Notice Inviting Expression of Interest (EOI) for pre-bid tie-up with vendors for PSLV Mechanical package-3

EOI Reference Number
BHEL-T/PSLV M-3/2022
January 19, 2022

Bharat Heavy Electricals Limited,
High Pressure Boiler Plant-Trichy

1.0 About BHEL

BHEL is a leading Public Sector Undertaking under Ministry of Heavy Industries and Public Enterprises, Government of India. BHEL is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing organizations in India. We are engaged in the design, engineering, manufacture, construction, testing, commissioning and servicing of a wide range of products and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation (Railway), Renewable Energy, Oil & Gas and Defence. The Power sector covers generation, transmission and distribution equipment for hydro, fossil, and gas fuels. BHEL has been in this business for more than 50 years and BHEL supplied equipment account for 61 % of the total thermal generating capacity in India. Nearly 68% of the equity is owned by the Government of India. The company has 17 manufacturing units, 4 power sector regions, 8 service centers, 10 overseas offices and 15 regional offices, besides host of project sites spread all over India and abroad. The annual turnover of BHEL for the year 2014-15 was Rs 30947 Crores (US$ 4.94 Billion approx.). BHEL's highly skilled and committed manpower of approximately 47000 employees, the best of manufacturing facilities and practices together with the latest technologies, has helped BHEL to deliver a consistent track record of performance. More details about the entire range of BHEL's products and operations can be obtained by visiting our web site www.bhel.com.

2.0 About HPBP, BHEL Trichy

High Pressure Boiler Plant (HPBP) is one of the major units of BHEL. It is one of the leading boiler manufacturers in the world providing total boiler island solutions for utility, industrial, captive power and heat recovery applications. At present, Trichy unit is designing & manufacturing sub-critical boilers, industrial boilers, CFBC (Circulating Fluidised Bed Combustion) boilers, Heat Recovery Steam Generators (HRSG), state-of-art Once-through supercritical boilers and is working on Advanced Ultra Supercritical boilers. It also designs/manufactures Advanced Technology Products like Nuclear Steam Generators, Valves for Power and Industrial applications and Seamless Steel Tubes. The Unit has been accredited with ISO 9001, ISO 14001, OHSAS 18001 and ISO 27001 standard certifications.

3.0 Background for this Expression of Interest (EOI)

NSIL- commercial wing of ISRO invited EOI for selection of industry partner in order to outsource production of PSLV-XL. BHEL had submitted its offer and was shortlisted by NSIL as potential integrator. NSIL was floated on 18 Dec'20 for realization of 5 Nos of PSLV-XL over a period of 48 months. As per the RFP requirements, Indian industry partner would be responsible for realizing and delivering end-to-end stages PSLVs, by utilizing the approved supply chain of ISRO and developing facilities for fabrication.

Annexure-1 Technical specifications

4.1 Introduction

Attention of manufacturing Industry within the country is drawn for fabrication, assembly, testing and supply of PS2 Vikas Engine, couplers, valves, components and Modules for PSLV-XL for M/s ISRO and M/s NSIL.

4.2 Eligibility criteria:

Vendor must have supplied listed hardware to ISRO in the past or else vendor is presently executing some order.

and

Vendor must be an approved supplier of ISRO for all the items mentioned below or approved for some of the items and would have registered to ISRO for qualification of remaining hardware in 6 months from the date of EOI:

(i) Fabrication, inspection, Functional assembly and supply of Vikas PS2 version Engine (contour)

(ii) Fabrication, assembly and testing of Fill and drain coupler for water tank

(iii) Fabrication, assembly and testing of Over flow coupler for water tank

(iv) Fabrication, assembly and testing of Couple holder CFDO

(v) Fabrication, assembly and testing of Couple holder COFO

(vi) Fabrication, assembly and testing of Complementary Drain Coupler (V.H) N204

(vii) Fabrication, assembly and testing of Complementary Drain Coupler (V.H) UH25

(viii) Fabrication, assembly and testing of Propellant Isolation Valve PFDV

(ix) Fabrication, assembly and testing of Modules: Group I, Group II, Group III

(x) Fabrication, assembly and testing of Modules: CSM

(xi) Fabrication, assembly and testing of Modules: Pogo

(xii) Fabrication, assembly and testing of Modules: HRCM

(xiii) Fabrication, assembly and testing of Main Engine Valve U

(xiv) Fabrication, assembly and testing of RFDS Assembly N204

(xv) Fabrication, assembly and testing of RFDS Assembly UH25

(xvi) Fabrication, assembly and testing of PS4 components and Modules

(xvii) Fabrication, assembly and testing of PS1 RCS, PS0 & PS1 SITVC components and modules.

Required raw materials will be supplied by BHEL as Free Issue Materials (FIM) for fabrication and machining.

4.3 Scope of work:

i) Fabrication and machining of above mentioned items need to be carried out by the vendor as per the documents received from ISRO.

ii) Heat treatment to achieve mechanical properties.

iii) Quality check and NDT on weld joints to meet requirement of ISRO.

iv) Required machining to achieve the final component.

v) Preparation of quality documents.

vi) Painting, packing, preservation and delivery to designated ISRO facility / BHEL.

4.4 Facilities:

All facilities required for realization of the segments hardware shall be available with the vendor before taking up this work. Major facilities required are as follows:

i) Pillar-less bay (at least 2000 sq. m area, height under crane hook: 15m) with crane facility

ii) Rolling facility adequate for rolling of sheets/plate material of Al. alloy upto 25mm thickness and 5 mts width (to form a cylindrical shell).

iii) Hydraulic press of 1200 Tonnes capacity for forming Domes and Crown.

iv) Auto TIG Welding stations: Long seam and circ seam with necessary fixtures to handle 3.2-meter diameter.

v) X-ray radiography to be done within the company premises

vi) UT scanning - Supplier must have in-house qualified manpower and equipment for UT flaw detection

vii) Skilled operator to carry out LPT on all weld joints

(for UT and radiography, professionals of Level-III are required)

viii) Electrical Heat treatment furnace of 3.2 m diameter and 4 m height / depth for ageing treatment of weld assembly; calibration of the furnace up to 600° C within ± 5° C.

ix) CNC Lathe of 3.2-meter dia. and 4 m admit between centers for final machining of segment and Uni master for measuring diameter of 3.2 m size. Dedicated drilling station with 3.0 m diameter rotating table and horizontal drilling station for drilling / reaming.

x) Clean Room facilities.

xi) 3 m diameter Vertical Turning Lathe(VTL)

xii) For storing FIM, sufficient space with covered roof and handling facilities.

xiii) Mechanical testing facility (Tensile and Fracture Toughness)

Vendor needs to have essential facilities (Sl. No. i to xii) within the company premises and sub-contracting is not allowed. In case vendor doesn't have testing machines, they need to get the specimens tested at centers accredited by NABL. Vendor while submitting the EOI shall furnish the details of facilities available with them. Along with required manufacturing facilities vendor must possess experience in tool engineering, quality control and inspection, material handling etc.

4.5 Other Facilities required

All facilities required for realization of the PS2 Vikas Engine, couplers, valves, components and Modules shall be available with the vendor before taking up this work. Major facilities required are as follows:

Light Alloy Structures for launch Vehicles scope of work	**Facilities required for Manufacturing of Light Alloy Structures.**
General plant & Shop Floor facility	An assembly bay of around 100m length, 50m width and 18m height with an overhead EOT crane of 10 tonne capacity.
Large fixtures & Tooling facility	Assembly facilities should include Main Assembly jigs with staging for assembly of Structures of size varying from dia 2.8m to 4m and height 4m to 8m.
CAD/CAM Facilities	CAD/ CAM facility for design of large assembly fixtures and programming and 3D modelling for machining of components. A dedicated tool design section with latest facilities for CAD.
Clean Room Facilities	Clean room Class 10000- ISO 14644-Class 7, Clean room Class 1,00,000-ISO14644-Class 8, 100 class clean room.
Machining Facilities	4 Axes Vertical-Turn-Mill-Centres (4 Axes Vertical Turn-Mill Centres of table sizes ranging from 2 meter to 4 meters in diameter with accurate indexing capability, capable of handling components up to 2 meters in height.)

	5 axes high speed profilers and routers with vacuum clamping facility.
	5 axes machining centre: for machining intricate components as large as 1m X 1m
	Precision jig boring machine: for hole drilling in Al alloy as well as hardened steel alloy components within the positional tolerances of ±10µm
	EB welding facility
	Vacuum Brazing facility
Welding facilities	State of the art automatic TIG welding equipment for carrying out following welding operations: 1. Longitudinal welding 2. Circumferential welding 3. Rotary welding 4. Orbital welding 5. Friction Stir welding The welding shop should be equipped with NDT facilities like X-ray, Radiography and complex welding fixtures.
	Shearing Machine for Shearing or die-cutting machine which cuts stock without formation of chips, or use of burning or melting.
	General machine shop to include machines like CNC turning, Heavy duty Lathe, precision lathe, Milling machine, Grinding machine, Radial drilling machine, high speed drilling machine, Routing Machine, water jet cutting, burnishing machines, wire cutting machines, High precision tool room lathe, Spot welding machine.

Testing facilities	Proof -Pressure Test, Burst Test and Leak Test facility, Sterieo Microscope, IPA Filtration System, Test Gauges, Pneumatic Pressure Test Consoles, Pneumatic Mobile Booster, Hydraulic pressure test consoles, Thermal Chamber, vibration test facility, High Flow Test Facility
Other facilities	Vacuum Oven, Liquid Borne Particle Counter, Water Jet cleaner, IPA Flushing Unit, Ultrasonic Cleaner, Airborne particle counter, Spring Calibration Machine, Semi-Automatic Coil Winding Machine, Injection Valve Automated Test Facility, Soldering Iron Station, Fume Exhauster, Thermal Wire Stripper, Precision Electrical tools.
Metal Forming Facility	Advanced Sheet Metal forming facilities like sheet bending, Section rolling, Stretch forming, Spinning, Rubber pad forming.
Process Shop and Heat Treatment Facilities	3m class electrical Ageing furnace with a close temperature control of ±3°C for Annealing, Solution Treatment with water quenching and precipitation treatment of Aluminium Alloy components.
	Drop bottom furnace for solutionizing of Aluminium.
	Cold Room – 5 Meter x 5 Meter x 3 Meter (maintained up to temperature -22-degree C)
	Chemical milling is required for various skin components of light alloy structures. Chemical Milling with 3mx 3m bath with the provisions for multi-step selective milling with masking and de-

	masking from 3mm wall thickness to 1.5mm from 3mmx 3m x 5m size of the AA sheet
	Vacuum impregnation & chromate treatment facility handling components up to 1.2 mtr dia and 2.2 mtr x 1.2 mtr size
Surface Treatment Facility	Anodizing facilities for Chromic Acid for large size components like skins, Rings, Bracket items etc. Having 3m dia class
	Short blasting, SS Passivation facility
	Cadmium plating bath having 500x500mm capacity
	Paint booth for internal Etch priming of completed Aluminium Alloy structure. Nital Etch/Temper Etch
Thermal Paint Application facility	Automatic spray gun facilities to carry out thermal painting of assemblies of 3.2m Dia x10m height
	Rotary turn table and vertical carriage control mechanism with fume exhaust system are required for carrying out thermal painting on bigger structures.
Inspection Facilities	Large 3D Coordinating Measuring Machine of size more than 9m x 4m x 5.5m (X-Y-Z) with accuracy of 10 microns
	Computerized Remote Measuring System with measuring range of 4 mtr and accuracy of 50 microns/mtr.
	Laser tracker capable of measuring a wide range (Dia 1 to 5 metres) components and Assemblies with accuracy of 0.01microns/mtr.

	Universal Testing Machines for mechanical testing evaluation.
	Photogrammetry which can measure components with 10 microns per meter accuracy.
	Non-Destructive Testing facilities involving Fluorescent Penetrant Inspection (FPI) – up to 6 Meter and magnetic Particle Inspection (MPI) – up to 2 Meter. The facility with A-scan ultrasonic equipment and C-scan.
Storing Facility with Bonded Stores	A bounded store with proper tracking system is mandatory. The space available in the store shall be sufficient to keep all items in designated location with traceability in respect of different category of materials / shapes/ size etc..
Transportation Facility	The qualified structures have to be transported to different locations as per requirement. The party shall have handling facility and logistics for transport of completed structure by road in re-usable metallic shipping containers. Transport handling facilities shall be qualified for loading of completed structural assemblies without any damage. The size of transport container may be up to 10m long, 4m wide and 5m height

4.6 Delivery:

The requirement is for 5 sets of above mentioned components within 4 years from the date of PO. Delivery of the first segment shall not be later than 12 months from placement of order or 8 months from the date of supply of free issue material whichever is later. EOI shall be comprehensive giving all the required details mentioned above enabling BHEL to assess the capabilities of the vendor.

Annexure-2 Commercial Terms and Conditions

SL NO	Terms
1	**Amendment of the EOI** a. At any time prior to the due date for submission of bid, BHEL may, for any reason, whether at its own initiative or in response to a clarification requested by prospective Eligible Bidder(s), modify the EOI document by amendments. Such amendments shall be sent to the Eligible Bidders via e-mail and letters, in the form of corrigendum and shall form an integral part of EOI document. The relevant clauses of the EOI document shall be treated as amended accordingly. b. It shall be the responsibility of the prospective Eligible Bidder(s) to check any correspondence received from BHEL from time to time for any amendment in the EOI document. In case of failure to get the amendments, if any, BHEL shall not be responsible. c. In order to allow prospective Eligible Bidders a reasonable time to take the amendment into account in preparing their EOI bids, BHEL, at its discretion, may extend the deadline for submission of bids. Such extensions shall be communicated to the Eligible Bidders via e-mail and in the form of corrigendum.
2	Procurement of various materials for fabricating the PSLV stages involving components and sub-systems from the approved supply chain of ISRO. Procurement of propellants, consumables, components, electronics, subsystems and systems required for building up different stages of PSLV from the approved sources of ISRO. Manufacturing, testing and qualifying the systems as per the Quality Audit Procedures (QAP) finalized by NSIL/ ISRO
3	**Warranty**

	a. Comprehensive warranty applicable on goods supplied under this contract shall be provided for the period of contract from the date of acceptance of respective system by BHEL/NSIL as per the requirements provided in this EOI b. Bidder warrants that the Goods supplied under the Contract shall be of proven technology, new, non-refurbished, unused and recently manufactured. c. Bidder further warrants that the Goods supplied under this Contract shall be free from all encumbrances and defects/faults arising from design, material, manufacture or workmanship (except insofar as the design or material is required by BHEL/NSIL Specifications). d. BHEL shall promptly notify the bidder in writing of any claims arising under this warranty. e. Upon receipt of such notice, bidder shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, without prejudice to any other rights which BHEL may have against the bidder under the Contract. f. If the bidder, having been notified, fails to remedy the defect(s) within a reasonable period, the BHEL may proceed to take such remedial action as may be necessary, at BHEL's risk and expense and without prejudice to any other rights which BHEL may have against the bidder under the Contract and/ or under Applicable Law. g. Any bidder's specific warranty terms that do not conform to conditions under this Contract shall not be acceptable .
4	**Right to Vary Quantity** a. At the time of award of contract, the quantity of goods, works or services originally specified in the bidding documents may be increased. It shall be without any change in the unit prices or other terms and conditions of the Bid and the bidding documents. b. If BHEL does not procure any subject matter of procurement or procures less than the quantity specified due to change in circumstances, the vendor shall not be entitled for any claim or compensation except otherwise provided by BHEL. c. Repeat orders for extra items or additional quantities may be placed, on the rates and conditions given in the contract.
5	**Right to Terminate the Process**

	BHEL may terminate the EOI process at any time and without assigning any reason. BHEL makes no commitments, express or implied, that this process will result in a business transaction with anyone. This EOI does not constitute an offer by BHEL.
6	**Confidentiality** a. All the material/information shared with the Eligible Bidder during the course of this procurement process as well as the subsequent resulting engagement following this process with the successful Eligible Bidder, shall be treated as confidential and should not be disclosed in any manner to any unauthorized person under any circumstances. The employees of the successful Eligible Bidder who are proposed to be deployed on the project need to furnish a Non-Disclosure Agreement (NDA) . The successful Eligible Bidder shall execute and maintain all copies of the Non-Disclosure Agreement (NDA) and shall produce it when sought by the BHEL. b. Official Secrets Act: The Eligible Bidders shall also abide all statutory requirements and all provisions of the Official Secrets Act 1923.
7	**Fraud and Corrupt Practices** a. The Eligible Bidders and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Selection Process. Notwithstanding anything to the contrary contained in this EOI, BHEL shall reject a Bid without being liable in any manner whatsoever to the Eligible Bidder, if it determines that the Eligible Bidder has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice (collectively the "Prohibited Practices") in the Selection Process. In such an event, BHEL shall, without prejudice to its any other rights or remedies, forfeit and appropriate the EMD or PBG, as the case may be, as mutually agreed genuine pre-estimated compensation and damages payable to BHEL for, inter alia, time, cost and effort of BHEL, in regard to the EOI, including consideration and evaluation of such Eligible Bidder's Bid. b. Without prejudice to the rights of BHEL under Clause above and the rights and remedies which BHEL may have under the contract agreement, if a Eligible Bidder is found by BHEL to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or

	restrictive practice during the Selection Process, or after the signing of the contract, such Eligible Bidder shall not be eligible to participate in any tender or EOI issued by BHEL during a period of 5 years from the date such Eligible Bidder is found by BHEL to have directly or through an agent, engaged or indulged in any Prohibited Practices. c. For the purposes of this Section, the following terms shall have the meaning hereinafter respectively assigned to them: i. *"corrupt practice"* means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of any person connected with the Selection Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of BHEL who is or has been associated in any manner, directly or indirectly with the Selection Process or the LOI or has dealt with matters concerning the Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of BHEL, shall be deemed to constitute influencing the actions of a person connected with the Selection Process); or (ii) save as provided herein, engaging in any manner whatsoever, whether during the Selection Process or after the issue of the LOA or after the execution of the Agreement, as the case may be, any person in respect of any matter relating to the Project or the Award or the Agreement, who at any time has been or is a legal, financial or technical consultant/adviser of BHEL in relation to any matter concerning the Project; ii. *"fraudulent practice"* means a misrepresentation or omission of facts or disclosure of incomplete facts, in order to influence the Selection Process; iii. *"coercive practice"* means impairing or harming or threatening to impair or harm, directly or indirectly, any persons or property to influence any person's participation or action in the Selection Process; iv. *"undesirable practice"* means (i) establishing contact with any person connected with or employed or engaged by BHEL with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or (ii) having a Conflict of Interest; and

	v. *"restrictive practice"* means forming a cartel or arriving at any understanding or arrangement among Eligible Bidders with the objective of restricting or manipulating a full and fair competition in the Selection Process.
8	**Conflict of Interest** a. An Eligible Bidder shall not have a conflict of interest that may affect the Selection Process or the Solution delivery (the "Conflict of Interest"). Any Eligible Bidder found to have a Conflict of Interest shall be disqualified. In the event of disqualification, BHEL shall forfeit and appropriate the EMD, if available, as mutually agreed genuine pre-estimated compensation and damages payable to BHEL for, inter alia, the time, cost and effort of BHEL including consideration of such Eligible Bidder's Bid, without prejudice to any other right or remedy that may be available to BHEL hereunder or otherwise. b. BHEL requires that the Eligible Bidder provides solutions which at all times hold BHEL's interests paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work. The Eligible Bidder shall not accept or engage in any assignment that would be in conflict with its prior or current obligations to other clients, or that may place it in a position of not being able to carry out the assignment in the best interests of BHEL.
9	**Sub-contracting** a. The Eligible Bidder shall not be allowed to sub-contract / outsource a task, to any vendor or organization not approved by the NSIL/ISRO for that task. b. Even if the work is sub-contracted / outsourced, the sole responsibility of the work shall lie with the Bidder. The Eligible Bidder shall be held responsible for any delay/error/non-compliance etc. of its sub-contracted vendor. c. The Bidder shall not sub-contract any part of the work to any entity that has been blacklisted by a Government Organization, Public Sector Undertaking (PSU), or State Government.
10	**Storage requirements of the materials and finished products** Few materials like filler wire for welding, aluminium alloy sheets, elastomer components ("O" rings, isolators etc.) shall be stored in humidity controlled

	environment. Proper tagging shall be implemented for all materials during storage for identification and retrieval. Storage requirements document shall be provided later.
11	**Non-conformance management and resolution of disputes** Non-conformance reports shall be prepared by QC agencies of the supplier clearly indicating observations/deviations during the processing, reason for occurrence and corrective mechanism proposed to avoid recurrence. A joint committee shall be constituted by NSIL for impact analysis and recommendations on rework or rejection along with approved corrective actions for future. The recommended rework or replacement will be within the scope of work. In order to review the nonconformance in real time so as to avoid delay in taking decisions, a Local Salvage Committee (LSC) shall be constituted with members from BHEL and NSIL resident engineer. In case any dispute arises, the same shall be referred to concerned Acceptance Review Committee and the decision of this committee shall be final.
12	**Rework Requirements after handing over the vehicle stage systems to NSIL** In case of any rework or replacement requirements of the Vehicle stage systems due to deviations from satisfactory performance subsequent to handing over to NSIL, supplier shall be responsible for necessary correction. No invoice for extra work/ change order on account of change order shall be submitted by supplier unless the said extra work/ change order has been authorized/ approved by BHEL.
13	**Key performance measurements** a. Unless specified by the NSIL/ISRO/BHEL to the contrary, supplier shall deliver the goods, perform the services and carry out the scope of work in accordance with the terms of this Contract, and global best practices of the industry. b. If the Contract, scheduled requirements, service specification includes more than one document, then unless the NSIL/ISRO/BHEL specifies to the contrary, the supplier shall comply with the stricter obligations prescribed.

	c. BHEL reserves the right to amend any of the terms and conditions in relation to the Contract/ Service Specifications and may issue any such directions which are not necessarily stipulated therein if it deems necessary for the fulfilment of the Schedule of Requirements.
14	**Other obligations** a. BHEL reserves the right to review the terms of the Warranty and Annual Maintenance agreements if any until the expiry of this contract, entered into between Supplier and other NSIL approved vendor and no such agreement/contract shall be executed, amended, modified and/or terminated without the prior written consent of the BHEL. An executed copy of each of such agreements/contracts shall, immediately upon execution be submitted by Supplier to BHEL. b. Supplier shall ensure that the supplier provides the support and assistance to BHEL in case of any problems / issues arising due to integration of components supplied by him with any other component(s)/ product(s) under the purview of the overall solution. c. The Supplier shall provide a detailed schedule in the Detailed Project Plan with respect to the activities that may be required to be carried out within ISRO premises to BHEL Location within fifteen (15) days of signing of this Agreement and shall inform BHEL at least seven working days before the scheduled activity. d. Supplier shall not publicize or advertise the work performed under the scope of work in any paper, electronic/ digital or any other media.
15	**Reporting progress** NSIL /ISRO/ BHEL reserves the right to inspect and monitor/ assess the progress/ performance of the work / services at any time during the course of the Contract. BHEL may demand and upon such demand being made, Supplier shall provide documents, data, material or any other information which the NSIL /ISRO/ BHEL may require, to enable it to assess the progress/ performance of the work / service.
16	**IPR** Supplier shall not copy, reproduce, translate, adapt, vary, modify, disassemble, decompile or reverse engineer or otherwise deal with or cause to reduce the value of the Materials except as expressly authorized by BHEL in writing.

Contact Details

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