduction to dynamic simulation principles;
- Introduction to dynamic model development;
- Performing dynamic analyses;
- Small signal simulations.

Task 6: Conducting a third 5-day training program (Training 3) to further advance REGIDESO, NELSAP and EAPP planning personnel's modeling and analytical capacity. The program, organized in Nairobi, Kenya, will include the following tentative topics. Final topics will be confirmed upon selection.

- Performing advanced contingency analyses taking into account multi-level contingency analyses, tripping simulations and corrective actions;
- Implementing renewable generation and simulating their effects on the grid;
- Performing Inertia/Governor load flow calculations;
- Performing PV, QV analysis;
- Reactive power planning.

Task 7: Performing detailed load flow and security (N-1) analyses focusing on impediments to fully evacuating electricity produced by the generating stations associated with the Burundi Power network, in cooperation with NELSAP, Tanzania Electric Supply Company (TANESCO), and Rwanda's Energy Utility Corporation Limited (EUCL) and Energy Development Cooptation Limited (EDCL).

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

Deliverable 1: Conduct a 3-day training workshop (Workshop 1) on data collection. Two digital copies – in English and in French – of the full workshop curriculum, including questionnaires, manuals, presentations and all other training materials developed for REGIDESO and distributed to the participants.

Deliverable 2: Conduct a 4-day site visit to various power plants across the country to collect data necessary for developing an operational load flow model. Two digital copies – in English and in French – of a brief report on data collected, difficulties encountered in the process and recommendations for mitigating these challenges.

Deliverable 3: Conduct a 5-day training program (Training 1), including all necessary theoretical and practical elements, to prepare REGIDESO to develop and/or improve its national load flow models for the existing network topology. Two digital copies – in English and in French – of the full workshop curriculum, including manuals, presentations and all other training materials developed for REGIDESO and distributed to the participants.

Deliverable 4: Two digital copies – in English and in French – of the Operational Model and Training Report, comprising the developed models critical overview, recommendation for future steps, training overview and conclusions about the overall productiveness of the training.

Deliverable 5: Two draft copies – in English and in French – of the Operational Load Flow Model and Model Creation Report to be submitted to USEA and REGIDESO for their review.

Deliverable 6: Two digital final copies – in English and in French – of the Operational Load Flow Model and Model Creation Report incorporating updates and responses to USEA and REGIDESO's comments.

Deliverable 7: Conduct a second 5-day training program (Training 2) to further enhance REGIDESO, NELSAP and EAPP planning personnel's modeling and analytical capacity. Two digital copies – in English and in French – of the full workshop curriculum, including manuals, presentations and all other training materials developed for REGIDESO, NELSAP and EAPP and distributed to the participants.

Deliverable 8: Two digital copies – in English and in French – of the 2nd Training Report on approach, accomplishments and recommendations.

Deliverable 9: Conduct a third 5-day training program (Training 3), including all necessary theoretical and practical elements, to further advance REGIDESO, NELSAP and EAPP's planning personnel's capacity. Two digital copies – in English and in French – of the full workshop curriculum, including manuals, presentations and all other training materials developed for REGIDESO, NELSAP and EAPP and distributed to the participants.

Deliverable 10: Two digital copies – in English and in French – of the 3rd Training Report. The Report will include an Executive Summary, findings, recommendations, and annexes.

Deliverable 11: Two draft copies – in English and in French – of the Report on detailed load flow and security (N-1) analyses focusing on impediments to fully evacuating electricity produced by the generating stations associated with the Burundi Power network, undertaken in cooperation with NELSAP, TANESCO, EUCL and EDCL. The Report shall include recommendations for solutions to alleviate network congestion, including remedial dispatch actions, equipment upgrades, and additional transmission investment. A draft copy to be submitted to USEA, NELSAP and REGIDESO for their review.

Deliverable 12: Two digital **final** copies - in English and in French – of the Report on detailed load flow and security (N-1) analyses incorporating updates and responses to USEA, NELSAP and REGIDESO's comments.

Reporting

The consultants will report to USEA.

Schedule

The project is expected to begin in June 2019 and take approximately 12 months to complete.

Task(s)	Activities	Deliverables	Target Completion Date
1 and 2. Workshop1 & Data Collection Site Visits	Conduct 3-day workshop; 4-day Data Collection Site Visits	Workshop materials; Data for load flow model; Brief data collection report	July 31, 2019
3. Training 1	Conduct 5-day training to prepare REGIDESO to develop and/or improve its national load flow models for the existing network topology	Training materials; Training report	August 30, 2019
4. Operational Load Flow Model	Develop, fine-tune and validate the model	Operational Load Flow Model	October 31, 2019
5. Training 2	Conduct 5-day training on advanced contingency analyses, Inertia/Governor load flow calculations, PV, QV analysis and reactive power	Training materials; Training report	November 30, 2019
6. Training 3	Conduct 5-day training on dynamic models' development and analyses	Training materials; Training report	February 28, 2020
7. Security Analyses Report	Perform load flow and security analyses	Report	May 29, 2020

These target completion 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 contain the following:

a) A cover letter to the proposal, including:
   - A bidder's Data Universal Numbering System (D-U-N-S) number and proof of a current registration in the System of Award Management (SAM).

b) A technical proposal, including:
   - Demonstration of an understanding of the issues to be addressed under the proposed scope of work specified above by providing a summarized technical approach for each of the tasks listed (not to exceed 3 pages);
   - Proposed project schedule to perform the tasks under this project highlighting any deviations from the scope of work specified above;
   - Bio sketches of personnel, including at least 1 – 2 subject matter experts including a team leader that will be dedicated to the project;

- 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). Not to exceed 2 pages for each proposed team member;
- Summary of the work to be performed by each employee proposed for this project.

c) A financial proposal, including:
   - Detailed justification (i.e. line item budget);
   - Labor, other direct costs, indirect costs, and level of effort for each employee proposed for this project.

d) Completed USAID Contractor Employee Biographical Data Sheet forms for each employee proposed for this project (https://www.usaid.gov/forms/aid-1420-17).

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 and budget justification. Proposals shall first be evaluated from a technical standpoint (qualifications and subject matter expertise) without regard to proposed budget justification. For those proposals determined to be technically acceptable, budget justification will be evaluated.

Evaluation Criteria:	15%:	Experience with similar projects (for each consultant and the organization in general)
	30%:	Subject matter expertise (education and other relevant experience)
	30%	Technical approach
	25%:	Cost

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 no later than March 19, 2019. All questions and answers will be provided to all prospective bidders.

END OF RFP