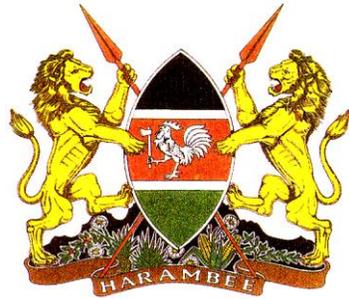


**REPUBLIC OF KENYA**



**MINISTRY OF ENERGY**

**TERMS OF REFERENCE**

**FOR**

**THE MIGRATION AND UPDATE OF THE SMALL HYDROPOWER  
ATLAS**

# **THE SMALL HYDROPOWER ATLAS**

## **TERMS OF REFERENCE**

### **1. Introduction**

The Government of Kenya through the Ministry of Energy is keen on promoting a wider adoption and use of renewable energy technologies to enhance their role in the country's energy supply matrix. In particular, carrying out resource assessments to assist investors planning on setting up power plants from renewable energy sources. The Government is committed to promotion of small hydropower as a viable option. This is in line with its development policy, and these measures are expected to lead to reduction of cost of energy, increase the share of electricity from renewable sources, and spur rural economic development and wellbeing.

The objective of the Small Hydropower Atlas is to enhance access to information for investors and other practitioners seeking to invest in the sector. The Ministry of Energy conducted studies to facilitate hydrological data collection, facilitating the mapping of hydropower resources in all the river basins in the country, thus leading to the establishment of a Geographic Information System (GIS). The GIS database was fed with layers of information essential for hydropower development and sites categorized by size (potential in MW). The main aim was the creation of a national database for hydropower development with a data query system for interrogating the GIS.

These datasets were structured in ArcGIS ArcMap document format (MXD) representing all the 47 Counties in Kenya. The Atlas was presented in ArcReader format which enabled the users to access the river data and generate reports. ArcReader is a free and easy-to-use application that allows viewing and printing of maps in the form of Published Map Files (PMF). However, ArcReader is a read-only application that does not support updating of the geodatabase.

In order to enhance the usage of these datasets and thus promote the development of small hydropower, the Ministry of Energy intends that the Atlas be migrated to an Open Source GIS System. The Ministry also plans to capture data and update the database to reflect the current small hydropower developments in the country.

The Ministry of Energy seeks to contract the services of a consultant/consortium firm to undertake the exercise of migrating the Small Hydropower Atlas and digitize the information based on available data and where the data is unavailable conduct field surveys to fill the gaps.

### **2. Objectives**

The main objective of the assignment is to migrate and update the Small Hydropower Atlas to an Open Source GIS Platform to be a national database and information retrieval system for small hydropower development.

### **3. Scope of Works**

- i. Carry out a review of previous studies on small hydropower potential, the Small Hydropower Atlas, The National Water Master Plan 2030, the Kenya National Electrification Strategy (KNES), 2019 Kenya Population and Housing Census etc.,

- ii. Migrate the current geodatabase to an Open Source GIS System that is stable, with read/write capability with enhanced interactive feature, customizable with relevant plugins, well documented and supported.
- iii. Establish associative layers of information on the GIS, necessary for hydropower development including:
  - a. County boundaries
  - b. All major towns
  - c. Road networks
  - d. Population Density
  - e. Rivers (including location of small hydropower plants)
  - f. water uses, e.g. irrigation schemes and drinking water schemes
  - g. Weather stations and RGS stations
  - h. Land use
  - i. Exclusive areas like the national parks, gazette forests, etc
  - j. Geological characteristics
  - k. Power transmission lines and voltages levels
  - l. Power distribution lines and voltages
  - m. Population household proximity maps to both 11 and 33 kV lines and generation sites
  - n. Electricity Generating stations
  - o. Load centers and load projections
- iv. For sites with hydropower potential, the data to have attributes for coordinates with WGS 84 projection, potential in MW, river drainage system, counties etc.
- v. Undertake geo-referencing of all electricity generation projects indicating their status. These will include generation systems feeding to the national grid and isolated mini grids. The projects shall be grouped into the following categories:
  - a. Undertaking Feasibility studies,
  - b. Negotiation of PPA,
  - c. Initialed/Signed PPA,
  - d. Under construction,
  - e. Commissioned

The GIS output will contain thematic layers for all forms of generation, indicating attributes such as: site name, site coordinates, owner, type of technology, altitude and capacity of the power plant.

- vi. The GIS to be a national data base with a query system for decision making for small hydropower development. It should have an in-built system for updating data, retrieval and backup with appropriate access control features.
- vii. The consultant will be required to train the users on the use of the GIS Platform as well as demonstrate field data collection/verification process and consequently the update of the database.

- viii. Pilot testing the accuracy of the atlas will be done using an appropriate sample size (at least 30 undeveloped sites) within all the river drainage systems through carrying out prefeasibility studies on sites generated through the interactive Atlas and update the Atlas appropriately.
- ix. The Atlas to be available in read-only format online for public, while all the source GIS map projects files be in the custody of the client.
- x. Document areas of improvement for the Atlas identified during the assignment.

#### **4. Counterpart Personnel**

The Ministry of Energy will provide counterpart personnel who will work alongside the consultant for the duration of the study and who will assist in providing the relevant information and data as necessary. The consultant will endeavor to involve them in all aspects of the study so that it can help build capacity in the field of study. The Ministry of Energy staff shall join the consultant during field work activities. The consultant will be expected to facilitate their participation. The Ministry of Energy shall also undertake independent monitoring and evaluation of the consultant's activities.

#### **5. Responsibility of the Client**

The Ministry of Energy will provide information, data and documents relevant for the assignment. It is expected that the Consultant will deploy his/her own resources including transport to carry out the assignment. The Consultant will have access to all relevant records including studies, reports and agreements e.t.c. available within Ministry of Energy to effectively carry out the tasks under this assignment. Ministry of Energy will assist and facilitate obtaining data that is available at public sources in Kenya including from Kenya Power and Lighting Company (KPLC), Energy and Petroleum Regulatory Authority (EPRA), Rural Electrification and Renewable Energy Corporation (REREC), Geothermal Development Company (GDC), Kenya Electricity Transmission Company (KETRACO), County governments, etc. The Consultant is however, expected to use his/her own ingenuity to collect as much information as possible to facilitate a rigorous and scientific study.

#### **6. Deliverables/Consultant's Reporting Obligations**

The consultant will be required to submit the following outputs:

- i. **Inception Report:** Within one (1) month after commencement of the assignment, the Consultant shall submit seven (soft and hard copies) of an Inception Report to Ministry of Energy. This shall include an indicative content and format for the assignment, as well as an outline of the methodology proposed, a detailed work plan and budget.
- ii. **Mid Term Report:** A midterm update that includes a narrative summary of progress to date, any challenges faced and plans to resolve them; overview of expenses (planned/actual), and updated timeline (planned/actual) for the activity. This will also include the presentation of the GIS Atlas for review.
- iii. **Draft Final Report:** Within nine (9) months of commencement of services, seven (soft and hard copies) of a draft final report and the GIS Atlas will be submitted as per the terms of reference. This is to be shared and followed by a Stakeholders validation workshop.

- iv. **Final Report:** Within ten (10) months of commencement of services, seven (soft and hard copies) of a final report incorporating all comments raised by Ministry and/or any other stakeholders with whom this report will be shared as well as the GIS Atlas.
- v. Open Source GIS map project files incorporating current small hydropower developments and all forms of power generation in the country.
- vi. online GIS Atlas
- vii. Training of Fifteen (15) staff on the appropriate Open Source GIS application. Training to be categorized into Admin and User Training.
- viii. , Desktop workstations and laptops.

## **7. Time Frame and Reporting**

The work will be coordinated by **The Secretary, Renewable Energy** of the Ministry of Energy.

The assignment is estimated to be carried out over a period of 12 months. The Consultant will provide all the necessary expertise and services to enable the tasks to be completed within this period. Most of the work shall be carried out in Kenya to enable close liaison with the counterpart personnel.

## **8. Improvement of Terms of Reference**

The consultant may offer suggestions and improvements in the Terms of Reference.

## **9. Required Qualifications and Skills of the Consultant**

The selected Consultant/Consortium is expected to be a firm able to demonstrate the following minimum requirements. The team must be fluent in both written and spoken English. The team must exhibit considerable experience of carrying out similar renewable energy resource assessments/mapping and resource planning in developing countries where data may be uncertain or inadequate.

The Team is expected to include:

- i. Lead consultant/consortium: First degree or higher in Geo-technical Information System (GIS), Surveying, Project management, or any other related discipline. The Team Leader will be responsible for the overall implementation and delivery of the Atlas. The lead consultant will oversee the teams comprising all the expertise listed below.
- ii. GIS Specialists: (Specify field of study - optional) Bachelor's degree holder with at least 5 years working experience.
- iii. Energy Sector Specialists: (Specify field of study - optional) Bachelor's degree with 5 years working experience.
- iv. Hydrologists: (Specify field of study - optional) Bachelor's degree with at least five years of working in the relevant sectors in developing countries and experience of undertaking resource assessments under similar conditions.
- v. Statisticians: Bachelor's degree in Economics and Statistics with a minimum of 5 years of experience in analyzing survey data yielding socio-economic metrics.

## **10. Application Process**

The Ministry of Energy is seeking to engage a consortium of firms to update the Small Hydropower Atlas. The process will follow the following steps:

- i. Request for Expressions of Interest (EoIs)
- ii. Evaluation and shortlisting of the EoIs
- iii. Request for Proposal (RfP) from the shortlisted applicants
- iv. Evaluation and selection of the winning applicant

The application will be done using the prescribed EoI and RfP templates which will also include the evaluation criteria.

## **11. Application Requirements**

RfP will be invited from organisations that meet the following criteria:

- i. Detailed company profile, physical address and qualification of key personnel (CVs, academic and professional certificates to be attached).
- ii. Certified copies of Certificate of Registration or Incorporation.
- iii. Must possess a valid Tax Compliance Certificate.
- iv. Audited accounts for the last three years.
- v. The applicants must be a company able to undertake small hydropower resource assessment and registered in Kenya.
- vi. The consultant must have previous experience in conducting natural resource assessment, socio-economic studies and field /on-site studies of similar nature and magnitude (attach evidence).
- vii. The consultant should have carried out similar assignment(s) to at least one organization preferably in public sector (provide evidence).
- viii. For a consortium: Consortium Agreement and Power of Attorney nominating the lead team of consortium.
- ix. Certified copies of Memorandum/Articles of Association for all consortium members.
- x. Key resource persons must meet the qualifications and experience stated above.
- xi. Excellent report writing skills.

Consultants may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualifications. Where organizations apply as a consortium, they must appoint (in writing) one Lead Organisation that will, if selected, submit the full proposal.

Firms will be selected in accordance with the Quality Cost Based Selection (QCBS) method, following shortlisting, as set out in the Procurement Regulations.