

Ministry of New and Renewable Energy
Geo-thermal Energy Division

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113/ 37/ 2011-NT

02.09.2011

To

1. Concerned State Nodal Agencies for harnessing geo-thermal energy in India.
2. Members of the Committee and Invitees for formulation of Approach for harnessing geo-thermal technology demonstration projects in India, constituted by MNRE.

Subject: Guidelines for Implementation of R&D-cum-Technology Demonstration and Resource Validation Multi-purpose Project for Power and Energy Generation from Geo-thermal Energy Resources in India.

For harnessing geo-thermal energy in the country the Ministry of New and Renewable Energy has been supporting R&D and exploration activities and efforts during last over 25 years. This includes formation of Expert Group, Working Group, Core Group and Committees in addition to providing financial support for such projects. Recently a Committee was constituted for formulation of Approach for harnessing geo-thermal technology demonstration projects in India in the month of June, 2011 on the request of implementing agencies. The Committee has prepared guidelines to invite 'Request for Proposals (RFP)/ Bids' for taking up R&D-cum-technology demonstration and resource validation multi-purpose projects for power and energy generation from geo-thermal resources in the country and the same is given in **Appendix – I**.

2. All the concerned State Nodal Agencies for harnessing geo-thermal energy in the country and Members of the said Committee and Invitees for formulation of Approach for harnessing geo-thermal technology demonstration projects in India, constituted by MNRE, are requested to peruse these guidelines and offer comments, if any, for developing such projects in the geo-thermal potential areas of their State. The comments may be sent through e-mail latest by 12th September 2011 at e-mail id: shuklaar@nic.in, rnsawant@nic.in.

(Dr. A. R. Shukla)
Adviser (Geo-thermal)

GUIDELINES

FOR

IMPLEMENTATION

OF

**R & D-CUM-TECHNOLOGY DEMONSTRATION
AND RESOURCE VALIDATION MULTI-
PURPOSE PROJECT FOR POWER AND ENERGY
GENERATION FROM GEO-THERMAL ENERGY
RESOURCES IN INDIA**

**GEO-THERMAL ENERGY DIVISION
MINISTRY OF NEW & RENEWABLE ENERGY
GOVERNMENT OF INDIA**

I. INTRODUCTION

1. At present geothermal energy is used for power generation and other non-electrical utilization such as district heating, green house cultivation and other possible uses globally. The world-wide power generation using geothermal energy at present is about 10,000 MW out of which most of the power generation capacity by geothermal energy is in USA, Philippines, Mexico, Italy, Japan, New Zealand and Indonesia.

2. There are about 340 'hot springs' spread over different parts of India. The temperatures of these springs vary from just over 50°C in excess of the mean ambient temperature (15°C – 30°C) of the area to the boiling point of water at the altitudes of their occurrence. In most of the geothermal fields of India, surface and sub-surface studies such as geological, geophysical, geochemical and shallow drilling in some geothermal field has been carried out. Recently MT survey (latest geophysical technology for measuring low resistivity areas) was conducted by NGRI Hyderabad at Puga, Tattapani and other geothermal fields. These studies show that two most promising geothermal fields in India are Puga geothermal field in Ladakh and Tattapani geothermal field in Chhattisgarh. Studies reveal the presence of about 10,000 MW potential of geothermal energy in India under these hot spring areas and its thermal energy can be exploited for different geothermal applications like power generation and direct uses at Puga and Tattapani and other non-electrical utilizations such as space heating and green house heating etc. in other geothermal fields keeping in view the local needs.

3. Technical support for installation of geothermal power plant and direct utilization projects at Puga geothermal field in Ladakh, Tattapani geothermal field in Chhattisgarh and other geothermal fields can be sought from the countries developing the geothermal field by single flash system, double flash system and using binary cycle for low temperature field. The demonstration projects for direct utilization of the out flowing fluid, after generating the power for different applications have also been taken up in some countries.

4. Looking at the available temperature ranges of geothermal fluid at different locations in India it is economical to set up multi-purpose projects for heating, cooling, power generation, green house cultivation, health and chemical extraction instead of power generation alone.

5. A Mile or deeper wells can be drilled into underground reservoirs to tap steam and very hot water that drive turbines that drive electricity generators. Globally four types of power plants are operating today:

- i. Flashed Steam Plants - The water "flash" boils and the steam is used to turn turbines.
- ii. Dry Steam Plants - These plants rely on the natural steam that comes from the underground reservoirs to generate electricity.

- iii. Binary Power Plants – These plants use the water to heat a “secondary liquid” which vaporizes and turns the turbines. The vaporized liquid is then condensed and reused.
- iv. Hybrid Power Plants – In these plants binary and flash techniques are utilized simultaneously.

6. Geo-thermal heat pump technology is used for space heating and cooling. The technology for power generation and application of direct utilization keeping in view the local requirements may be decided after deep drilling based on measurement of flow, temperature, pressure and steam water ratio of the geothermal fluid yielding from the boreholes.

II. ACTIVITIES TAKEN UP IN GEO-THERMAL ENERGY

1. The presence of geothermal energy in India continent is known since prehistoric times of which thermal springs of Tattapani, Puga Valley (Ladakh), Manikaran (Manali) are often quoted. Ministry of New and Renewable Energy has been continuously supporting projects in geothermal energy through various organizations in the country including GSI, NGRI, ONGC, NTPC, NHPC, SNAs and other others during last 25 years. A R&D project for geothermal based cold storage and power generation was taken up in Manikaran which was damaged due to landslide and is no more in existence.

2. These agencies have been working in the field of geothermal energy in India but most of the efforts have been primarily of R&D in nature. In a recent study on geothermal energy south Cambay basin has also been identified as priority area.

3. Some of the private companies like M/s Thermax, M/s Tata Power, M/s Bhilwara Energy Ltd., M/s Avin Energy Systems, M/s Geo-syndicate, M/s Hindustan Turbomachinery Limited and others along with their international collaborators have also shown interest and engaging with the concerned State government agencies in Andhra Pradesh, Chhattisgarh, Gujarat, Jammu & Kashmir, Maharashtra, Uttarakhand and others.

4. A project for harnessing geo-thermal energy in Chhattisgarh was tendered. However, as suitable offers were not received the project could not be implemented. Another project for harnessing geo-thermal energy in Puga (Jammu & Kashmir) has been generated. NGRI has carried out magneto-telluric (MT) studies in Himachal Pradesh, Uttarakhand, Jharkhand and some of the potential states of the country. A project has been received from NGRI for conducting MT studies in the remaining potential States, namely Andhra Pradesh and Odisha.

5. The strength of geo-thermal energy is that it provides firm energy and fits in well with energy hungry and ready market. It is a green energy with minimal environmental impact and almost infinite energy source with minimal exploration risk. There is a need to harness large geothermal provinces and 350 geothermal energy locations identified in the country. Although, there is an estimated large resource base of over 10,000 MW and there is a shortage of all forms of energy, some geothermal provinces are logistically difficult and restricted due to confined zones and occurrence and there is a lack of suitable technology, serious project executors and source of funding, even for pilot projects are also constrained. It is, therefore, there is need for concrete action plan and sustain policy support from Central as well as State government for harnessing geothermal energy similar to oil sector and hydro power projects. Technologies for assessment and exploitation also need to be imbibed and serious efforts are required to be made for making available trained manpower in the area of geo-thermal energy.

III. ACTIVITIES BEING UNDER TAKEN BY THE MINISTRY OF NEW AND RENEWABLE ENERGY

For harnessing geo-thermal energy in the country in a meaningful and time bound manner the Ministry has under taken a number of consultations with various stake holders including State Nodal Agencies, R&D Institutions, concerned Central Government Organizations, Experts and Potential Project Promoters/ Executers. As a result of these consultations the Ministry has received following recommendations:

- i. A dedicated central public sector company for harnessing geo-thermal energy may be formed for harnessing geo-thermal energy may be formed by MNRE in association with ONGC as exploration research and drilling expertise is required.
- ii. Directorate of Geo-thermal Energy like Directorate of Hydrocarbons may be formed for allotment of blocks to attract private sector investments.
- iii. Allotment of geo-thermal blocks may be done like oil blocks.
- iv. A model document and guidelines may be prepared for inviting bids for setting up geo-thermal energy R&D-cum-technology demonstration pilot projects in various States.
- v. A few boreholes in the known areas of geothermal activity may be drilled in consultation with NGRI, who have developed a technique to identify geothermal energy source through analysis of MT data.
- vi. Technology induction from world leaders.

- vii. Assess the technical feasibility of exploiting geothermal energy the identified area(s) i.e. Puga valley, Tattapani, Manikaran, Sohna and other areas.
- viii. Identify other areas/ locales in consultation with NGRI and GSI through deep drilling multipurpose projects of appropriate capacity of geo-thermal energy generation and utilization may be set up.
- ix. Upto 50% of cost of projects may be provided to private sector projects and upto 75% to public sector company projects.
- x. R&D projects may be taken up in accordance with R&D Policy of the Ministry.
- xi. Previous studies carried out at various work centers may be re-looked and collaborate with GSI and other Indian agencies working in this area and world leaders working in Geo-thermal energy
- xii. One multi-purpose pilot demonstration projects may be taken up in all the potential States of the country.
- xiii. Funding of drilling geo-thermal wells and carrying out studies on the usage of these waters (heating, power generation, mineral extraction, etc.) may be supported by a Corporate R&D fund which may be administered by MNRE.
- xiv. Joint studies are to be carried out by different agencies like ONGC, GSI, NGRI, NTPC, etc. Quantum of funding may be firmed up on case specific basis.

2. In view of the above recommendations the Ministry proposes to take up R&D projects in the following areas:

- i. Hard-rock and geothermal geology – understanding the disposition of older strata and locales of high geothermal gradients that could have geothermal potential.
- ii. Application of Techniques like MT and radiometric methods for identification of sweet spots.
- iii. Remote sensing other techniques and technologies that may aid mapping of geothermal zones.
- iv. Feasibility of drilling and design of deep wells in high geothermal gradients.
- v. Engineering of pilot programmes for harnessing geothermal energy.
- vi. Design and efficiency of turbines and power generators for local applications.
- vii. Any other relevant area.

3. A model document and guidelines has been prepared for inviting bids for setting up geo-thermal energy R&D-cum-technology demonstration pilot projects in various States and enclosed at **Annexure – I**.
4. The Ministry of New and Renewable Energy will be considering multi-purpose geo-thermal energy projects for harnessing geo-thermal energy in the country so as to take up at least one such project in all the potential States in accordance with the R&D Policy guidelines of the Ministry (available on website at address <http://mnre.gov.in>) and provide financial support upto 50% of cost of projects, including private sector projects for harnessing geo-thermal energy in the country. The R&D projects under taken through government institutions and organizations would be provided a financial support upto 100% in accordance with the R&D Policy guidelines of the Ministry.
5. Action on other recommendations as mentioned in heading no. III above are proposed to be taken over a period of time in consultation with SNAs and other stake holders.
6. The Ministry of New and Renewable Energy would provide these supports to this sector as country is in a situation of energy starved economy that is largely dependent upon imports for meeting its energy needs geothermal energy needs geothermal energy has the potential of changing the energy scenario. With an estimated 10,000 MW potential, the opportunity of setting up geothermal energy based power generation simultaneously in several parts of the country is gigantic. The geothermal energy can not only cater to the local needs of remote areas through small-scale power generation but also feed the industry on a larger scale.

REQUEST FOR PROPOSALS/ BID DOCUMENT

FOR

**R & D-CUM-TECHNOLOGY DEMONSTRATION
AND RESOURCE VALIDATION MULTI-PURPOSE
PROJECT FOR POWER AND ENERGY
GENERATION FROM GEO-THERMAL ENERGY
RESOURCES IN INDIA**

**GEO-THERMAL ENERGY DIVISION
MINISTRY OF NEW & RENEWABLE ENERGY
GOVERNMENT OF INDIA**

Request for Proposals (RFP)/ Invitation of Bids

Proposals are invited (sealed bids - One Original plus Two Photocopies marking Technical Bid and Financial Bid) under "One Drop Two Covers System" for the work given below:

Description	REQUEST FOR PROPOSAL FOR R & D-CUM-TECHNOLOGY DEMONSTRATION AND RESOURCE VALIDATION MULTI-PURPOSE PROJECT FOR POWER AND ENERGY GENERATION FROM GEOTHERMAL ENERGY RESOURCES IN INDIA UNDER (Name of the scheme and support level) AT (Name of the site/ area, District, State)
NIB/NIT No.	
Earnest Money Deposit	(2-5% of the estimated cost)
Last Date and Place for Submission of Bid	
Date and Place of Opening of Technical Proposal (Technical	
Validity of Offer	180 Days from the Date of Opening
Method of Submission of Bid	"One Drop Two Covers System"
Bid Copies to be Furnished	"One Original plus Two Photocopies" of each of the Technical Bid and Financial Bid
Place of Sale of Bid Document	
Pre - Bid Conference	Intimation regarding the Pre-Bid Meeting is to be issued
Cost of Bid Document	Free of charge available on website at address:
Date of Sale of the Bid Document	
Date and Time of Closing the Sale of the Bid Document	
Who Can Apply	<ol style="list-style-type: none"> 1. Public or Private Limited Companies, registered in India, which are financially sound and legally competent to enter in to contracts as per prevailing laws 2. Consortium of Companies, with not more than 3 partners, and lead partner being a Company registered
Minimum Eligibility Criterion for Financial Capability	<u>The Company or the Lead Partner of the Consortium of Companies should have an average annual turnover during the three previous Financial Years (2008 – 2009 to 2010 – 2011) of not less than Rupees Five Hundred Crore.</u>

<p>Minimum Eligibility Criterion for Technical Capability</p>	<ol style="list-style-type: none"> 1. The Company or Consortium Partner / Partners or the Team identified by the Company / Consortium to take up the work, as implied in this RFP document, should have at least 5 years experience in surface and subsurface geothermal exploration techniques. 2. Bidders / team identified by Company / Consortium should also have adequate demonstrable experience in planning and designing geothermal production wells and drilling to depth of about 2000 m. 3. Bidders / team identified by Company / Consortium should have experience in designing and installation of a geothermal power plant of a capacity of not less than 30 MW or at least 3 geothermal plants of 5 to 10 MW capacity during last 10 years. 4. Bidders / team identified by Company / Consortium should have experience in waste / low grade heat management and utilization schemes 5. Experience in taking up/completing R&D/ Technology Demonstration Projects in Public-
<p>Minimum Technical Score Required to Qualify</p>	<p>60 out of 100</p>
<p>Formula for Determining the Financial Score (Sf)</p>	<p>$Sf = 100 \times (\text{Lowest Bid} / \text{Quoted Bid})$</p>
<p>Weightage to Technical Proposal Score</p>	<p>70 %</p>
<p>Weightage to Financial Proposal Score</p>	<p>30 %</p>
<p>Formula for Determining the Final Score (S) for Selection of the Bidder</p>	<p>QCBS Selection: $S (\text{Final Score}) = [(St \times 0.70) + (Sf \times 0.30)]$ Where, <u>St = Score on Technical Proposal and</u> <u>Sf = Score on Financial Proposal</u></p>
<p>Contract Performance Guarantee (CPG) or Security</p>	<p>Successful Bidder shall provide to (Name of State Agency) a Contract Performance Guarantee of Rupees..... (5-10% of estimated cost of the Project) in the form of a Bank Guarantee</p>

SECTION - I

INFORMATION FOR BIDDERS

1.1 GENERAL

For and on behalf of his Excellency the Governor ofState. (Name of the State Agency)..... invites sealed bids in triplicate (One original and two photo copies marking “Technical Bid” and “Financial Bid”) through "One Drop Two Cover System" in the form of a Request for Proposal (RFP) from Public or Private Limited Companies, registered in India, or Consortium of Companies (with lead partner being a Company registered in India) for installing a R&D-cum-technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources in India under(name of the scheme and support level) at (name of the site/ area, district, State).

Developer selected through this competitive bidding process for the installation of a R&D-cum-Technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources in India may be considered for up to 50 % funding of the Project Cost by MNRE for execution of the Project under Public-Private-Partnership mode in accordance with existing Rules and subject to fulfilling Terms and Conditions as laid down by (Name of Central and State Govt./ agency) in this regard.

Last date for bid submission is xx – xx - 2011 at 14.00 hrs.

1.2 BACKGROUND INFORMATION

As a result of decades of studies, surveys and research by various organizations, such as, GSI, NGRI, CEA, ONGC and MNRE, initiated in 1973, it has been unequivocally proved that geothermal area, located in area/ District of, is one of the promising geothermal area in the country from the point of view of power and energy generation.

There is, however, no consensus on the likely power generation potential of this geothermal area. Information/ Report of the MNRE/ GSI/ Others, submitted in, has reproduced the data from a study by for their clients inferring with 90% probability that Geothermal Field may sustain a MW Geothermal Power Plant for a period of years.

Various studies carried out till date and the MNRE/ GSI/ Others have clearly brought out that in spite of the suggested potential of Geothermal Field, there is complete lack of reliable resource evaluation data. There is a consensus of expert opinions that deep drilling to at least 2000 m (or more) is the only way the potential of the resource may be ascertained for the optimum development of the resource.

In a number of meetings with officials of MNRE / Experts it was realized that paucity of deep drilling and resource evaluation data made it difficult to conceive full capacity development of the Geothermal Field, located in one of the most power-starved regions of the country. (Name of the State Agency), therefore, in its capacity as the State Nodal Agency for the Development of Geothermal Resource, took a decision in consultation with the Ministry of New & Renewable Energy (MNRE), Government of India, to select a developer through competitive bidding for installing aMW R&D-cum-technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources at this site.

It is the considered opinion of (Name of the State Agency) that resource validation/ evaluation data collected during the execution of the MW R&D-cum-technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources at, to be presented in the form of a DPR to (Name of the State Agency), after the commissioning of the plant, shall pave the way for the full-scale development of Geothermal Resource in the State.

→(The Background Information on the Geothermal Prospect of the State should consist of following information:

1. Agencies which have carried out earlier studies – whether feasibility studies have been carried out
2. Background geological, geophysical and geochemical information available
3. Information on available subsurface data
4. Information on resource evaluation, if available
5. Demographic Information of the area
6. Power Demand – Supply scenario in the area
7. Possible applications of geothermal energy – electrical and off grid applications
8. Other relevant information

→)

1.3 OBJECTIVES IN BRIEF

The work proposed to be undertaken through this RFP has following objectives in brief.

1. Installation of Geothermal multi-purpose power and energy generation plant at Technology Demonstration scale at, District, has been conceived with an objective to obtain baseline information on Geothermal Project Development which may be of great use for planning harnessing of geothermal resources in region in state and

other parts of the country.

2. Any additional surface studies or geophysical surveys as considered necessary by the selected Developer with an objective to acquire additional data for further understanding the geothermal resource
3. Subsurface studies in Geothermal Field by way of carrying out deep drilling to about 2000 m (or more) in at least one well with an objective to ascertain the existence and viability of the deep reservoir
4. Wellhead studies and other measurements, including logging and testing of wells are to be carried out with an objective to understand the sustainability of thermal discharge for power generation and other possible applications.
5. Resource evaluation studies with an objective to know the potential of the geothermal field from the point of view of optimum power generation and understand the long term behavior of the geothermal system under conditions of optimum power generation
6. Installation of aMW Technology Demonstration Geothermal Power and Energy Generation Plant using appropriate technology.
7. Evacuation of power and transmission to the nearest load centre, which in all likelihood would be, located about Km (by road/ rail) from Generating Station at
8. Experimental / Demonstration scale off – grid applications, such as, space heating, greenhouse cultivation and creation of recreational facilities (hot water pond / lagoon)
9. Data generated during execution and implementation of the Project to be shared at all stages with the State Government ofand Government of India for use in Public Interest for developing other geothermal resources of the State of / India.
10. Submission of a Detailed Project Report to(Name of the State Agency)/ MNRE for facilitating the optimum capacity development of Geothermal Field and for application in geothermal development programmes in other parts of the state / country
11. The said DPR should also address aspects of the viability of commercial scale waste heat management / utilization from the point of view of down-the-line (off grid) applications of geothermal energy which may be beneficial for the region, in particular, and the State, in general, in terms of societal benefits and generation of employment.

1.4 COST OF BID DOCUMENT (NON-REFUNDABLE)

S. No.	Description	Cost
1	If Obtained in Person	Rs..... /-
2	If Required to be Sent by Post	DD of Rs..... plus Rs. for postal / courier charges

1.5 EARNEST MONEY DEPOSIT

- **Earnest Money Deposit (EMD) shall be Rs./-.** Intending bidders should pay EMD as specified in Invitation for Bid. Bids without EMD will be summarily rejected.
- EMD shall be made payable without any precondition. The EMD of all the bidders except that of the successful bidder will be returned after the acceptance and award of the contract. No claim for interest will be payable on the above EMD remitted by the bidder.

1.6 SCHEDULE FOR RECEIPT AND OPENING OF BIDS

Date of commencement of Sale of Bid Documents
Date and time for closing the Sale of Bid Documents
Last date and time for Receipt of Bids
Date and time for opening of Bids (Technical Bids)

If the last day for sale / submission of bid happens to be a holiday, the next working day will be the last day for sale / submission of bids.

1.7 SALE OF BID DICUMENT

Bid documents can be obtained from the Corporate Office of (Name and Address of the State Agency) by remitting the cost either by Cash / Banker's Cheque or Crossed Demand Draft drawn in favour of DG/ MD/ Director/ General Manager (.....),(Name and Address of the State Agency), payable at noting the NIT Number and sending the receipt to the designation of the recipient organization with a requisition furnishing the complete postal address, telephone numbers, fax numbers and E-mail. Please note that cheques / money order or any other mode of payment will not be

accepted.

The Corporation will not be responsible for any delay or loss of document sent by post or courier.

1.8 SUBMISSION OF BID DOCUMENTS

Submission of bids shall be under Two Parts Tender System and should be furnished in sealed covers. Two separate sealed covers marked "Cover A" — (Technical Proposal / Bid) and "'Cover B"- (Price Bid) shall be put in a Sealed Outer Cover marked in bold letters [Title of the Project]

- Proof towards Earnest Money Deposit may be placed either in the outer cover or in Cover A.
- The offer should be addressed to the (Head of organization and address). **It would, however, be preferred if the offers are submitted to the said office on or before the due date and time specified above.**

1.9 OPENING OF BIDS

- 1.9.1** Bids will be opened in the Office of the (Name and Address of State Agency), on the due date and time prescribed, in the presence of such of those bidders who may desire to be present. If the due date for bid opening happens to be a holiday, the bids will be opened on the next working day.
- 1.9.2** The individuals attending opening of bids should be duly authorized by the participating firms in the bid.
- 1.9.3** The outer cover and Cover-A will only be opened at the time notified for opening. At the time of opening the bids, any offer which does not satisfy the EMD conditions will not be read out. If the bidder indicates the price in Cover - A, the bid will not be read out and will be rejected.
- 1.9.4** The Bid will be received up to the time and date mentioned in the 'Notice Inviting Bid'. The Bids received after the due date will not be entertained.
- 1.9.5** Cover B shall not be opened at the time of opening of Cover A, but will be authenticated on the covers by the officers authorized to open the bids.
- 1.9.6** The Bid Qualification Requirement details submitted by the bidders will be analyzed based on the details furnished by them and Cover B of those succeeded in the analysis, only will be opened. The Cover B of those not succeeded will be returned to the bidders unopened.
- 1.9.7** Analysis and Evaluation of Technical Bids would be carried out in a transparent way and may take some time as it is proposed to be carried out with the help of experts in the field and consultants. Technical

Qualification details and Technical Bid contained in Cover A would be opened and Bidders / Representative would be asked to authenticate the completeness of the documents submitted by them. Giving some margin (about a week or so) for the meeting of experts/consultants for the evaluation of the Technical Proposal / Bid, Bidders / Representatives would be asked to assemble again to be informed about the recommendations of the Technical Proposal Evaluation Committee. Details about this procedure and other aspects related to Technical Qualification would be discussed in the Pre-Bid Meeting.

1.9.8 The due date and time of opening of Cover-B shall be intimated separately or at the time of the reading out the recommendations of the Technical Proposal Evaluation Committee.

2.1 PRICES

Bids shall quote FIRM Price only.

The quoted price should be for [Title of the Project]

The Project Cost, which would be the part of the Financial Proposal, should consist of heads, such as:

- Investigation
- Land and Civil Work
- Drilling and Related Activities
- Generation Plant and Equipment
- Transformers and Substations
- Power Evacuation and Transmission
- Miscellaneous Expenditures, Consultancy Charges, Indirect Charges, Unforeseen and Contingency Expenses
- Expenses likely to be incurred in carrying out Waste Heat Management / Utilization Experiments.

The criteria for evaluation of Price Bids would be “PER MW COST OF POWER GENERATION FROM THE PROPOSED PROJECT”

2.2 VALIDITY OF BIDS

Bids should be valid for acceptance for a period of one hundred and eighty (180) days from the date of bid opening.

In exceptional circumstances, the Client may solicit the bidder's consent to an extension of the period of the validity.

2.3 FORCE MAJEURE

2.4 SUSPENSION

2.5 TERMINATION

2.6 OBLIGATIONS OF THE DEVELOPER

The Developer shall perform the services and carry out their obligations hereunder with all due diligence, in accordance with generally accepted techniques and methodologies used in geothermal project development programmes. The Developer shall always act in respect of any matter relating to this Contract or to the services with faith and trust towards the Client.

2.6.1 Law Governing Services

2.6.2 Confidentiality

2.6.3 Documents Prepared by the Developer to be the Property of the Client

2.7 CONTRACT PERFORMANCE GUARANTEE (CPG)

- The successful bidder will have to furnish a Contract Performance Guarantee (CPG) of Rupees One Crore only in the form of a Irrevocable Bank Guarantee for due and faithful performance of its obligations towards the Client in accordance with the terms and conditions specified in the Contract and in the Tender/Bid Specification, which may be obtained from any Nationalized Bank / Scheduled Bank of India or any reputed Foreign Bank having branches in
- The above Irrevocable Bank Guarantee shall be furnished within 21 days from the date of issuance of Letter of Intent failing which the EMD paid by the bidder would be forfeited besides cancellation of Contract.
- The Bank Guarantee shall be kept valid till successful completion of the contract, after which it will be returned to the Developer.
- If the Client incurs any loss or damage on account of breach of any clause mentioned above or any other cause arising out of the Contract that becomes payable by the Developer to the Client then the Client will in addition to such other rights that he may have, under law, appropriate the whole or part of the Contract Performance Guarantee and such amount that is appropriated will not be refunded to the Developer.

2.8 APPLICABLE LAW

2.9 JURISDICTION FOR LEGAL PROCEEDINGS

2.10 ARBITRATION

2.11 REJECTION OF TENDERS

2.12 THE CLIENT RESERVES THE RIGHT

- a) Not to accept the lowest or any Bid
- b) To reject any or all the Bids without assigning any reasons thereof
- c) To relax or waive off any of the conditions stipulated in the NIT as deemed necessary in the best interest of the Client for good and sufficient reasons
- d) To revise the quantum of works / completion period of work of any or all the items covered by their bid during the pendency of contract and to terminate the contract in between the agreed stipulated period

2.13 CORRUPT OR FRAUDULENT PRACTICES

SECTION-II

TERMS OF REFERENCE FOR REQUEST FOR PROPOSAL (RFP) FOR A MW R&D-CUM-TECHNOLOGY DEMONSTRATION AND RESOURCE VALIDATION MULTI-PURPOSE PROJECT FOR POWER AND ENERGY GENERATION FROM GEO- THERMAL ENERGY RESOURCES AT, DISTRICT,

3. BACKGROUND

4. SUMMARY OF AVAILABLE SCIENTIFIC DATA

- Geographical Studies
.....
.....
- Geological Studies
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.....
- Geophysical Studies
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.....
.....
- Geochemical Studies
.....
.....
- Chemistry of Thermal Discharge
.....
.....

(As Available through MNRE/ SNAs/ GSI/ NGRI/ ONGC and other sources)

5. OBJECTIVES

The work proposed to be undertaken through this RFP has following objectives in brief.

- Installation of Geothermal Power Plant at Technology Demonstration scale at
....., District, has been conceived with an objective to obtain
baseline information on Geothermal Project Development which may be of great
use for planning harnessing of geothermal resources in region in
state and other parts of the country. The Detailed Project Report to be generated

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after the successful completion of the Project should address all the problems and parameters specifically relevant to future Geothermal Development Programs in the State of, in particular, and the country, in general.

- Wealth of geological, geophysical, geochemical and shallow subsurface data is available for Geothermal Field. Any additional surface studies or geophysical surveys as considered necessary by the selected Developer may, however, be carried out with an objective to acquire additional data for further understanding the geothermal resource.
- Latest technologies for mud engineering, blow out prevention and wellhead assemblies are to be deployed for hassle-free and time-bound execution of the Project. As per the provisions of Clause – 6, equipments have to be deployed and observations have to be made for possible seepage of drilling mud, monitoring of ground subsidence and emission of non-condensable / harmful gases.
- Wells drilled for the Project have to be logged during the course of drilling for thermal and hydrological parameters and for this purpose multi logger needs to be deployed.
- Wellhead studies and measurements are to be carried out on Production Well / Wells using the latest available technology and equipment with an objective to understand the sustainability of thermal discharge for power generation and other possible applications.
- Flowing wells have to be tested for evaluating sustainability of thermal discharge and carrying out different measurements. These studies need to be carried out using established techniques and technology.
- Resource evaluation studies have to be carried out when once the deep drilling and wellhead measurements data are available using state-of-the-art technology and software. The objective of these studies would be to know the potential of the geothermal field from the point of view of optimum power generation and understand the long term behavior of the geothermal system under conditions of optimum power generation
- A MW R&D-cum-technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources is to be installed at the most suitable location using appropriate technology and methodology.
- One of the objectives of this Project would be waste heat management/utilization. This could be achieved by using appropriate techniques and/or putting the waste heat to judicious applications deploying off-grid technologies. In this context, it is proposed that the Developer would demonstrate on experimental scale some off – grid applications, such as, space heating, greenhouse cultivation and recreational facilities (hot water pond / lagoon)
- A major objective of this Project would be the conservation of the pristine environment of the region and for this effort has to be focused to cause no

damage to water resources and plant and animal species. Waste water from the plant / other applications would be required to be injected back in to the system. Before the commissioning of re-injection strategy, hot water generated during well testing has to be disposed in a judicious and environment friendly manner as mentioned in Clause – 6.

- In accordance with the provision of Clause 2.6.3, data generated during execution and implementation of the Project may be shared at all stages with the Organizations / Institutions / Departments of Government of India and Government of for use in Public Interest for developing other geothermal resources of the State of India/..... (Name of the State).
- A Detailed Project Report would be required to be submitted to (Name of State Agency), with a copy to MNRE, for facilitating the optimum capacity development of Geothermal Field and for dissemination of information to relevant Departments / Organizations for application in Geothermal Development Programs in other parts of the country/state.
- The said DPR should also address aspects of waste heat management / utilization from the point of view of down-the-line (off grid) applications of geothermal energy which may be beneficial for the region, in particular, and the State, in general, in terms of societal benefits and generation of employment.

6. ROLE OF DEVELOPER

The role of the Developer would tentatively consist of the following.

- Prospective Developers should get familiarized with the area and get acquainted with the accessibility, terrain and climate related aspects of the area. Some information in this regard would be provided during Pre – Bid Meeting.
- It is expected that Developers interested in taking up this work would try to access literature available on Geothermal area. Rich information is available on geological, geophysical, geochemical and sub-surface attributes of Geothermal Field. Available information is in the form of Reports and Publications of GSI, NGRI, CEA, MNRE, IIT – Mumbai and IIT – Kanpur. Most of the Publications are available on Internet. Some of GSI publications are available on Department’s sale counter. Unpublished Reports of GSI may be accessed in the Library of the Department or may be purchased from the Publication Division of GSI.
- Developer, in the light of the data available from all sources, shall have to decide whether he would like to take up some additional studies and surveys in the area in order to develop an improved understanding of the geothermal system. These studies/surveys, however, may be taken up only after the issue of the Letter of Intent (LOI) from, the Nodal Agency.
- Developer shall have to negotiate the availability of land on lease in the working site with Government of /
- Developer shall have to obtain all necessary permissions from Agencies /

Departments / Organizations of Government of Permissions may be required from, Administration of District, Directorate of Geology and Mining, Department of Forest and Wildlife, State Pollution Control Board and other Departments relevant in this regard.

- Developer shall have to take permission from Ministry of Defense / Army for carrying out work in the area.
- The Developer shall have to adopt the latest mud engineering technology and a drilling mud engineer / chemist shall be the member of the Team identified for taking up the job. Moreover, during the course of deep drilling, the area around the site shall be inspected on daily basis for any possible seepage of drilling mud on the surface and possibility of its mixing with surface water sources. A record of these observations shall be maintained which should be available for PMC / Expert Committee / SPCB for review.
- Latest technologies of well head assemblies blow out prevention, well designing and casing programming under the supervision of respective experts shall be deployed to ensure smooth and incidents free drilling operation.
- Possible ground subsidence as a result of drilling or during well testing shall be monitored using Total Station or Differential GPS (DGPS) on fortnightly basis and the log of the same shall be maintained for inspection by PMC / Expert Committee.
- Production wells would be tested for the quantity of mass output and its sustainability for a period of about 30 days during which about tons/ hour of thermal fluid would be discharged. This discharge should be disposed of downstream of, beyond village, after cooling to near ambient temperature so as to avoid any possible detrimental effect on aquatic life till an Injection Well is available to take this discharge back to the hydrological system of the area. The Developer should maintain a log of Well Testing Data (hourly mass output and its disposal on surface and / or through injection well), which should be available for inspection by the Committee.
- Developer shall be responsible for monitoring any possible depletion of the reservoir particularly during well testing stage when the system is producing at a rate of tons/ hour for a period of about 30 days. This shall be done by installing monitoring stations at some hot springs / old wells and (Site) and taking measurements on temperature and discharge (in liters/minute) on weekly basis. Any substantial depletion in natural discharges of hot springs would indicate an effect on the reservoir. Similarly, discernible changes in discharge and temperature of (Site) would also imply some effect on the reservoir.
- Drilling – related studies (logging of wells), wellhead studies and measurements and well testing have to be carried out.
- Using all the data collected on discharge temperature, pressure, mass output, dryness factor, thermal regime, hydrological parameters, reservoir dimensions and reservoir characteristics, resource evaluation exercises have to be carried out, which is one of the major objectives of this Project.
- Based on the data collected during the execution of the Project, appropriate

technology is to be selected for installing a MW R&D-cum-technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources.

- Although gases accompanying steam is not a serious environmental issue as geothermal power plants are characteristically known as the least pollutants (10 to 100 times less gas emanations than thermal power plants), but the developer is expected to monitor the atmospheric pollution in the vicinity of the Power Plant by analyzing the air samples on monthly basis, and particularly be vigilant for any possible increase in CO₂ and H₂S, the two dominant geothermal gases.
- Developer shall be responsible for deploying an adequate and appropriate re-injection strategy for putting the spent hot water (effluent from the Power Plant and various downstream applications) back to the local hydrological system.
- During the operation of the plant ground subsidence is to be continuously monitored using technologies, such as, Total Station and DGPS. Any subsidence, if reported, should be discussed with Geotechnical Engineers and Engineering Geologists of GSI, Central Road Research Institute and Central Building Research Institute so that mitigating measures may be taken under their supervision.
- Developer shall ensure that installation of the R&D based TD Plant shall not cause any discernible depletion of the reservoir which may act as a disincentive for the Developer of the Optimum Capacity Geothermal Power Plant at subsequent to the successful demonstration of the technology on R&D basis at MW level. This may be done in the following way:
 - Monitoring of natural thermal discharges is to be carried out for their discharge as done in the exploration stage. This would also include mapping any changes in the location of natural thermal manifestations.
 - Monitoring of mass output and discharge pressures of Production Wells and relating these to re-injection data through computer simulations
 - Observing any decline in temperature of natural thermal discharges and Production Wells
 - Periodic computer simulations on the basis of all the above data and calculating depletion in reservoir in specific quantitative terms.
- Developer, with an intention of environment – friendly and judicious harnessing of the resource and objective of waste heat management and utilization, may propose using appropriate techniques and/or off-grid applications, such as, space heating, greenhouse, aquaculture and tourism-related amenities for societal benefits.
- The Developer shall be responsible for laying transmission line between Generating Station at and possible Evacuation Point at, located km of, The work would also involve installing substations /

transformers and other relevant equipment.

- The Developer shall have to negotiate a Power Purchase Agreement (PPA) with the concerned authorities of the Government of, such as, Power Development Department (PDD) and
- The Developer shall have to demonstrate on experimental scale viability of off – grid applications, such as, space heating, greenhouse cultivation and hot water lagoon and indicate in the DPR as to how these waste heat / low grade heat management schemes may be developed at commercial level.
- As per Clause – 8, it is proposed to have a Monitoring Committee to monitor the progress of the Project and ensure smooth and hassles – free execution of the Project and timely commissioning of the MW R&D-cum-technology demonstration and resource validation multi-purpose project for power and energy generation from geo-thermal energy resources. The Developer has to co-operate with this Monitoring Committee and provide it with all the information and data requisitioned.
- As per the provisions of Clause 2.6.3, all data generated during the execution of the Project shall belong to, the State Nodal Agency. This data may be shared with the Project Monitoring Committee (Clause – 8) and various Organizations / Institutions / Departments of Government of and Government of India as and when it is deemed necessary / beneficial in Public Interest.
- The Developer shall have to submit a Detailed Project Report to the Government of within 3 months of the commissioning of the MW TD Geothermal Power Plant. A copy of this report also needs to be submitted to MNRE. This report should provide detailed information on all the scientific and technical aspects of the geothermal field and on parameters, such as, environmental impact assessment, reservoir characteristics, resource evaluation, optimum potential of the resource from the point of view of power generation, technology deployed in the TD Plant and technology most appropriate for the full-capacity development of the prospect. The DPR should also deal with various possible waste heat management / utilization schemes and off – grid applications which may be beneficial for the local populace and Defense Forces from the points of view of societal benefits and generation of employment. The DPR should also address as to how development of geothermal resource may enhance tourism in the region.

7. SUPPORT FROM(Name of State Agency) / GOVERNMENT OF.....

....., in its capacity as the State Nodal Agency for the Development of Geothermal Resource, would provide necessary help in facilitating various permissions required before the commencement of the Project work.

Government of would extend help in obtaining necessary permissions for the execution of the Project from the Ministry of Defense / Army.

8. CONSTITUTION OF PROJECT MONITORING COMMITTEE (PMC)

Since the Project is taken up by (Name of the State Agency), it is proposed to constitute a Project Monitoring Committee (PMC) to monitor the progress of the Project and ensure smooth and hassles – free execution of the Project and timely commissioning of the [Title of the Project] The Committee shall consist of 5 members:

- Two members from Government of India (MNRE and/or its Nominees)
- Two members from the Government of (drawn from (State Agencies)/ Department of Science & Technology / Directorate of Geology and Mining)
- One member from (Local Authority) or nominee of (Local Authority)

The Committee shall be constituted by the Secretary, MNRE, Government of India, in consultation with the Managing Director of the State Agency after the Developer is selected.

The first meeting of the Committee shall be held within three months of the award of the contract. The Committee would meet at least twice a year but could be more frequent if demanded by circumstances.

The Committee would be entitled for the review of the work in meetings with Project Authorities and would ensure that time schedule is adhered to.

In case the PMC is not satisfied with the progress of the work, it could take up an advisory role, suggest remedial measures and facilitate the Developer, as far as possible, in taking up these measures.

In extreme cases of irregularities or when Developer is found not adhering to time schedule or not complying with terms and conditions of the contract, it can make recommendations for penalties, such as, forfeiting of EMD / CPG and even termination of the contract.

9. SCOPE OF WORK

The Developer's scope of work will broadly be as given below.

9.1 Desk Studies

Desk studies would basically consist of getting familiarized and acquainted with ground conditions, such as, weather and climate conditions, nature and type of terrain, altitude, accessibility, working conditions and working period and special gear and equipment required in that region.

Another aspect of Desk Studies would be collection of available literature on studies on various aspects of Geothermal Field carried out by GSI, NGRI, ONGC, MECL, CEA, MNRE and other Organizations and Institutions.

Source for available published and unpublished material on Geothermal Field has already been mentioned in Clause – 6.

9.3 Permissions and Concessions

Before the Project activities are initiated, permissions shall be required from Agencies / Departments / Organizations of Government of Permissions may be required from (Local Authority), Administration of District, Directorate of Geology and Mining, Department of Forest and Wildlife, State Pollution Control Board and other Departments relevant in this regard.

Permission to use the land / land lease shall have to be obtained from (Local Authority). In addition, a No Objection Certificate for carrying out the Project Work shall also be needed from them.

9.4 Site Preparation and Civil Work

Residential, office and store sheds may have to be erected at the working site.

Other jobs in this context would comprise making approach roads to drilling sites and arrangement for water supply.

9.5 Environmental Impact Analysis

An EIA Report shall have to be prepared by Experts in the field and shall have to be submitted to (Name of State Agency) before the drilling activity starts.

This EIA study would also deal with the proposed Transmission Line.

The Report should address aspects, such as, impact of drilling and power generation on the ecosystem and advantages / disadvantages of installation of a geothermal power plant at the site.

9.6 Project Implementation Strategy

A strategy needs to be devised for taking up various components of the Project in a systematic and sequential matter.

The strategy would basically consist of the following actions.



9.7. Environmental Safeguards

Various environmental safeguards, as given under Clause – 6 need to be implemented which include observations / monitoring of seepage of drilling mud to surface, ground subsidence, possible emission of harmful gases and detrimental effects on surface thermal manifestations. These studies need to be continued for at least two years after the commissioning of the Plant.

9.8. Resource Evaluation

Detailed resource evaluation exercises have to be carried out using available reliable software when data would be available on various reservoir parameters and wellhead characteristics. This is the most important aspect of this Project as this information would enable the Government of for planning the full capacity development of geothermal Resource. A detailed account on Resource Evaluation Studies is to be presented in the DPR to be submitted to (Name of State Agency) after commissioning of the TD Geothermal Power Plant.

9.9. Reservoir Monitoring

It would be mandatory to monitor as to in what way the deep geothermal reservoir is getting affected as result of the operation of the Power Plant. This would imply assessing any possibility of the depletion of the reservoir. As given in Clause – 6, this could be done by monitoring the surface thermal discharges and wells and by carrying out periodic simulation of discharge, recharge and wellhead temperature and pressure data for estimating any possible depletion in the reservoir during the operation of the Technology Demonstration Plant. This information would be very vital while developing the field for its optimum potential.

9.10. Power Generation Technology

Completion of the envisaged drilling program is to be followed by the development of the steam field and making decision about the appropriate technology for power generation.

Basic parameters which would help decide the Power Generation Technology are discharge temperature, discharge pressure, dryness factor of the thermal discharge and chemical characteristics of the thermal fluid, particularly, in terms of TDS, pH and concentration of dissolved gases.

EPC work would be taken up when once the decision is made on Power Generation Technology to be deployed in the TD Plant.

9.11. Waste Heat Management / Utilization

From the point of view of judicious and environment-friendly use of geothermal resource, waste heat management and utilization may play a very significant role.

Appropriate techniques may be used for the optimum utilization of heat from thermal fluid flowing out of the power plant.

The DPR, which is to be submitted by the Developer to (Name of State Agency), with a copy to MNRE, after the commissioning of the TD Plant, should also deal with various possible waste heat management / utilization schemes and off – grid applications which may be beneficial for the local populace ~~and Defense Forces~~ from the points of view of societal benefits and generation of employment.

The DPR should also address as to how development of geothermal resource may enhance tourism in the region.

9.12. Transmission Line and Power Evacuation

The Developer shall be responsible for laying kV transmission line between Generating Station at and possible Evacuation Point at, located km of, The work would also involve installing substations / transformers and other relevant equipment.

This work needs to be carried out in consultation with (Name of State Agency) / PDD.

Necessary permissions in this regard would be facilitated by (Name of State Agency).

9.13. Power Purchase Agreement (PPA)

The Developer shall have to negotiate a Power Purchase Agreement (PPA) with the concerned authorities.

PPA could be negotiated at a time when Drilling activities are over and the Developer has made decision on Power Generation Technology to be deployed in the TD Plant / before EPC.

9.14. Plant Commissioning and Charging of Transmission Line

Plant would be commissioned and transmission line would be charged. Studies would be carried out on number of units available at the Generating Center and at the Evacuation Point to work out parameters, such as, plant efficiency and loss in transmission.

It may be expected that initially the plant may be generating about 70 to 80% of its efficiency but subsequently may get stabilized at about 90%

9.15. Preparation and Submission of a Detailed Project Report

The final action on part of the Developer would be preparation of a Detailed Project Report.

This report should consist of the following.

- Meteorological, geomorphological and geographic information
- A summary of previous studies
- Geological, geophysical and geochemical attributes of Geothermal System and information available from deep drilling program
- Environmental Impact Assessment (EIA) of the Project (both power plant and transmission line) in terms of advantages and disadvantages of geothermal power generation
- Reservoir characteristics, resource evaluation and optimum potential of the resource from the point of view of power generation
- Any possible depletion of the reservoir due to the operation of the Technology Demonstration Plant
- Environmental issues during the exploration and development stage and those which are important after the commissioning of the plant
- Technology deployed in the TD Plant and technology most appropriate for the full-capacity development of the prospect
- Re-injection strategy deployed and quantification of fluid produced and fluid injected back to the system
- Various possible waste heat management / utilization schemes and off – grid applications which may be beneficial for the local populace and Defense Forces

SECTION-III SELECTION OF DEVELOPER

10. BID QUALIFICATION REQUIREMENTS (BQR)

Bid Qualification Requirements (BQR) or the Minimum Qualifications that a Bidder must have to be eligible to submit this RFP are given below and summarized in the Table.

1. Bidder should be a reputed Public or Private Limited Company, registered in India, financially sound and legally competent to enter in to contracts as per prevailing laws.
2. Bidder could also be a Consortium of Companies with not more than three (3) partners. The Lead Partner of the Consortium should be a Company registered in India, financially sound and legally competent to enter in to contract under prevailing laws.
3. Bidder should have experience of taking up and / or completing R & D / Technology Demonstration Projects in Renewable Energy and / or Power Sectors in Public-Private-Partnership mode under DSIR certification.
4. Bidder should be willing to share all the data generated during the execution of the Project with the Agencies of Government of and Government of India.
5. The Company or the Lead Partner of the Consortium of Companies should have an Average Annual Turnover during the three previous Financial Years (2008 - 2009, 2009 – 2010 and 2010 – 2011) of not less than Rupees Five Hundred Crores.
6. The Company or Consortium Partner / Partners or the Team identified by the Company / Consortium to take up the work should have significant experience of working in the Sector of Geothermal Energy Technology / Geothermal Project Development Programs. This experience has to be at least in three respects:
 - At least 5 years experience in surface and subsurface geothermal exploration techniques and planning of a Geothermal Development Program
 - Adequate demonstrable experience in planning and designing geothermal production wells and drilling to depth of about 2000 m (or more).
 - Bidders / team identified by Company / Consortium should have experience in designing and installation of a geothermal power plant of a capacity of not less than 30 MW or at least 3 geothermal power plants of 5 to 10 MW capacity during last 10 years.

7. The Company or Consortium Partner / Partners or the Team identified by the Company / Consortium should have experience in waste / low grade heat management and utilization.

Bidder shall provide details of each assignment undertaken on the basis of which he is claiming qualification as per requirements laid above indicating types of assignment taken up and present status of these assignments in terms of the progress and / or completion duly certified by the Bidder. Bidders, in particular, should provide information on the type and specifications of Geothermal Power Plant designed / installed by them. **The offers of bidders not satisfying the BQR as summarized in the Table given below will be summarily rejected.**

11. PROCESS OF SELECTION OF DEVELOPER

11.1 Bidder has to meet Bid Qualification Requirements as per Clause - 10. Only those who satisfy the BQR conditions will be considered for Technical Evaluation.

11.2 The objective of the Technical Evaluation shall be to assess the Technical Competence of the Bidder in handling the Technology Demonstration Geothermal Project Development Program and the responsiveness of the bid in terms of:

- Compliance with the Scope of Work and Objectives of the Project
- Practicality of Implementation

S. No.	BID QUALIFICATION REQUIREMENTS
1	Bidder should be a reputed Public or Private Limited Company, registered in India, financially sound and legally competent to enter in to contracts as per prevailing laws. Bidder could also be a Consortium of Companies with not more than three (3) partners. The Lead Partner of the Consortium should be a Company registered in India, financially sound and legally competent to enter in to contract under prevailing laws.
2	The Company or the Lead Partner of the Consortium should have an Average Annual Turnover of Rupees Five Hundred Crore during the three previous Financial year (2008 – 2009 to 2010 - 2011).
3	Experience of taking up and/or completing R&D based Technology Demonstration Projects in Renewable Energy and/or Power Sectors under Public-Private-Partnership mode with DSIR certification
4	Bidder should have experience in the management and utilization of waste heat or low grade heat in the form of off – grid applications
5	Bidder should be willing to share all the data generated during the execution of the Project with the Agencies of the Government of and Government of India

6	<p>The Company / Consortium / Team Identified by Company / Consortium for taking up the Project must have significant experience in Geothermal Energy Technology and / or Geothermal Project Development in at least 3 respects:</p> <ul style="list-style-type: none"> • At least 5 years experience in surface and subsurface geothermal exploration techniques and planning of a Geothermal Development Program • Adequate demonstrable experience in planning and designing geothermal production wells and drilling to depth of about 2000 m (or more). • Bidders / team identified by Company / Consortium should have experience in designing and installation of a geothermal power plant of a capacity of not less than 30 MW or at least 3 geothermal power plants of 5 to 10 MW capacity during last 10 years.
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11.3 The responsiveness of the Technical Proposal shall be determined on the following aspects:

- Specifically Relevant Experience of the Bidder
- Concept, Design, Methodology, Work Plan and Project Execution Schedule
- Proposed Team for the Work, its Collaborations at National and International Levels and its Experience in Handling R&D / Technology Demonstration Projects
- EPC and O&M Capabilities of the Bidder in Renewable Energy / Power Sector
- Financial Status of Bidder

11.4 Technical Proposal

- The Technical Proposal from the interested Firms should essentially include the Firm's Experience in carrying out similar assignments and should demonstrate its ability to handle the Project in accordance with the Objectives and Scope of Work as mentioned in preceding sections.
- Bidder should provide information, substantiated by documents, on experience in handling R&D / Technology Demonstration Projects in Public-Private-Partnership mode with DSIR / compatible certification.
- Bidder should provide a certificate pledging sharing the data generated during the execution of the Project with (Name of State Agency) and other Central / State Government agencies.

- A Comprehensive Document carrying information on the Work Plan, Methodology, Project Execution Schedule and Proposed Time Lines should be annexed with the Technical Proposal.
- Individual Curriculum Vitae of key resources, identified for the assignment, indicating their proposed role in the assignment, should also be a mandatory part of the Technical Proposal.
- Bidder should also provide documented evidence of their collaboration with Organizations / Institutions / Departments / Institutes, both at National and International levels in the Renewable Energy Sector in matters related to Project Development Programs and R&D / Technology Demonstration. Bidders should also indicate as to how these collaborations / tie up would be beneficial in the execution of the Project.
- Bidder should indicate their capabilities in EPC and O&M in Power / Renewable Energy Sectors. Capabilities / experience in this regard need to be substantiated by an inventory of such jobs handled / undertaken.
- Financial status of the Bidder needs to be substantiated by documents.

11.5 Financial Proposal

Bidders should submit a Financial Proposal for all the tasks as specified under the heads, Objectives, Role of Developer and Scope of Work, under Clauses 5, 6 and 9, respectively.

Financial Proposal (in Indian Rupees) should clearly identify the following:

1. Total Project Cost inclusive of all taxes

2. Break-up of the Project Cost in heads, such as:

- Land, Building and Civil Work
- Scientific Investigation and Surveys
- Drilling and related activities
- Generation Plant, Transformers, Substation and other Equipment
- Transmission Line
- Experimental Off-Grid Applications
- Miscellaneous, Unforeseen and Contingency Expenditures

3. PER MW COST OF POWER GENERATION FROM THE [TITLE OF THE PROJECT] INCLUDING COST OF TRANSMISSION AND EVACUATION (EXCLUDING COST OF EXPERIMENTAL OFF-GRID APPLICATIONS)

This shall be the criteria for comparative evaluation of Financial Proposal.

11.6 Other Special Instructions

Each Curriculum Vitae must be signed by the individual and countersigned by the authorized signatory of the Bidding Organization. The information given in the CV may be independently verified and if at any stage, any information is found to be incorrect, the bidder may be disqualified.

All claims regarding experience for handling similar assignments, specific experience or any matter related to Technical Qualification should be substantiated by documents / certificates.

Per MW cost of power generation should be inclusive of the cost of transmission line between and and evacuation at the latter.

Per MW cost of power generation should be calculated excluding from the total Project Cost the amount spent on experimental off – grid applications, such as greenhouse, space heating and hot water lagoon.

12. TECHNICAL PROPOSAL EVALUATION CRITERIA

The evaluation of the Technical Proposal shall be carried out based on the criteria / parameters given in Clauses – 11.4 and 11.5

It would consist of a marking system with Total Marks 100.

Bidders scoring 60 Marks out of 100 would be declared “Technically Qualified” and only their Price Bids would be opened. Unopened Price Bids would be returned to those Bidders who score less than 60 out of the Maximum Marks 100 (“Technically Not Qualified”) in Technical Evaluation.

Technical Proposal Evaluation Criteria with Marks allotted out of the Maximum Marks of 100 is given below in the Table.

S. No.	Criteria	Sub-Criteria	Marks
1	Experience in Geothermal Exploration, Geothermal Project Development and Installation of Geothermal Power Plants	<ul style="list-style-type: none"> ▪ At least 5 years experience in surface and subsurface Geothermal Exploration Techniques and planning of a Geothermal Project Development Program ▪ Planning and designing Geothermal Production Drilling Program ▪ Drilling / drilling supervision of wells about 2000 m deep ▪ Designing and installation of a Geothermal Power Plant of at least 30 MW capacity or at least 3 Geothermal Power Plants of 5 to 10 MW capacity during 	20

		last 10 years.	
2	Concept, Design, Proposed Work Plan, Methodology, Project Execution Schedule and Time Lines	<ul style="list-style-type: none"> ▪ Practicality of Implementation ▪ Compliance with the Project Scope of Work and Objectives ▪ Project Execution Schedule and time taken for Project Completion 	20
3	Experience in handling and completing R&D and Technology Demonstration Projects in Power Sector, particularly, Renewable Energy in Public-Private-Partnership mode with DSIR / compatible certification	<ul style="list-style-type: none"> ▪ Number of R&D / Technology Demonstration Projects handled during last 5 years ▪ Number of Projects completed during last 5 years ▪ Public-Private-Partnership experience ▪ DSIR / compatible Certification 	10
4	Constitution of the Team identified for the work and Qualification and Experience of Team Members	<ul style="list-style-type: none"> ▪ Team Leader ▪ International Experts of repute ▪ Experience of Team in similar Projects ▪ Evidence of Team Members having worked together in earlier Projects 	10
5	Collaboration or tie-up with National / International Institutes / Departments/ Organizations / Centers in the field of R&D and / or Geothermal Energy	<ul style="list-style-type: none"> ▪ Collaboration with reputed International Organizations dealing with Geothermal Development Programs ▪ Evidence that such collaborations would be beneficial for the execution of the Project ▪ Collaboration with National 	10

		Organizations / Departments which could be beneficiary of the Data collected for the Project ▪ Collaboration with State Govt. Departments and/or Universities of the State	
6	EPC and O&M capabilities of the Bidder	▪ EPC jobs taken up during last 5 years in the Power / Renewable Energy Sector ▪ Present O&M assignments	10
7	Experience in Waste Heat and Low Grade Heat Management and utilization in Off – Grid Applications	▪ Experience and Expertise in Waste / Low Grade Heat Management/utilization in the form of number of Projects handled during last 5 years ▪ Experience in space heating and building greenhouses	10
8	Financial Strength of Bidder	An Average Annual Turn Over of at least Rupees Five Hundred Crore during the three previous Financial years (2008 – 2009, 2009 – 2010 and 2010 – 2011)	10

12. FINANCIAL PROPOSAL EVALUATION CRITERIA

- Financial Proposal of only those Bidders shall be opened who have been declared “Technically Qualified” on the basis of their score of 60 or more marks out of 100 in the Technical Proposal.
- The criteria for evaluation of Price Bids would be PER MW COST OF POWER GENERATION FROM THE PROPOSED [TITLE OF THE PROJECT] which would be calculated by bidders based on the total Project Cost as per the provision in Point 3 of Clause – 11.5 dealing with the Financial Proposal.

For example, if the cost of complete installation of the MW Technology Demonstration / Resource Evaluation cum Geothermal Power Generation Plant including Power Transmission/Evacuation and excluding the cost of experimental scale off-grid applications works out to Rupees 9 Crores, the per MW cost of geothermal power generation to be quoted by bidders for Competitive Price Bidding is Rupees 3 Crores.

Financial Score (Sf) of a Bidder shall be calculated using the Formula:

Financial Score (Sf) of Bidder = [100 x (LB / QB)]

Where LB is the Lowest Bid received from among the technically qualified Bidders and QB is the Bid quoted by the Firm being evaluated.

For example, if the lowest Bid received for per MW Geothermal Power Generation is Rupees 3 Crores and Bidder A quotes a price of Rupees 4 Crores, his Sf would be $100 \times 3 / 4 = 75$

13. SELECTION OF THE DEVELOPER

- The Developer shall be selected applying QCBS criteria.
- In view of the Project basically being a R&D Project with objectives of Resource Evaluation and demonstration of the viability of Geothermal Energy available in valley for power generation and possible off-grid applications, it is proposed to give high weightage of 80% to the score on the Technical Proposal.
- Score on the Financial Proposal would therefore have a weightage of 20%.

The Final Score, which would be the criteria for the final selection of the Developer, would therefore be calculated by the equation given below.

$S = [(St \times 0.80) + (Sf \times 0.20)]$

Where St and Sf are Scores on Technical Proposal and Financial Proposal, respectively