



BHARAT HEAVY ELECTRICALS LIMITED
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Ref: BOI/EOI/19-20/01

Date: 02/05/2019

Notice Inviting Tender for technological tie-up with OEM of Steam Turbine for doing R&M/Retrofitting of 200/210MW LMZ Set

The Heavy Electrical Equipment Plant (HEEP) located in Haridwar is one of the major manufacturing plants of BHEL. The core business of HEEP includes design and manufacture of large steam and gas turbines, turbo generators, hydro turbines and generators and so on. In the field of Power generation, BHEL is involved in design, Manufacturing, Erection and commissioning of power plant equipment with state of art production facilities. BHEL is the OEM of most of the LMZ steam turbines of 200/210MW sets installed in India.

Objective of retrofit is to improve efficiency/heat rate, restoring 210MW sets by introducing new technology and catering to the problems of technical obsolescence for reliable, flexible operations & sustainable availability of the unit. In this regard, BHEL intends to go for technological tie-up with Original Equipment Manufacturer (OEM) of Steam Turbine having proven technology and experience in design, manufacturing, testing & commissioning of Power Plant Equipment as Bidder. **The EOI is published for seeking response from leading OEMs for the indicative scope of work & Supply, Terms & Conditions/Evaluation & Qualifying criterion mentioned in Annexure-1.**

Contact Person 1:

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Contact Person 2:

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The offers received will be technically evaluated by BHEL & successful short listed bidders will be asked to submit their detailed Techno-Commercial offers through formal NIT/Enquiry, for our future requirements. They shall confirm that there is no deviation with respect to BHEL Specifications. However, deviations, if any, are to be listed as a separate attachment. The offers that do not meet the substantial requirements of our specifications are liable to be ignored. **Following documents are to be necessarily confirmed and submitted by the prospective bidder/s:**

1. Indicative Broad Scope of work w.r.t. Engineering (Clause 3 of Annexure-1, up-loaded)
2. Indicative Broad Scope-Split for Manufacture and/or supply (Clause 4 of Annexure-1, up-loaded)
3. Terms & Conditions. (Indigenous/Foreign as applicable) (Clause 5 of Annexure-1, up-loaded)
4. Details/ Documents in support of Evaluation & Pre-Qualification criterion (Clause 6 of Annexure-1, up-loaded)
5. Specific Experience format (Clause 8 of Annexure-1)

Only Technical BID is to be submitted along with the documents mentioned above. The envelope containing the offer shall be duly sealed and super scribed as **"Technical Offer AGAINST Reference No. BOI/EOI/19-20/01, SUBMITTED BY (Name of company)"**.

The last date for submission of Technical offers is 06/06/2019. The Technical Offers complete in all respect must be addressed to "Shri Vivek Kr. Singh, AGM (PPX/BOI)" and **should reach before 13:45 Hrs (IST) of closing date of NIT.** Late offers will not be considered in any case. BHEL will not be responsible for any type of postal delay / incomplete information from vendor. For any further clarifications, feel free to contact the undersigned.

(Vivek Kr. Singh)
AGM - In charge (PPX-BOI)



**Expression of Interest (EOI) for Technology
Tie-Up for R&M/ Retrofit of 200/ 210MW LMZ Steam Turbine Set**

Document-No.-HW/STE/R&M/LMZ/001

Date-27th March 2019

Revision-00

**Expression of Interest
For
Technology Tie-Up for R&M/ Retrofit of 200/
210MW LMZ Steam Turbine Set**

**BHARAT HEAVY ELECTRICALS LIMITED
HEAVY ELECTRICAL EQUIPMENT PLANT
HARIDWAR-249403, INDIA**



**Expression of Interest (EOI) for Technology
Tie-Up for R&M/ Retrofit of 200/ 210MW LMZ Steam Turbine Set**

**Sub: Expression of Interest for Technology Tie-Up for 200/ 210MW LMZ
Steam Turbine R&M**

1) Introduction

- 1.1 Bharat Heavy Electricals Limited (BHEL), a Government of India undertaking, is the largest Engineering and Manufacturing organization in India and is one of the leading international companies for providing total business solutions in the field of Power Generation & Transmission, Defense, Transportation, Oil & Gas, Telecommunication etc. The company has several manufacturing units, power sector regions, service centers, overseas offices and regional offices, besides host of project sites spread all over India and abroad.
- 1.2 In the field of Power Generation, BHEL is involved in Design, Manufacturing, Erection and Commissioning of Power Plant Equipment with state of the art production facilities. BHEL is the OEM of most of the LMZ Steam Turbines of 200/ 210MW sets installed in India.

2) Present Expression of Interest

The objective of Retrofit is to "Improve efficiency/ heat rate and restoring the name plate rating as 210 MW of the unit by introduction of new technology and catering to the problems of technical obsolescence for reliable, suitable for flexible/ 2-shift/ cyclic operations & sustainable availability of the unit". Implementation of the above measures should also be able to extend the life by minimum 20 years of reliable operation.

In the above context, BHEL intends to go for tie-up with Original Equipment Manufacturer (OEM) of Steam Turbines having proven technology and experience in design, manufacturing, testing & commissioning of Power Plant Equipment as Bidder. This EOI is published for seeking response from leading OEMs for the following indicative Scope of Work & Supply, Terms & Conditions/ Evaluation & Qualifying Criterion. The prospective bidder should be willing to associate with BHEL in a collaborative manner to meet the above stated requirements. BHEL shall receive offers pursuant to this EOI in accordance with the terms set forth herein, as modified, altered, amended and clarified from time to time by BHEL, and all offers shall be prepared and



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submitted in accordance with such terms on or before the date specified in this EOI.

3) Indicative Broad Scope of Work w.r.t. Engineering

3.1) For Prospective Bidder/s

The Prospective Bidder to perform complete Engineering activities & provide complete Engineering information w.r.t. Steam Turbine & its systems/ auxiliaries for efficient & reliable long term operation as per tender requirements. Engineering work will also include the activities related to interface issues with other equipments for optimization of complete thermal cycle to meet market expectations.

The Engineering scope is limited to steam turbine area only however, modifications, if required in other associated areas/ systems/ interfaces etc. also to be informed by the Prospective Bidder to BHEL for taking care of system/ equipment requirements.

The Broad scope is given below:

- a- Design & Engineering for the Turbine & Valves along with High pressure EHA type Governing system suitable for flexible/ 2-shift/ cyclic operations. Detail Design & Engineering of Bearing Pedestals, Journal Bearings, Radial Thrust & Journal Bearing, Cross Over Pipe Assembly and Turning Gear / Motor Arrangements, etc. are also included.
- b- Performance-Guarantees related to Steam Turbine will be provided by the bidder. Performance Guarantee Test conductance at site will be in BHEL scope. *Ref.-Point No.-5)-b*
- c- Inputs for modifications/ checking w.r.t. strength point of view of existing foundation to be provided for modifications in the existing foundation-if required. It is expected that the proposed modification in the Steam Turbine retrofit work will not have any increase in load on existing foundation. The bidder to share the proposed loading pattern & load on foundation details.
- d- Technical-Inputs w.r.t. Interfaces, Specifications for Auxiliaries & Boiler (if changes required) to be provided.
- e- Erection & Commissioning support at site.
- f- Turbine Integral Piping Systems Schemes
- g- The Prospective Bidder will carry-out complete Steam Turbine Engineering Activities/ Analysis namely Thermodynamic Analysis, component level mechanical analysis of offered retrofit components of all the three turbine cylinders & valves, Thermal-

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Expansion Calculations of Rotors & Casings (Axial, Differential & Radial), Jacking/ Lube Oil calculations, Bearing-Design, Calculation of Load on Bearings (maximum loading capacity of each Bearing and maximum Thrust Bearing capacity of Thrust Bearing), Rotor-Train Dynamic Analysis of complete train including existing Generator, Catenary-Calculations/ Load on Foundation/ Structural/ Resonance/ Dynamic Analysis & any other analysis which might be required during execution & successful completion of the project.

- h- The Prospective Bidder to share the results/ outputs/ datasheets/ design-reports etc. of the above Engineering activities covered under point-g.
- i- The Prospective Bidder to share with BHEL all relevant manufacturing drawings of main supply & spares including specifications for materials, drawings of long-lead items including forgings & castings, technical details and specifications of bought out items, test requirements, shop & site protocols, quality-checks, technological-process information, shop & site welding schedules, over-speeding & Balancing records (along with acceptance norm and specification) of complete steam turbine scope (for both parties scope of work & supplies).
- j- The Prospective Bidder to also provide O&M with Startup & Shutdown procedure, Erection & Commissioning manuals including site Erection & Commissioning drawings for complete Steam Turbine.
- k- The Prospective Bidder shall also share the following information with BHEL (but not limited to this) related to Controls & Instrumentation (C&I) Engineering (to be implemented in BHEL scope of control system):
 - Operational philosophy of Governing System for the Turbine along with all related technical details.
 - Details of TSI system including data sheet of sensors & their mounting accessories
 - FCDs/ logics/ Schemes of Turbine Control & Protection system with all required & applicable data/ curves/ set-points etc.
 - If any further information/ document is required during project execution w.r.t C&I and electrical engineering area for TG controls, then party shall share the complete information with BHEL.
- l- The prospective bidder to also provide Engineering support during project execution at any stage, if required.



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3.2) For BHEL

Complete System-Engineering. However, Interface & Auxiliary Engineering wherever required will be provided by Prospective Bidder.

4) Indicative Broad Scope-Split for Manufacture and/ or Supply

4.1) Prospective Bidder/s Scope

HP & IP Steam Turbines Flowpath Components.

4.2) BHEL Scope

- a- HP, IP & LP Turbines
- b- Cross over pipe including compensators
- c- Pedestals & Bearings
- d- HP Stop & Control Valves and Pipings
- e- IP Stop & Control Valves and Pipings
- f- Turbine Governing & Control System (High Pressure 160 bar Control fluid based Electro-Hydraulic Actuator type)
- g- Turning Gear, MOP & Thermal Insulation
- h- BOP, Steam Turbine Auxiliaries & Integral Systems
- i- Electrical Auxiliaries
- j- Tools & Tackles
- k- Boiler Scope, if applicable
- l- Steam Turbine Erection & Commissioning
- m- PG test to be conducted by BHEL
- n- Spares (Mandatory, Recommended and Tools & Tackles) of all Steam Turbine Equipments/ Items will be in BHEL scope
- o- Modification & Strengthening of foundation-if required
- p- Controls & Instrumentation Engineering & Supply. (Turbine related inputs by Bidder)

4.3) Prospective bidder/s to also propose their preferred Scope-Split for Manufacture and/ or Supply.



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4.4) Notes

- a- HP & IP valves should be turbine casing mounted having common body for both stop & control valves.
- b- Replacement of complete steam path of LP module (Diaphragm, liners, rotor and Baumann stage) with new high efficient design keeping Outer Casing same.
- c- Modification in Turbine gland sealing system with seal steam supply and leak off valve to make turbine self-sealing type during normal operation.
- d- Modification in control fluid system as well as lube oil system to suit the turbine retrofit.

5) Terms & Conditions

- a- Front end for the customer will be BHEL. The prospective bidder will be treated as BHEL vendor & will work as per scope-split in close association with BHEL.
- b- The Prospective bidder to associate with BHEL during Performance Guarantee test (along with associated documents/ PG test procedure) for quoted Heat rate and output for desired load conditions at site. *Ref.-Point No.-3)3.2)-b.*
- c- Scope-split as mentioned above is indicative only & will be further aligned with retrofit Steam Turbine R&M Technical-Specifications requirements.
- d- BHEL would like to associate the Bidder during project association.
- e- The Prospective Bidder to also conduct Investigation & Root-Cause Analysis of the important issues if arises post-commissioning till guarantee/ warranty/ defect liability period with the customer.
- f- The Prospective Bidder should also share the information related to their approved vendors who will be associated in the project.

All above are the indicative requirements, however any other document/ information/ input required by BHEL for effective execution shall be decided in due course of Project.

6) Evaluation & Qualifying Criterion of Prospective Bidder/s

Based on the information provided under this EOI, the prospective bidder needs to full-fill the following:

- a- The Prospective Bidder should be an Original Equipment Manufacturer (OEM)

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having proven technology & experience in Design, Manufacturing, Erection, Commissioning & Testing of Steam Turbines.

- b- The prospective bidder should have executed comprehensive (i.e. HP, IP & LP Turbines) R&M/ Retrofit of LMZ make Steam Turbine. The bidder must have experience in the area of R&M/ Retrofit related to Design, Engineering, Manufacturing & Supply of LMZ make 200/210MW Steam Turbine and should have commissioned such Steam Turbine of atleast one (1) unit of 200/210 MW or above capacity in at least one (1) fossil fuel fired thermal power station, which is in successful operation for at least two (2) years as on the date of Invitation for Bid (IFB).
- c- The tie-up bidder should offer Heat-Rate commensurate with prevailing Heat-Rate in the market. Turbine Heat Rate higher than 1940 kCal/ kWhr shall not be considered.
- d- The details of the work will be finalized after technical discussions with the short listed bidder. The short listed bidder may further be evaluated on the basis of techno-commercial criterion during subsequent evaluation.

7) Miscellaneous

7.1 EOI & all documents to be submitted under this contract submittals should be in English. If at any time during the evaluation of EOI, BHEL requires any clarification on the documents submitted by the prospective bidders, it reserves the right to request a clarification so as to complete the evaluation.

7.2 Right to accept or reject any or all applications

Notwithstanding anything contained in this EOI, BHEL reserves the right to accept or reject any application and to annul the EOI process and reject all applications, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons therefore.

In the event that BHEL rejects or annuls all the applications, at its discretion, may invite all eligible Bidders to submit fresh applications, if required.

BHEL reserves the right to disqualify any applicant during or after completion of EOI process, if it is found there was a material misrepresentation by any such bidder or the bidder fails to provide, within the specified time, supplemental information sought by BHEL.

BHEL reserves the right to verify all statements, information and documents submitted by



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the bidder in response to the EOI. Any such verification or lack of such verification by BHEL shall not relieve the bidder of his obligations or liabilities hereunder nor will it affect any rights of BHEL.



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- 8) This form to be completed by the Bidder and Required Information to be furnished along with EOI

SPECIFIC EXPERIENCE

(As per Clause 6 –Evaluation & Qualifying Criterion of Prospective Bidder/s)

(To be completed by the Bidder and, if JVA, by each partner)

Bidder's Legal Name: _____ Date: _____

JVA Partner Legal Name: _____

Subcontractor's Legal Name: _____

("Reference Plant", details of which have been declared in this Form shall only be considered by BHEL to ascertain for meeting Qualification Requirements (QR) and Bidder wishing to provide additional "Reference Plants" can give the them in similar form.

Sl. No.	Item Description	Particulars to be Furnished by the Bidder
1.0	Name of Bidder	
1.1	Name of Collaborator/Associate, if applicable	
1.2	Should have executed comprehensive (i.e. HP, IP & LP Turbines) R&M/ Retrofit of LMZ make Steam Turbine. The bidder must have experience in the area of R&M/ Retrofit related to Design, Engineering, Manufacturing & Supply of LMZ make 200/210MW Steam Turbine and should have commissioned such Steam Turbine of atleast one (1) unit of 200/210 MW or above capacity in at least one (1) fossil fuel fired thermal power station, which is in successful operation for at least two (2) years as on the date of Invitation for Bid (IFB).	
	(a) Name of Client	
	(b) Name of TPS	
	(c) Unit No.	
	(d) Capacity of Unit (MW)	
	(e) Contact Person	
	(f) Address in full	
	(g) Telephone No	
	(h) Fax No	
	(i) Email	
1.3	Purchase Order / Contract / LOA	



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	(a) Number	
	(b) Date	
	(c) Value in INR/Equivalent USD as on the date of IFB	
1.4	Scope of work covered Capacity (R&M/ Retrofit Work). The Scope of Work should clearly mention individual Steam Turbine Modules, valves, Governing System & Comprehensive R&M work (complete TG set including Governing-System)	
	(a) Designed	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(b) Engineered	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(c) Manufactured	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(d) Supplied	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(e) Completed Civil/Structural Works	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(f) Erected	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(g) Commissioned	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(h) Successfully Completed Performance Guarantee Test PG Test Reports of executed projects. Bidder to inform heat rate/ efficiency for the recent R&M Tenders.	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
	(i) Date of Commissioning of the Unit	
	(j) No. of years the Unit is in successful operation as on the date of Invitation For Bid (IFB).	
1.4	Whether client's certificate in support of specified QR conditions enclosed?	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)
1.5	Undertaking that it is not black listed or debarred in India by any agency	YES <input type="checkbox"/> NO <input type="checkbox"/> (Tick whichever is applicable)

Date:

(Signature).....

Place:

(Printed Name).....

(Designation).....

(Official Seal).....



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