KenGen

EXPRESSION OF INTEREST (EOI) FOR CONSULTANCY SERVICES FOR FEASIBILITY STUDY ON GEOTHERMAL POWER GENERATION FROM BRINE IN KENGEN OLKARIA FIELD (OPEN INTERNATIONAL)

KGN-BDD-002-2024

1.0 General Information

Kenya Electricity Generating Company PLC (KenGen) is the leading power generating company in Kenya with an installed capacity of 1,904MW comprising of Hydropower (825.69MW), Geothermal (799MW), Thermal (253.5MW) and Wind (25.5MW). The Company's strategy is to increase its generation capacity through renewable energy sources that include optimisation of existing renewable resources in Geothermal and Hydro.

In Olkaria geothermal field, KenGen has drilled over 180 production wells. The wells produce two phase geothermal fluid that is separated into steam and brine. In total, the production wells connected to the existing power plants produce over 4,000 tonnes per hour of brine at separation pressures of between 6 and 12 bars and corresponding temperatures of between 158^0C and 188^0C. The separated brine from the interconnected wells is then re-injected while still at high temperatures (>160°C). KenGen intends to utilize this considerable amount of heat energy in the separated brine for additional power generation using binary technology.

In addition, there are a number of production wells that have been drilled but have not been utilised in the single flash condensing power plants because of their low pressure, long distances to the existing power plants, low enthalpy, and cyclic characteristics of some of the wells. Part of the scope of the study shall involve evaluation of these wells for potential use with the brine for power generation.

It is in view of the above that KenGen wishes to engage a consultant to carry out a detailed examination and study of the brine production from Olkaria fields, analyse the physical quality and quantity of the brine for reinjection, recommend most favourable wells for reinjection and advise on the additional power generation possible from the brine by use of Binary technology and further advise on the potential chemical, technical and economic constraints plus options.

The successful applicants must have proven technical capabilities and a proven track record in carrying out feasibility studies and operation of binary power plants. The study is expected to take 6 months.

2.0 Objectives of the feasibility study

The main objective of this feasibility study is to assess the technical, economic, environmental, and financial viability of power generation from brine and feasible un-utilized wells within the Olkaria Geothermal field.

3.0 Scope of Work

The scope of the consultancy for the project is comprised of but not be limited to the following:

i. To assess the wells production data from the Olkaria Geothermal field concessional to KenGen.

ii. To analyse the quantity and quality (physical and chemical parameters) of the brine produced from the production wells within KenGen's Olkaria field and determine the available temperature range that can be further utilized without precipitation of silica;

iii. To analyse the available geothermal fluid from all the wells and its characteristics including the physical and chemical properties; and assess the possibility of connecting them to the proposed binary plants utilising brine from the wells taking into account the distances and possibility of modular brine generation stations from the existing brine gathering systems and fluid separation stations.

iv. Review existing binary technologies and recommend the most appropriate plant sizes, technology and location.

v. To analyse the quantities of brine to determine the minimum generation potential using modern binary generation technologies;

vi. To identify the development strategy that best matches the brine parameters and the reservoir response for long term exploitation of the field;

vii. To advise KenGen on the eventual disposal of the brine after utilization at the binary plants and the expected impacts on the reservoirs with respect to selection of reinjection points and potential scaling in the disposal pipelines and re-injection well bores;

viii. To provide a selection criterion for the reinjection points and recommend a reinjection strategy that will ensure sustainability and recommend any treatment required for economically managing silica scaling.

ix. Propose an optimum exit temperature that will avoid chemical brine treatment before re-injection.

x. To recommend the optimum development of the field, the location and sizes of the binary power plants to be installed, centralised operation system for the plants, and the development sequence;

xi. To prepare cost estimates of proposed binary power plants and binary transmission lines as well as substations required to connect the power to the national grid;

xii. To carry out ESIA for the recommended power plant sites;

xiii. To carry out a conceptual design for the recommended option of the power plants including power evacuation and grid connection;

xiv. To carry out geotechnical and topographical survey of the proposed project;

xv. To prepare economic and financial analysis of proposed binary plants and recommended development options; This shall include deriving the LCOE and the proposed tariff;

4.0 Evaluation Criteria

Interested consultants must provide information and documentations indicating that they are qualified to successfully undertake the feasibility study. Shortlisting of consultants will be based on the following:

(i) Provide the requirements below;

- Name of firm
- Postal address
- Physical address
- Telephone number
- Email Address
- Authorized representatives' names (s) and position(s)

(ii) 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;

(iii) Certified copies of Memorandum / Articles of Association;

(iv) Financial Statements for the last 3 years including Tax registration and Tax compliance certificates or equivalent documents applicable in the bidder's Country of origin. (For consortium arrangements, each member must meet the requirements);

(v) List of consultancy services on Geothermal Feasibility studies, power plant design assignments in geothermal, and any feasibility study for a brown field geothermal power plant carried out in the last 15 years. Including a brief description of the study (scale and scope) and the status of the projects;

(vi) A list of Geothermal projects in which the bidder has experience in operating and maintaining;

(vii) Where the Applicant is a consortium, a list of the proposed members of the consortium and the proposed Leader of the consortium and the roles of each member.

(viii) Demonstrate at least 15 years' experience in consulting services for geothermal binary feasibility studies of at least 10MW;

(ix) Demonstrate at least 15 years' experience in designing of geothermal binary power plants;

(x) Demonstrate experience in geothermal power generation using brine/two phase fluids;

(xi) Demonstrate comprehensive and proven knowledge of Geothermal Binary Power Plants operations;

(xii) Additional experience in a feasibility study for a brown field geothermal power plant will be an added advantage;

(xiii) In addition to the firms experience, a list of proposed professional staff and disciplines expected to take part in the feasibility study, including but not limited to a Power systems Engineer ,Power plant engineer, - Mechanical Engineer, Civil & Structural Engineers, Geothermal experts including a Geothermal steam field expert, Geothermal Reservoir Expert and geochemist all who must have a minimum of fifteen(15) years relevant working experience each, Geotechnical and Topographical surveyor, Environmental and Social scientist, Financial/Economic analyst all with a minimum of fifteen (15) years relevant experience and a Team Leader, with a minimum of fifteen (15) years' experience in project management, design, construction and operation of Geothermal binary power plants and Feasibility studies on binary plants

(xiv) Must have at least one operational grid connected binary technology geothermal power plant of not less than 10MW and in operation for not less than 10 years based on their feasibility study

(xv) Demonstrate a strong financial status by positive cash flows, minimum average annual turnover of over USD 3 Million and profitability for at least 3 years.

5.0 CLARIFICATIONS

The interested parties may request for clarifications on this Expression of Interest up to ten (10) days before the EOI submission date. Any request for clarification must be sent in writing by paper mail, or electronic mail to:

General Manager, Supply Chain Management,
Kenya Electricity Generating Company PLC,
RBS PENSION PLAZA 1, Kolobot Road, Parklands,
P.O. Box 47936 – 00100,
Nairobi, Kenya.

Tel: +254-20-3666427
Email: tenders@kengen.co.ke;
CC: fkamanja@kengen.co.ke; fmakhanu@kengen.co.ke; hnganga@kengen.co.ke;

6.0 EoI SUBMISSION

The EOI documents made in English must be received in a plain sealed envelope on or before **28th February, 2024 at 1400hrs East African Time** and delivered or registered to:

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

Information on the outer envelope should also include: "**KGN-BDD-002-2024- EXPRESSION OF INTEREST (EOI) FOR CONSULTANCY SERVICES FOR FEASIBILITY STUDY ON GEOTHERMAL POWER GENERATION FROM BRINE IN KENGEN OLKARIA FIELD'** Do not open before **28th February, 2024 at 1400hrs East African Time**."

Bidders should submit **one original and 2 (two) Copies** of the EOI

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's Office located on the 9th Floor KenGen RBS Building on or before the submission deadline. The EOI will be opened on the same day in public at **1430hrs East African Time** at KenGen RBS Building, 6th Floor 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 website from time to time up to Seven (7) days before 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 issued with the Request for Proposal (RFP) and be invited to submit their technical and financial proposal.

GENERAL MANAGER, SUPPLY CHAIN MANAGEMENT