

TERMS OF REFERENCE FOR THE GEOGRAPHIC INFORMATION SYSTEM (GIS) EXPERT FOR WORLD BANK-FINANCED PROJECTS IMPLEMENTED BY AND THROUGH THE MINISTRY OF ENERGY AND PETROLEUM.

REF NO. KE-MOE-495766-CS-INDV

The objective of the Consultancy

The objective of the consultancy is to provide technical assistance to the implementing agencies and provide support services for the use of Geographic Information System (GIS). The use of GIS in the World Bank financed Projects will allow for fast, cost-effective, and visually powerful modeling of optimal energy pathways in expanding energy access toward the government's goals of achieving universal access to electricity and clean cooking. The GIS Expert will provide technical services to projects under implementation and under preparation but not limited to the following: Kenya Off-Grid Solar Access Project (KOSAP) and all phases of Kenya's Green and Resilient Expansion of Energy (GREEN) Program.

The GIS data, that will be collected for the project include topography (elevation maps, land cover), demographics (rural/urban areas, population characteristics), climatological data (wind speed, temperature, hydrology, and solar irradiation), existing infrastructure (roads, transmission, power plants and mines) amongst others.

Scope of the Consulting Services and Specific Responsibilities

Scope of the consulting services

Collecting, analyzing, and distributing Geospatial information; development and maintenance of geospatial database; timely availability of digitized drawings and GIS information; providing support and expertise in the development of the State Department for Energy and its Agencies GIS capabilities to meet strategic objectives.

Responsibilities of the Geographic Information System (GIS) Expert

Collecting, analyzing, and distributing Geospatial information; development and maintenance of geospatial database; timely availability of digitized drawings and GIS information; providing support and expertise in the development of the State Department for Energy and its Agencies GIS capabilities to meet strategic objectives. More specifically, the specialist will perform the following tasks.

a) Data Collection and Management:

- Acquire and compile geospatial data from various sources, including satellite imagery, aerial photographs, field surveys, and public databases.
- Organize and maintain spatial databases to ensure data integrity and accessibility.

- Conduct quality checks on collected data and update databases as needed.
- b) Spatial Analysis:
- Perform spatial analysis techniques, such as overlay analysis, Land Use/Land Cover (LULC) mapping, proximity analysis, and network analysis, to derive meaningful insights from geographic data.
 - Apply statistical methods to analyze spatial patterns and relationships.
 - Identify trends, patterns, and anomalies through geospatial analysis and present findings clearly and concisely.
 - Perform digital manipulation of topographic information by querying, viewing, evaluating, and downloading digital data.
- c) GIS Mapping and Visualization:
- Create maps and visualizations using GIS software, such as ArcGIS Pro, QGIS, or other industry-standard tools.
 - Develop thematic maps, interactive web maps, dashboards, storymaps and other cartographic products to communicate spatial information effectively.
 - Collaborate with stakeholders to understand their mapping needs and provide tailored solutions.
 - Draw, scribe, digitize, and scan cultural, topographic, hydrographic, and/or other features on overlay/scribing surfaces or in digital formats.
- d) Geodatabase Design and Maintenance:
- Design and implement geodatabases for the storage of aerial photographs, maps, digital databases, and collateral source materials, ensuring appropriate data modeling, schema design, and documentation.
 - Manage geodatabase updates, versioning, and archiving.
 - Implement data standards and best practices to ensure consistency and data integrity.
 - Integrate the geodatabase into the Ministry's database.
- e) Project Support and Collaboration:
- Provide technical support and training on Geographic Information Systems (GIS) related tools and techniques to clients or users.
 - Design, program, and model Geographic Information Systems (GIS) applications or procedures.
 - Provide technical input in the operationalization of the Geospatial Unit at the State Department for Energy.
 - Develop computer programming, data analysis, or software development for Geographic Information Systems (GIS) applications, including the maintenance of existing systems or research and development for future enhancements.

- Develop specialized computer software routines, internet-based Geographic Information Systems (GIS) databases, or business applications to customize geographic information.
 - Provide Geospatial information to relevant stakeholders.
 - Collaborate with other stakeholders to integrate GIS data and analysis into larger projects and initiatives.
 - Assist in project planning, scoping, and execution, ensuring GIS requirements are met.
 - Collaborate with stakeholders to understand their mapping needs and provide tailored solutions.
 - Any other duties assigned by the Project Coordinator.
- f) Least – Cost Energy Modelling:
- The GIS consultant should be familiar with open-source geospatial methodologies for electrification planning for universal access. This includes the World Bank supported methodologies – Open-Source Spatial Electrification Tool (OnSSET) and the Energy Access Explorer.
 - Familiarity with GEOSIM, the geospatial electrification planning tool used as input in the Kenya National Electrification Strategy (KNES) for achieving 100% access to electricity in the shortest time frame and at the least cost.
 - Review and provide input on the geospatial aspects of energy modelling.

Duration and location of the Assignment

The duration of the assignment will be three (3) years and will be renewable subject to satisfactory performance and work programme requirements. The Consultant will generally be based in Nairobi (Kenya) at the offices of the State Department for Energy at Kawi Complex. However, the position may involve travels to other counties.

Reporting Requirements and Timelines of Deliverables

The GIS Expert will be expected to deliver the following outputs:

Table 1: Reporting requirements

S/No.	Deliverables/Reports	Timelines after contract commencement	Format of submission
1.	Monthly Report and Monthly Timesheet: Detailed report of GIS activities undertaken, data acquired /processed, analyses performed, issues encountered, proposed solutions, and outputs achieved within the month. It serves as essential support for your service performance and subsequent invoiced payment claims.	Within 7 days after the end of the reporting month	Soft copy
2.	Spatial Analysis Reports: Reports detailing the methodology, results, and interpretation of specific spatial analyses (e.g., site suitability, network analysis, demographic mapping, environmental impact assessment mapping). Includes relevant maps and charts.	within 10 days of completion of each defined analysis component	Soft copy
3.	Metadata Documentation: Creation and provision of comprehensive metadata for all newly created or significantly modified geospatial datasets	Upon completion of each dataset	Soft copy
4.	Training Report: Development of user manuals, training guides, and a report on the conduct and attendance of GIS training sessions for stakeholders involved.	Within 7 days after training completion	Soft copy

Remuneration

The GIS Expert shall be remunerated based on a monthly rate with clearly identified applicable taxes. The GIS Expert will be reimbursed for approved, project-related expenses incurred outside the office. To facilitate this, a detailed statement of expense and all verifiable supporting documentation must be submitted to the Principal Secretary.

Qualifications

1. Bachelor's Degree in GIS, Geospatial Science, Surveying or a related field and certification in fields such as ArcGIS, data science, spatial analytics, and data transformation. A master's degree is a plus
2. Four (4) years of working experience as a GIS Analyst/consultant responsible for, the design, development, deployment, and support of ArcGIS solutions overseeing large-scale geospatial data infrastructures. A minimum of one (1) year demonstrated experience in the energy sector. Additionally, he/she should demonstrate a strong grasp of platform integration.
3. Strong proficiency in setup, configuration, and administration of GIS software, such as ArcGIS Pro, QGIS, or similar tools, with a focus on applications in the energy sector especially in electrification including
4. Experience with data visualization tools such as Tableau, Power BI, Excel, or similar platforms.
5. Familiarity with geospatial methodologies for energy modelling, particularly as an input in the country's least cost electrification strategy.
6. Knowledge of spatial data cleaning, manipulation, transformation, and preparation techniques specific to energy data.
7. Proficiency in geospatial analysis techniques and spatial statistics specifically related to energy.
8. Experience with Geodatabase design and data management, with a focus on energy data.
9. Knowledge of remote sensing techniques, satellite imagery analysis, and image processing techniques relevant to the energy sector.
10. Familiarity with Global Positioning System (GPS) technology and data collection.
11. Knowledge of scripting languages, such as Python or R for automation and analysis.
12. Experience with web mapping technologies and spatial data visualization, specifically in the context of energy, is desirable.
13. The consultant should be experienced in using Google Earth Engine (JavaScript syntax) for geospatial data collection, analysis, and visualization.
14. Familiarity with the World Bank approved, publicly released and published datasets such as those hosted on Data360 and other Bank geospatial platforms.

15. Strong understanding of ArcGIS Pro suites including StoryMaps, web maps and dashboards.

Management and Accountability of the Assignment

The State Department for Energy in the Ministry of Energy and Petroleum is the Client for these services. The Consultant will report on all contractual matters to the Principal Secretary responsible for Energy.

The Principal Secretary will also be responsible for all payments to the consultant. The Consultant will report on all technical matters to the Project Coordinator.

Obligations of the Client

The Client will provide the following support to the Consultant:

- a) Office space, office equipment (shared printer, copier, scanner, computers), stationery, internet access, and transport services for official use in delivery of the services.
- b) All available relevant documentation to the consultant, such as the Project Appraisal Document, Periodic reports, Implementation Manual, etc.
- c) Contacts of key stakeholders.
- d) Facilitate review and dissemination meetings with key stakeholders; and
- e) Facilitate liaison with other program-implementing partners.

Obligations of the Consultant

The consultant is expected to undertake activities that will ensure that outputs are consistent with the professional and legal requirements.

The Consultant shall perform and carry out the tasks with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices.

The Consultant shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Project Coordinator, and shall at all times support and safeguard the Project's legitimate interests in any dealings with the third parties.

The Consultant shall be responsible for the provision of their own transport, accommodation, insurance, communication, and other associated costs.

Confidentiality, Propriety Rights of Client in Reports and Records

All the reports, data, and information developed, collected, or obtained from the implementing agencies, Client, and other Institutions during this exercise shall belong to the Client. No use shall be made of them without prior written authorization from the Client.

At the end of the Services, the Consultant shall relinquish all data, manuals, reports and information (including the database, codes, and related documentation) to the Client and shall make no use of them in any other assignment without prior written authority from the Client.