KGN-GDD-05-2023

EXPRESSION OF INTEREST (EOI) FOR CONSULTANCY SERVICES FOR UNDERTAKING FEASIBILITY STUDY OF THE HYBRID AIR DRY COOLING OF THE GREATER OLKARIA GEOTHERMAL FIELDS.

(Open International)

1. Background.

Kenya Electricity Generating Company Public Liability Company (KenGen) registered under The Companies Act. The Government of the Republic of Kenya owned 70%. The Public owns 30% shareholding as listed on The Nairobi Stock Exchange. KenGen incorporated in 1954 mandated in the development, management and operation of geothermal power plants.

Under Energy Petroleum Regulatory Authority (EPRA) regulation KenGen entered into power plant specific Power Purchase Agreement with Kenya Power and Lighting Company Limited (KPLC). KenGen obtained the ministry of energy licence for geothermal resource exploitation covering 204 km^2 in Naivasha. KenGen produced about 75% of the electricity used in the country, with Geothermal sources contribution of approximately 48 % of the 8442.97 GWh sold during the 2021 financial year from geothermal resources located at Olkaria, NAIVASHA and Eburru, Gilgil with each installed capacity of 796.7 MW and 2.3 MW respectively.

Other electricity generation sources range from hydro, thermal power plants and windmills. KenGen PLC 1,818 MW total installed capacity besides the 96% electricity sales from renewable energy sources: geothermal, wind, and hydro. KenGen's power generation expansion strategy focuses on clean technology. while optimizing the use of existing resources.

Under Vision 2030, the Kenya Government expects to increase the installed power capacity from 2,298 MW to 17,764 MW by the year 2030 so as to meet the estimated 8% per year power demand. Generation from geothermal resources is expected to take a leading role in this initiative to address the increasing power supply-demand imbalance while reducing the carbon emissions associated with conventional power generation.

Pursuant to this, KenGen, together with the Government, plans to increase geothermal power capacity to 1260 MW by the year 2022. KenGen intends to engage consulting services of a qualified and experienced firm for undertaking feasibility study of hybrid air dry cooling focused on the greater Olkaria geothermal fields to ensure cost effective, quality and environmentally sustainable utilization of the proven geothermal resources.

2. Objectives.

To achieve this target, the company seeks to engage the consulting services of reputable firms to carry out detailed feasibility study on hybrid air dry cooling by the incorporation of utilization data that has become available since the last study.
Overall, the objectives of the study are:

1) To review the available chemistry results, operation of steam gathering systems, and power plants besides the existing data (previous study reports, past resource and environmental assessments, status of operations and resource utilization datasets, and any other relevant data

and reports). Advice on the additional data gaps required to carry out successful optimization study. The consultant to indicate their methodology since there is no preferred methodology is adduced.

2) To identify the suitable technology, and location for the design, construction and operation of hybrid dry air cooling tower and condenser with respect to footprint (sizing, and plant layout) requirements and water conservation ratios. Advise on the most suitable optimal project arrangement and configuration.
3) To perform numerical simulation of the hybrid dry air cooling towers to predict condenser performance, power generation output, auxiliary load requirements in response to present and future ambient conditions.
4) To advice on the most optimum cooling towers development for the specific powerplant assigned for simulation including recommendations on sustainable resources utilization scheme with respect to

   (i) Optimum steam efficiency per megawatt Process cycle

   (ii) Optimum output (MW) according to Plant size simulation,

   (iii) Reinjection strategy for the whole field

5) To carry out cost estimation then develop a conceptual design for the cooling tower and associated infrastructure including the retrofitting of the existing power plants per megawatt produced in each generator.

6) To carry out the capital and operational expenditure costs considerations
7) To perform economic and financial analysis for technology choice to implement hybrid dry air cooling tower, and assess performance penalties likely to be incurred as provided for in Power purchase agreement obligation due to the estimated decline percentages in energy production.
8) To carry out Environmental Impact Assessment Study Report of the proposed hybrid air cooling towers.
9) To participate in at least one physical meeting to be held in Kenya and two virtual meetings at scheduled times on the relevant aspects of geothermal development activities, processes and practices relevant to the assignment.
10) To perform technology transfer and capacity building to client's counterpart personnel to assigned to the hybrid dry air cooling project focused on maintenance of internal systems and capacity. Operations Department will be the end user. The approximated number of users is fifty (50) subject to confirmation based on the nature of tools and schemes proposed.

3. Scope of Services

To achieve this target, the company wishes to engage the services of reputable consulting firms to carry out detailed optimization study and reservoir numerical modeling to cover the 204 km^2 Greater Olkaria geothermal field, the study will incorporate new exploration and utilization data that has become available since the last study in the Greater Olkaria geothermal field with the scope detailed below.

1. Review the existing available data on chemistry (past resource and environmental assessments and reports); steam gathering systems, and power plants status of operations and resource utilization datasets, and any other relevant data and reports)
2. Advice on the additional data and studies required to carry out successful optimization study. The consultant to indicate their methodology since there is no preferred methodology.
3. The determination of the optimal capacity, the identification of the suitable technology choices, footprint requirements (sizing, location, and optimum plant layout) and water conservation

ratios as an innovative process in the design, construction and operation of hybrid dry air cooling towers.
4. Perform numerical simulation of the hybrid dry air cooling towers to predict condenser performance, power generation output, auxiliary load requirements in response to present and future ambient conditions.
5. Develop a conceptual design for the hybrid dry air cooling towers and associated infrastructure.
6. Perform economic and financial analysis of proposed development options. Performance penalties likely to be incurred as provided for in Power purchase agreement obligation due to the inefficiency of the system due to the estimated decline percentages in energy production.
7. The capital and operational expenditure costs considerations for technology choice to implement air dry cooling in Olkaria geothermal plants; The cost effectiveness of retrofitting the existing power plants per megawatt produced in each generator. Quantify the performance of the gas extraction system.
8. Environmental Impact Assessment Study Report of the proposed hybrid dry air cooling towers.
9. Participate in at least one physical meetings to be held in Kenya and two virtual meetings at scheduled times on the relevant aspects of geothermal development activities, processes and practices relevant to the assignment.
10. Perform technology transfer and capacity building to the client's counterpart personnel assigned to the hybrid air dry cooling project focused on maintenance of internal systems and capacity. Operations Department will be the end user. The approximated number of users is fifty (50) subject to confirmation based on the nature of the tools and schemes proposed.

4. Documentation Requirements

a) Provide the requirements below;

- Name of firm
- Postal address
- Physical address
- Telephone number
- Email Address
- Contact person

b) Certified copies of company registration certificates/documents to prove legal status in the country of domicile; in addition, where the bidder is a consortium, a signed consortium agreement which must specify the role of each party in the consortium. (Not more than one consortium agreement of the same firm for this EOI will be allowed).

c) Certificate of incorporation (and any certificate of change of name), certified by an authorized representative of the bidder or (as the case may be) the consortium member

d) Certified copies of Memorandum/Articles of Association for all consortium members.

e) Where the Applicant is a consortium, a list of the proposed members of the consortium and the proposed Leader of the consortium. (Attach consortium agreement).

f) All the members of the consortium must meet the EOI requirements

g) Information regarding any current litigation involving the consulting firm certified by a reputable law firm

5. Eligibility Criteria

Apart from the interested parties (firms, experts, or consortium) having no interest in contracts being tendered by KenGen, or in organizations performing work or proposing to work for KenGen. The interested parties (firms, experts, or consortium) should comply with The Public Procurement and Asset Disposal Act 2015 Part X, Clause 130 provisions on conflicting interests. Further, Interested firms, experts or consortia shall meet the following criteria listed below:

a) The bidder must provide two (2) latest annual audited reports by a reputable consultancy firm.
b) Description of management/organization structure, list of key staff relevant to the assignment a with minimum academic qualification of a degree in sciences (environmental; geochemistry), engineering (civil, mechanical, electrical, power), economics, or equivalent;
c) Individual professional experience of the key staff of at least ten years in geothermal resource modelling, assessment, management and power operation, environmental assessment. Their curriculum vitae (CV) including academic, and professional experience must be attached in the bidding document. General qualifications, certification, and Evidence of individual's experience in geothermal related fields (at least 20 years) Copies of certificates submitted should be authenticated according to the expert's country requirement. For example, Certificates for Kenyan experts can be certified by commissioner of oaths.
d) Disclosure of current litigation (if any) involving the consulting parties (firms, experts, or consortium) certified by a reputable law firm.
e) The interested parties (firms, experts, or consortium) should have Five (5) years' experience in geothermal resource modelling, assessment, power project planning and development, environmental assessment. Provide reference letters detailing specific assignments. Attach at least three commendation letters from power utilities developers and/or operators for carrying out similar services. Evidence of three major clients references.
f) Valid tax compliance or equivalent statutory document for international bidders.
g) Evidence of registration as firms, expert, or consortium. The engineers, scientists and other professional should be registered by a professional body as required by the respective jurisdiction.
h) Evidence of transfer of knowledge capability

6. Clarifications

Interested individuals may request for clarification on this Expression of Interest qualification process for up to Seven (7) days before submission date. Any request for clarification must be sent in writing by paper, mail, or electronic mail to:

General Manger, Supply Chain,
Kenya Electricity Generating Company PLC,
9th Floor, Stima Plaza, Phase II, Kolobot Road, Parklands,
P.O. BOX 47936-00100 GPO Nairobi, Kenya
Tel: 254-020-3666204
Email: tenders@kengen.co.ke; **CC:** Ponyango1@kengen.co.ke; pmangi@kengen.co.ke.

7. Submission

Three (3) copies of the prequalification documents shall be submitted clearly marked **ORIGINAL** (1) and **COPY** (2) in separate sealed envelopes. Each envelope should be clearly marked **"KGN-GDD-05-2023- CONFIDENTIAL - EXPRESSION OF INTEREST (EOI) FOR CONSULTANCY SERVICES FOR UNDERTAKING FEASIBILITY STUDY OF THE HYBRID AIR DRY COOLING OF THE GREATER OLKARIA GEOTHERMAL FIELDS"**

The prequalification documents must be delivered by hand or registered mail to:

General Manager, Supply Chain,
Kenya Electricity Generating Company PLC,
9th Floor, KenGen Pension Plaza II,
Kolobot Road, Parklands,
P.O. Box 47936, 00100
NAIROBI

The EOI documents should be dropped at the tender box located on Ground Floor at KenGen, RBS building. Bids that **cannot fit** in the tender box should be submitted to the General Manager - Supply Chain Office located on the 9th Floor KenGen Plaza II **on or before** the submission deadline.

Bidders should submit one **original and Copy (2) copies** of the EOI on or before **14th February 2023 at 1000 hrs**.The EOI will be opened on the same day in public at **1030 hours,** (Kenyan time) at 6th Floor, KenGen Pension Plaza II in the presence of bidders' representatives who choose to attend.

The Expression of Interest can also be viewed and downloaded from our website www.kengen.co.ke

Bidders are advised to be checking the websites from time to time up to seven (7) days before the submission date for any uploaded information through clarification/addendum.

Only firms pre-qualified under this procedure will be invited to submit their Technical and Financial proposals under the Request for Proposals (RFP).

KenGen reserves the right to accept or reject any or all applications without the obligation to assign any reason for the decision. Only individuals pre-qualified under this procedure will be issued with the tender documents and be invited to submit their technical and financial bids under the Request for Proposals (RFP).

GENERAL MANAGER, SUPPLY CHAIN